SAN JOAQUIN VALLEY ENERGY POWER PLANT PROJECT (01-AFC-22) STAFF ASSESSMENT

EXECUTIVE SUMMARY 1

INTRODUCTION 2

PROJECT DESCRIPTION 3

ENVIRONMENTAL ASSESSMENT

- AIR QUALITY 4.1
- BIOLOGICAL RESOURCES 4.2
- CULTURAL RESOURCES 4.3
- HAZARDOUS MATERIALS 4.4
- LAND USE 4.5
- NOISE AND VIBRATION 4.6
- PUBLIC HEALTH 4.7
- SOCIOECONOMIC RESOURCES 4.8
- SOIL AND WATER RESOURCES 4.9
- TRAFFIC AND TRANSPORTATION 4.10
- TRANSMISSION LINE SAFETY AND NUISANCE 4.11
- VISUAL RESOURCES 4.12
- WASTE MANAGEMENT 4.13
- WORKER SAFETY 4.14

ENGINEERING ASSESSMENT

- FACILITY DESIGN 5.1
- GEOLOGY AND PALEONTOLOGY 5.2
- POWER PLANT EFFICIENCY 5.3
- POWER PLANT RELIABILITY 5.4
- TRANSMISSION SYSTEM ENGINEERING 5.5

ALTERNATIVES 6

GENERAL CONDITIONS 7

PREPARATION TEAM 8

EXECUTIVE SUMMARY

INTRODUCTION

This Staff Assessment (SA) contains the California Energy Commission staff's independent analyses and recommendations on the San Joaquin Valley Energy Center (SJVEC).

The SJVEC and related facilities such as the electric transmission lines, natural gas line, water supply lines and wastewater lines are under the Energy Commission's jurisdiction (Pub. Resources Code § 25500). When issuing a license, the Energy Commission acts as lead state agency (Pub. Resource Code § 25519(c)) under the California Environmental Quality Act (Pub. Resource Code §§ 21000 et seq.), and its process is functionally equivalent to the preparation of an environmental impact report (Cal. Code Regs., tit. 14 § 15251(k)).

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

This document includes staff's analysis of both the construction and operation of the proposed facility. The analyses contained in this SA were prepared in accordance with Public Resources Code Sections 25500 *et seq*.; the California Code of Regulations Title 20, Sections 1001 *et seq*.; and the California Environmental Quality Act (PRC §§ 21000 *et seq*.) and its guidelines (CCR title 14 §§ 15000 *et seq.*). This AFC was processed under the Commission's 6-month expedited AFC review process, as specified under PRC Section 25550.

This SA is not the decision document for these proceedings. It is preliminary in nature and represents draft conclusions at the staff level only. Staff intends to issue an addendum to the SA containing any updated information from the issuance of the Final Determination of Compliance by the San Joaquin Valley Air Pollution Control District, as well as an analysis of potential indirect impacts that could occur from the transmission line reconductoring that staff believes will be a reasonably foreseeable result of approving the project. Staff will also address any comments received on the SA in the addendum. This addendum will be published approximately one month from receipt of information from the Applicant concerning the reconductoring projects.

The Staff Assessment and the addendum 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 October 31, 2001, Central Valley Energy Center, LLC, a wholly owned subsidiary of Calpine Corporation, filed an AFC with the Energy Commission for a nominal 1,100 MW power plant called the Central Valley Energy Center. Because of potential conflict with a plant owned by Enron that has a similar name, Calpine later filed to change the name of the facility and the Applicant to the San Joaquin Valley Energy Center (SJVEC). San Joaquin Valley Energy Center, LLC (Applicant) proposes to construct and operate a natural-gas-fired combined-cycle generating facility with a 230-kilovolt (kV) switchyard and approximately 0.25 miles of new 230-kW transmission lines. The applicant's proposed site lies within an 85-acre parcel of land under the applicant's control, located in an industrial area at the southeastern edge of the City of San Joaquin, in Fresno County. The right-triangle-shaped site is bordered by W. Colorado Ave. to the northeast, W. Springfield Ave. to the south, and S. Colusa Ave. to the west. If built, the plant would occupy up to 25 acres near the center of the property, with the remainder available for lease as agricultural land. **PROJECT DESCRIPTION Figure 1** depicts the regional setting of the property.

The project would include its own switchyard, with a 230 kV transmission line extending southward approximately one-quarter mile to the south to connect with two PG&E transmission lines at the Helm Substation. Natural gas for the facility would be delivered via approximately 20 miles of new 24-inch pipeline connecting to Pacific Gas and Electric's (PG&E) existing gas transmission system on Manning Avenue near Interstate-5. The Applicant plans to supply the plant's cooling water requirements (roughly 4,600 acre-feet per year) with reclaimed water from the Fresno-Clovis Wastewater Treatment Facility via a 21-mile pipeline. The project as proposed includes a zero-liquid discharge system designed to eliminate off-site disposal of wastewater. Cooling water would be cycled three to eight times; wastewater would then be directed to a brine crystallizer. Sanitary wastewater from sinks and toilets would be discharged to the City of San Joaquin's municipal sewer system.

The project is estimated to have a capital cost of between $400 and $500 million. The applicant plans to begin construction in late 2002 and complete construction by the summer of 2004. The project would result in a peak of approximately 600 construction jobs over a 2-year period and up to 30 skilled operational positions throughout the life of the project.

PUBLIC AND AGENCY COORDINATION

In preparing the SA, Energy Commission staff conducted several publicly noticed workshops. These workshops were invaluable for bringing out comments of concerned citizens. Staff also has coordinated with relevant local, state and federal agencies, such as the California Independent System Operator (Cal-ISO), San Joaquin Valley Air Pollution Control District, U.S. Fish and Wildlife Service, California Department of Fish and Game, and the Central Valley Regional Water Quality Control Board.

Written or oral comments received from members of the public, and letters from agencies that require some form of response, have been included in this SA. No comments have been received from intervenors.

STAFF'S ASSESSMENT

Each technical area section of the SA contains a discussion of impacts and, where appropriate, mitigation measures and conditions of certification. The SA includes staff's assessments 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; and
- proposed conditions of certification.

OVERVIEW OF STAFF'S CONCLUSIONS

Environmental / System Impacts and LORS

Staff's analysis indicates that the project's environmental impacts can be mitigated to levels of less than significant in all areas. Staff's analysis also indicates that the project can be made to conform with all LORS. Below is a summary of the potential environmental impacts and LORS compliance for each technical area.

Technical Discipline	Environmental / System Impact	LORS Conformance
Air Quality	Impacts mitigated	Yes
Biological Resources	Impacts mitigated	Yes
Cultural Resources	Impacts mitigated	Yes
Power Plant Efficiency	N/A	N/A
Power Plant Reliability	N/A	N/A
Facility Design	N/A	Yes
Geology	Impacts mitigated	Yes
Hazardous Materials	Impacts mitigated	Yes
Land Use	Impacts mitigated	Yes
Noise	Impacts mitigated	Yes
Public Health	Impacts mitigated	Yes
Socioeconomics	Impacts mitigated	Yes
Traffic and Transportation	Impacts mitigated	Yes
Transmission Line Safety	Impacts mitigated	Yes
Transmission System Engineering	Impacts mitigated	Yes
Visual Resources	Impacts mitigated	Yes
Waste Management	Impacts mitigated	Yes
Water and Soils	Impacts mitigated	Yes
Worker Safety	Impacts mitigated	Yes

Staff has determined that, with the recommended mitigation, the construction and operation of the SJVEC would not create a significant impact to the environment, public health, or the electric transmission grid. However, staff's analysis uncovered several potential impacts that required additional mitigation measures, beyond those proposed by the Applicant, in order to eliminate, compensate or reduce them to a less-than-significant level. Staff has proposed additional mitigation in the areas of Air Quality, Land Use, Noise, and Visual Resources, as discussed below. Staff also determined that the project has the potential to create a potentially significant impact to the electric transmission system, and that about 42 miles of transmission line would require upgrading as a result of approval of the project in order to reduce the impact to a less-than-significant level. Each of these technical areas are briefly discussed below.

Air Quality

Because of the potential that the project could create a significant impact to air quality by emitting excessive emissions of particulate matter less than 10 microns in diameter (PM_{10}) during construction activities, staff has proposed that the project owner install continuous air emissions monitoring equipment up- and down-wind of the project during construction, in order to determine the project's contribution to total PM_{10} concentrations in the area. If the monitoring equipment shows that construction activities are creating measurable PM_{10} emissions above background levels, the owner will enact additional PM_{10} control measures, such as additional watering of disturbed areas. If these measures do not adequately lower PM_{10} emissions, the owner will continue enacting additional dust and construction equipment controls until the monitoring equipment indicates that the project is not creating PM_{10} emission levels above the background

reading. If, however, PM_{10} emissions are not lowered despite all additional actions taken, construction activities will cease until the problem can be controlled.

Land Use

Commission staff's analysis revealed that mitigation is now available for an impact that was recognized, but not mitigated, when the project site was transferred by the Local Area Formation Commission (LAFCO) from Fresno County to the sphere of influence of the City of San Joaquin. When the project site, along with several hundred acres nearby, was transferred into the City's sphere of influence, the County determined that a significant impact was created because of the potential that the LAFCO action would result in the conversion of several hundred acres of Prime Farmland to other uses. At the time, the County determined that although the action created a significant impact, no feasible mitigation was available to compensate for the loss of Prime Farmland.

The SJVEC Applicant intends to develop the project in a 25-acre area within an 85-acre parcel, and then return the balance of 60 acres to agricultural production by leasing the land to area farmers. Staff has determined that the project would result in the permanent conversion of 25 acres of Prime Farmland that was in cotton production as recently as two years ago, and that mitigation is now available for that conversion. Accordingly, staff has recommended a condition of certification that would require the project owner to pay a fee to a farmland trust, such as the American Farmland Trust, to compensate for the permanent conversion of farmland. These trusts use the fee money, plus other sources of funding, to buy Prime Farmland and ensure it remains in production in perpetuity.

Noise

Operation of the SJVEC has the potential to create significant noise impacts at several residences in unincorporated areas of Fresno County around the project site. Staff has determined that some residents would experience an increase in noise levels of as much as 20 dB during nighttime hours, when background noise levels are typically around 30 dB. To reduce this impact to a less-than-significant level, staff is recommending that the Applicant measure noise levels at the identified residences and enact feasible mitigation to ensure that noise levels caused by the power plant are lower than 40 dB at the residences. Staff determined that 40 dB is a reasonable noise standard for this project because it is located in a very quiet rural area, and because this level of noise is widely recognized as appropriate for quiet rural areas. Staff has specified that the Applicant first explore the feasibility of enacting the mitigation on the power plant site, through the use of super-quiet fans and motors, for example, to meet the performance standard. Only if the Applicant could show that the performance standard cannot feasibly be met through on-site mitigation would off-site mitigation be considered. Off-site noise mitigation could include installing sound insulation or double-pane windows at the residences, for example. This proposed noise mitigation was the subject of several workshops held for the purposes of allowing staff and the Applicant to discuss potential noise impacts that the project could create, and suitable mitigation to reduce the noise to a less-than-significant level. Staff and the Applicant were unable to reach agreement on the significance criteria for noise impacts, nor the suitable mitigation for addressing those impacts.

Transmission System Engineering

Based on comments from PG&E and the Independent System Operator, and on its own analysis, staff has determined that the operation of the SJVEC would likely require upgrading about 42 miles of transmission line. The Applicant disagrees with this conclusion, asserting that it would be able to profitably operate its project but avoid creating impacts to the transmission system merely by limiting plant output to a lower level during the Spring runoff period. The actual impacts, and the need for transmission system upgrades, will be identified later when PG&E and the Applicant complete a detailed facilities study. Because staff has determined that the reconductoring of 42 miles of transmission line is a reasonably foreseeable consequence of the approval of the project, it will conduct an additional analysis of the project's potential indirect environment impacts that would result from the reconductoring work. That analysis will appear as an appendix to the Transmission System Engineering section in the addendum to the Staff Assessment, which will be released approximately one month after receiving information from the Applicant concerning the identified reconductoring projects.

Visual Resources

Staff's analysis of the impacts that would occur from construction of the project revealed that there is potential for impacts to visual resources as viewed from several observation points in the area. To mitigate these potential impacts, Staff has recommended that the Applicant work with the City of San Joaquin to develop a plan for installing additional landscaping that would grow large enough and fast enough to mitigate these impacts by the fifth year of operation.

Environmental Justice

EPA guidelines on environmental justice state that if 50 percent of the population affected by a project has minority or low-income status, it must be determined if these populations are exposed to disproportionately high and adverse human health or environmental impacts. Although staff determined that a environmental justice population exists in the project area, there are no unmitigated impacts to the environmental or to public health that would be caused by construction or operation of the SJVEC. Therefore, staff has concluded that there is no potential for unmitigated or disproportional adverse impacts on an EJ population in the project area.

CONCLUSION AND RECOMMENDATIONS

Summarizing the items identified above, staff has concluded that, with implementation of Staff's proposed Conditions of Compliance, the project as proposed would not create significant environmental or system impacts, and would conform with all applicable LORS.

INTRODUCTION

PURPOSE OF THIS REPORT

The Staff Assessment (SA) presents the California Energy Commission staff's independent assessment of Calpine Corporation's Application for Certification (AFC) of the San Joaquin Valley Energy Center (SJVEC). The SA is a staff document. It is neither a Committee document, nor a draft decision or proposed decision. This document was prepared by Commission staff with input from various federal, state, regional and local agencies.

The SA describes the following:

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

The analyses contained in this SA are based upon information from: 1) the AFC; 2) subsequent submittals; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of “verification.” The verification is not part of the proposed condition, but is the Energy Commission Compliance Unit’s method of ensuring post-certification compliance with adopted requirements. The SA presents conclusions and proposed conditions of certification 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 (PRC) 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.). This project was submitted to the Commission under the 6-month expedited process, as described in PRC Section 25550. The 6-month process differs from the 12-month process in that the Commission

releases only a single Staff Assessment, rather than a Preliminary Staff Assessment (PSA) and a Final Staff Assessment (FSA). The 6-month process also has somewhat different scheduling requirements, such as the length of the comment period on the Commission's proposed decision.

ORGANIZATION OF THE STAFF ASSESSMENT

Following the Project Description, this SA contains staff's environmental, engineering, and public health and safety analysis of the proposed project for 19 technical areas. Each technical area is included in a separate chapter as follows: air quality, public health, worker safety and fire protection, transmission line safety and nuisance, hazardous materials management, waste management, land use, traffic and transportation, noise, visual resources, cultural resources, socioeconomics, biological resources, soild and water resources, geology and paleontology, facility design, power plant reliability, power plant efficiency, and transmission system engineering. These chapters are followed by a discussion of facility closure and project construction and operation compliance monitoring plans, and a chapter containing an evaluation of project alternatives.

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

- laws, ordinances, regulations and standards (LORS);
- the regional and site-specific setting;
- project specific and cumulative impacts;
- mitigation measures;
- 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), 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, §§ 1742 and 1742.5(a)). Staff's independent review shall be presented in a report (Cal. Code Regs., tit. 20 , § 1742.5).

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

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

Under the 6-month expedited process, staff typically prepares an SA and an addendum to the SA. The SA 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 SA to resolve issues between the parties and to narrow the scope of adjudicated issues for the evidentiary hearings. During the period between publishing the SA and the addendum, staff will conduct one or more workshops in the project vicinity to discuss the preliminary findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshops and written comments, staff will refine the analysis, correct any errors, and finalize conditions of certification. Responses to written comments on the SA will be incorporated into the addendum. The SA and the addendum serves as staff's testimony on the applicant's proposal.

The staff's 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). Under the 6-month expedited process, the PMPD is circulated for a minimum of 15 days following publication in order to receive written public comments. At the close of the comment period, the PMPD is submitted to the full Energy Commission for consideration. The Commission generally takes the PMPD under advisement for no less than 30 days before releasing the final decision on whether to grant a license authorizing construction and operation of the facility. Within 30 days of the Energy Commission decision, any

party may request reconsideration of the decision by the Energy Commission, or challenge the decision in court.

A Compliance Monitoring Plan and General Conditions will be assembled from conditions contained in the SA and other evidence presented at the hearings. As part of the requirements for projects processed under the 6-month expedited review process, one of the conditions in the SA requires that the project owner commence substantial construction of the project within one year of receiving approval from the Commission. 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. Staff's proposed Compliance Monitoring Plan and General Conditions are included at the end of the SA.

PUBLIC AND AGENCY COORDINATION

In preparing the SA, Energy Commission staff conducted several publicly noticed meetings or workshops. These workshops were invaluable for bringing out comments of agencies and concerned citizens. One of the public meetings was a scoping meeting held in San Joaquin, California on February 7, 2002, to gather information and take comments from local residents and governmental officials concerning the scope of Staff's review of the AFC. Scoping provides anybody who is interested the opportunity to identify any issues of concern to inform the Energy Commission about potential environmental impacts, offer suggestions to improve the proposal, and suggest alternative actions.

Staff also held a series of publicly noticed workshops to address various issues of concern uncovered during the AFC review process. The first of these was held in San Joaquin on March 7, followed by several more workshops held in Sacramento. Staff, the Applicant and City of San Joaquin officials all conducted substantial outreach efforts for this project, including widespread distribution of the notices for the public meetings and workshops. For example, the City included copies of Staff's workshop and meeting notices in the water bills that were delivered to every household in San Joaquin. The Applicant also coordinated several events with the City to raise awareness of the project among the residents of the area, such as two town meetings conducted at the high school, in conjunction with barbecues prepared by local Little League baseball coaches and sponsored by the Applicant.

Staff also coordinated with relevant local, state and federal agencies, such as the California Independent System Operator, San Joaquin Valley Air Pollution Control District, U.S. Fish and Wildlife Service, California Department of Fish and Game, the Central Valley Regional Water Quality Control Board, the Native American Heritage Commission and the State Historic Preservation Office. This SA provides agencies and the general public an opportunity to review the Energy Commission staff's analysis of the proposed project.

Written comments received from agencies that require some form of response have been included in this SA.

AIR QUALITY

Testimony of William Walters and Lisa Blewitt

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 San Joaquin Valley Energy Center (SJVEC or Applicant), which will be located in the City of San Joaquin, Fresno County.

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

- whether the SJVEC is likely to conform with applicable Federal, State and San Joaquin Valley Air Pollution Control District air quality laws, ordinances, regulations and standards, as required by Title 20, California Code of Regulations, section 1744 (b);
- whether the SJVEC 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 SJVEC 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 (LORS)

FEDERAL

Under the Federal Clean Air Act, as codified in 40 CFR 52.21, there are two major components of air pollution control requirements for stationary sources, nonattainment New Source Review (NSR) and Prevention of Significant Deterioration (PSD). Nonattainment NSR is a permitting process for evaluation of those pollutants that violate federal ambient air quality standards. Conversely, PSD is a permitting process for evaluation of those pollutants that do not violate federal ambient air quality standards. The NSR analysis has been delegated by the U.S. Environmental Protection Agency (U.S. EPA) to the San Joaquin Valley Air Pollution Control District (SJVAPCD, or District). The U.S. EPA determines the conformance with the PSD regulations. The PSD requirements apply only to those projects (known as major sources) that exceed 250 tons per year for any pollutant, or any new facility or stationary source category that is listed in 40 CFR Part 52.21(b)(1)(i)(a), and that emits 100 tons or more per year of any criteria pollutant. A major modification at an existing major source that results in an emission increase of 100 ton per year for carbon monoxide (CO), 40 tons per year for oxides of nitrogen (NO_x), sulfur dioxide (SO_2) or volatile organic compounds (VOC), or 15 tons per year for particulate matter less than 10 microns in diameter (PM_{10}) will also be subject to PSD review. The entire program, including both nonattainment NSR and PSD reviews, is referred to as the federal NSR program.

Title V of the federal Clean Air Act requires states to implement and administer an operating permit program to ensure that large sources operate in compliance with the requirements included in 40 CFR Part 70. A Title V permit contains all of the requirements specified in different air quality regulations that affect an individual project. As a new major source, the SJVEC will require a Title V permit.

The SJVEC is also subject to the federal New Source Performance Standards (NSPS) for the combustion turbines (40 CFR 60 Subpart GG). This regulation has pollutant emission requirements that are less stringent than those that will be required by NSR requirements for best available control technology (BACT).

The U.S. EPA reviews and approves the SJVAPCD (District) regulations and has delegated to the SJVAPCD the implementation of the federal NSR, Title V, and NSPS programs. The District implements these programs through its own rules and regulations, which are, at a minimum, as stringent as the federal regulations. The U.S. EPA will complete the PSD permit. The Title V program, however, is administered by the District under Regulation XXX. In addition, the U.S. EPA has also delegated to the District the authority to implement the federal Clean Air Act Title IV "acid rain" program. The Title IV regulation requirements will include obtaining a Title IV permit prior to operation, the installation of continuous emission monitors to monitor acid deposition precursor pollutants, and obtaining Title IV allowances for emissions of SO_x. Regulation XXXI implements the federal Title IV program. Therefore, compliance with the District's rules and regulations will result in compliance with federal requirements.

STATE

The California State 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 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."

LOCAL

The proposed project is subject to the following San Joaquin Valley Air Pollution Control District (District) Rules and Regulations:

Rule 1080 – Stack Monitoring

This rule grants the Air Pollution Control Officer the authority to request the installation and use of continuous emissions monitors (CEM's), and specifies performance standards for the equipment and administrative requirements for record keeping, reporting, and notification.

Rule 1081 – Source Sampling

This rule requires adequate and safe facilities for use in sampling to determine compliance with emission limits, and specifies methods and procedures for source testing and sample collection.

Rule 1100 – Equipment Breakdown

This rule defines a breakdown condition, the procedures to follow if one occurs, and the requirements for corrective action, issuance of an emergency variance, and reporting. This rule is applied to the owner of any source operation with air pollution control equipment, or related operating equipment that controls air emissions, or continuous monitoring equipment.

Rule 2010 – Permits Required

This rule requires any person who is building, altering, replacing or operating any source that emits, may emit air contaminants, or may reduce emissions, to first obtain authorization from the District in the form of an Authority to Construct or a Permit to Operate. By the submission of an ATC application, GWF Energy LLC is complying with the requirements of the rule.

Rule 2201 – New and Modified Stationary Source Review Rule

The main function of the District's New Source Review Rule is to allow for the issuance of Authorities to Construct, Permits to Operate, the application of Best Available Control Technology (BACT) to new or modified permit source and to require the new permit source to secure emission offsets.

Section 4.1 – Best Available Control Technology

Best Available Control Technology is defined as: a) the mandatory performance levels that are contained in any State Implementation Plan and that have been approved by EPA; b) the most stringent emission limitation or control technique that has been achieved in practice for a class of source; or c) any other emission limitation or control technique that the District's Air Pollution Control Officer (APCO) finds is technologically feasible and is cost effective. BACT is required for NO_x, VOC, PM_{10} and SO_2 emissions from any new or modified emission unit that results in an emissions increase of 2 lb/day, and CO emissions that exceed 550 lb/day. In the case of SJVEC, BACT applies for NO_x, VOC, CO, SO_2, and PM_{10} emissions from all point sources of the project.

Section 4.2 – Offsets

Emissions offsets for new or modified sources are required when those sources exceed the following emission levels:

- Oxides of Nitrogen, NO_x – 10 tons/year
- Volatile Organic Compounds, VOC – 10 tons/year
- Carbon Monoxide, CO – 550 lbs/day
- PM10 – 80 lbs/day
- Sulfur Oxides, SO_x – 150 lbs/day

If constructed, the SJVEC would exceed all of the above emission levels, except SO_x; therefore, the District will require offsets for NO_x, VOC, CO and PM_{10}. The emission offsets provided shall be adjusted according to the distance of the offset from the project proposed site. The ratios are:

- Internal or on-site source – 1 to 1

- Within 15 miles of the same source – 1.2 to 1
- 15 miles or more from the source – 1.5 to 1

Section 4.2.5.3 allows for the use of interpollutant offsets (including PM_{10} precursors for PM_{10}) on a case-by-case basis, provided that the Applicant demonstrates that the emissions increase will not cause a violation of any ambient air quality standard. The ratio for interpollutant trading shall be based on an air quality analysis and shall be equal to or greater than the minimum offsetting requirement (the distance ratios) of this rule.

Section 4.3 – Additional Source Requirements

Rule 4.3.2.1 requires that a new source not cause, or make worse, the violation of an ambient air quality standard as demonstrated through analysis with air dispersion models.

Rule 4.3.3 requires that the Applicant of a proposed new major source demonstrate to the satisfaction of the District that all major stationary sources subject to emission limitations that are owned or operated by the Applicant or any entity controlling or under common control with the Applicant in California, are in compliance or on a schedule for compliance with all applicable emission limitations and standards.

Rule 2520 – Federally Mandated Operating Permits

Rule 2520 requires that a project owner file a Title V Operating Permit from EPA with the District within 12 months of commencing operation. A project is subject to this requirement if any of the following apply: the project is a major stationary source (under PSD definitions), it has the potential to emit greater than 100 tons per year of a criteria pollutant, any equipment permitted is subject to New Source Performance Standards, the project is subject to Title IV Acid Rain program, or the owner is required to obtain a PSD Permit from EPA. The Title V Permit application requires that the owner submit information on the operation of the air polluting equipment, the emission controls, the quantities of emissions, the monitoring of the equipment as well as other information requirements.

Rule 2540 – Acid Rain Program

A project greater than 25 megawatts (MW) and installed after November 15, 1990, must submit an acid rain program permit application to the District. The acid rain requirements will become part of the Title V Operating Permit (Rule 2520). The specific requirements for the SJVEC project will be discussed in the "Compliance with LORS – Local" later in this analysis.

Rule 4001 – New Source Performance Standards

Rule 4001 specifies that a project must meet the requirements of the Federal New Source Performance Standards (NSPS), according to Title 40, Code of Federal Regulations, Part 60, Chapter 1. Subpart GG, which pertains to Stationary Gas Turbines, requires that a project meet specific NO_x concentration limits, based on the heat rate of combustion. In addition, the SO_2 concentration shall be less than 150 parts per million by volume (ppmv) and the sulfur content of the fuel shall be no greater than 0.8 percent by weight.

Rule 4101 – Visible Emissions

Prohibits visible air emissions, other than water vapor, of more than No. 1 on the Ringelmann chart (20 percent opacity) for more than 3 minutes in any 1-hour.

Rule 4102 – Nuisance

Prohibits any emissions "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 person or public or which cause or have a natural tendency to cause injury or damage to business or property."

Rule 4201 – Particulate Matter Concentration

Limits particulates emissions from any source that emits or may emit dust, fumes, or total suspended particulate matter to less than 0.1 grain per dry standard cubic foot (gr/dscf) of gas calculated to 12 percent of carbon dioxide.

Rule 4202 – Particulate Matter Emission Rate

This rule limits particulate matter emissions for any source operation, which emits or may emit particulate matter emissions, by establishing allowable emission rates. Calculation methods for determining the emission rate based on process weight are specified.

Rule 4301 – Fuel Burning Equipment

Limits air contaminant emissions from fuel burning equipment used for the primary purpose of producing heat or power by indirect heat transfer to 0.1 gr/dscf of gas calculated to 12 percent of carbon dioxide, 200 lb/hr of SO_2 , 140 lb/hr of NO_x, and 10 lb/hr of combustion contaminants, which are defined as particulate matter discharged into the atmosphere from the burning of any kind of material containing carbon in a free or combined state.

Rule 4305 – Boilers, Steam Generators and Process Heaters

Limits NO_x and CO concentrations to no greater than 30 parts per million by volume dry (ppmvd) or (0.036 pounds-per-million British thermal units, lb/MMBtu) and 400 ppm, respectively.

Rule 4351 – Boilers, Steam Generators, and Process Heaters – Reasonably Available Control Technology

This rule limits emissions of oxides of nitrogen (NO_x) from boilers, steam generators, and process heaters with rated heat inputs greater than 5 million Btu per hour that are fired with gaseous and/or liquid fuels, and are included as a major NO_x source, to levels consistent with reasonably available control technology (RACT). This rule limits the NO_x emission and CO emissions to 90 ppm and 400 ppm at 3 percent O_2, respectively, when firing gaseous fuels. The SJVEC duct burners and auxiliary boiler are subject to this rule.

Rule 4701 – Stationary Internal Combustion Engines

Limits NO_x, CO and VOC emissions from internal combustion engines rated greater than 50 bph that require a Permit to Operate. Since the emergency generator and fire water pump proposed for this project will be limited to 200 hours per year of non-emergency operation, they are exempt from this rule.

Rule 4703 – Stationary Gas Turbines

Establishes requirements for monitoring and record keeping for NO_x and CO emissions from new or modified stationary gas turbines with a designed power of 0.3 MW or higher. According to this rule, at 15 percent O_2, NO_x and CO concentrations must be less than 9 ppm and 200 ppm, respectively.

Rule 4801 – SO_2 Concentration

Limits the emissions of sulfur compounds to no greater than 0.2 percent by volume calculated as SO_2 on a dry basis.

Rule 7012 – Hexavalent Chromium – Cooling Towers

This rule limits emissions of hexavalent chromium from circulating water in cooling towers and prohibits the use or sale of products containing these compounds for treating cooling tower water. Record keeping and monitoring requirements, test methods for determining emission concentration limits, and an implementation schedule are specified.

Rule 8011 – General Requirements

Specifies the types of chemical stabilizing agents and dust suppressant materials that can (and cannot) be used to minimize fugitive dust from anthropogenic (man-made) sources. The rule also specifies test methods for determining compliance with visible dust emission (VDE) standards, stabilized surface conditions, soil moisture content, silt content for bulk materials, silt content for unpaved roads and unpaved vehicle/equipment traffic areas, and threshold friction velocity (TFV). Records shall be maintained only for those days that a control measure was implemented, and kept for one year following project completion to demonstrate compliance. A fugitive dust management plan for unpaved roads and unpaved vehicle/equipment traffic areas is discussed as an alternative for Rule 8061 and Rule 8071.

Rule 8021 – Construction, Demolition, Excavation, Extraction and Other Earthmoving Activities

Requires fugitive dust emissions throughout construction activities (from pre-activity to active operations and during periods of inactivity) to comply with the conditions of a stabilized unpaved road surface and to not exceed an opacity limit of 20 percent, by means of water application, chemical dust suppressants, or constructing and maintaining wind barriers. A Dust Control Plan is also required and shall be submitted to the Air Pollution Control Officer (APCO) at least 30 days prior to the start of any construction activities on any site that include 40 acres or more of disturbed surface area, or will include moving more than 2,500 cubic yards per day of bulk materials on at least three days.

Rule 8031 – Bulk Materials

Limits the fugitive dust emissions from the outdoor handling, storage and transport of bulk materials. Requires fugitive dust emissions to comply with the conditions of a stabilized unpaved road surface and to not exceed an opacity limit of 20 percent. It specifies that bulk materials be transported using wetting agents, allow appropriate freeboard space in the vehicles, or be covered. It also requires that stored materials be covered or stabilized.

Rule 8041 – Carryout and Trackout

Limits carryout and trackout during construction, demolition, excavation, extraction, and other earthmoving activities (Rule 8021), from bulk materials handling (Rule 8031), and from unpaved vehicle and equipment traffic areas (Rule 8071) where carryout has occurred or may occur. Specifies acceptable (and unacceptable) methods for cleanup of carryout and trackout.

Rule 8051 – Open Areas

Requires fugitive dust emissions from any open area having 3.0 acres or more of disturbed surface area, that has remained undeveloped, unoccupied, unused, or vacant for more than seven day to comply with the conditions of a stabilized unpaved road surface and to not exceed an opacity limit of 20 percent, by means of water application, chemical dust suppressants, paving, applying and maintaining gravel, or planting vegetation.

Rule 8061 – Paved and Unpaved Roads

Specifies the width of paved shoulders on paved roads and guidelines for medians. Requires gravel, roadmix, paving, landscaping, watering, and/or the use of chemical dust suppressants on unpaved roadways to prevent exceeding an opacity limit of 20 percent. Exemptions to this rule include “any unpaved road segment with less than 75 vehicle trips for that day.”

Rule 8071 – Unpaved Vehicle/Equipment Traffic Areas

This rule intends to limit fugitive dust from unpaved vehicle and equipment traffic areas one acre or larger by using gravel, roadmix, paving, landscaping, watering, and/or the use of chemical dust suppressants to prevent exceeding an opacity limit of 20 percent. Exemptions to this rule include “unpaved vehicle and equipment traffic areas on any day which less than 75 vehicle trips occur.”

Rule 8081 – Agricultural Sources

This rule intends to limit fugitive dust from off-field agricultural sources exempted from Rules 8031 (Bulk Materials), 8061 (Paved and Unpaved Roads), and 8071 (Unpaved Vehicle/Equipment Traffic Areas). Requires fugitive dust emissions to comply with the conditions of a stabilized surface and to not exceed an opacity limit of 20 percent.

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, but also 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 7 inches of rain annually.

Temperature, wind speed, and wind direction data have been collected at the Lemoore Naval Air Station (NAS). The predominant wind direction in the project area is from the north through west-northwest. The wind speeds are higher during the spring, summer, and fall.

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 1**. As indicated in this table, the averaging times for the various air quality standards (the duration over which they are measured) range from 1-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 $\mu g/m^3$).

AIR QUALITY Table 1
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	1 Hour	0.12 ppm (235 μg/m^3)	0.09 ppm (180 μg/m^3)
	8 Hour	0.08 ppm (160 μg/m^3)	—
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9 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	0.03 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 (PM_{10})	Annual Geometric Mean	—	30 μg/m^3
	24 Hour	150 μg/m^3	50 μg/m^3
	Annual Arithmetic Mean	50 μg/m^3	—
Fine Particulate Matter ($PM_{2.5}$) [a]	Annual Arithmetic Mean	15 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	—	0.010 ppm (26 μg/m^3)
Visibility Reducing Particulates	1 Observation (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.

Note(s):
a. Recent court decisions have delayed the implementation of the $PM_{2.5}$ standards.

The 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 SJVEC is located in Fresno County and, as stated above, is under the jurisdiction of the San Joaquin Valley Air Pollution Control District. This area is designated as nonattainment for both the federal and state ozone and PM_{10} standards. **AIR QUALITY Table 2** summarizes federal and state attainment status of criteria pollutants for Fresno County.

AIR QUALITY Table 2
Federal and State Attainment Status for Fresno County

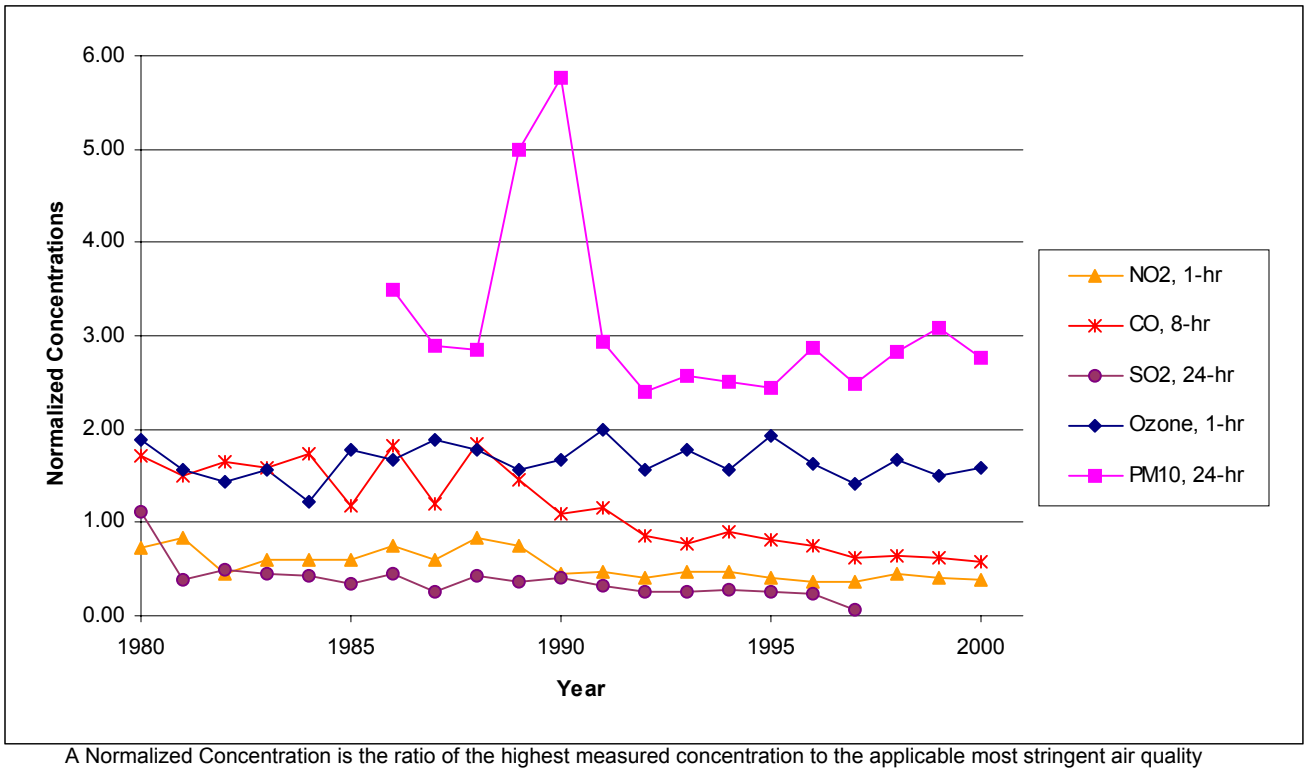
Pollutant	Attainment Status	
	Federal	**State**
Ozone – One hour	Severe Nonattainment [a]	Severe Nonattainment
CO	Unclassified/Attainment [b]	Attainment
NO_2	Unclassified/Attainment [b]	Attainment
SO_2	Unclassified	Attainment
PM_{10}	Serious Nonattainment	Nonattainment
Lead	No Designation	Attainment

Source: 40 CFR 81 and SJVAPCD web site (www.valleyair.org/aqinfo/attainment.htm)
a. Region 9 News Release San Francisco, CA, "U.S. EPA Downgrades San Joaquin Valley Air," October 23, 2001 (Ozone).
b. Unclassified/Attainment – The attainment status for the subject pollutant is classified as either attainment or unclassified.

The project site is in Fresno County, in the southeastern portion of the City of San Joaquin. The monitoring station closest to the proposed project site is the Fresno-Drummond Street Station. There are also several other monitoring stations in Fresno, Hanford and Corcoran that are representative of area-wide ambient conditions. Additional SO_2 data from Bakersfield is required, since the Fresno stations stopped measuring SO_2 concentrations after 1997.

AIR QUALITY Figure 1 summarizes the historical air quality data for the project location, recorded at the Fresno Olive Street (1980-1989) and Fresno 1st Street (1990-2000) air monitoring stations for ozone, PM_{10}, NO_2, CO, SO_2 and $PM_{2.5}$. In **AIR QUALITY Figure 1**, the short term normalized concentrations are provided from 1980 to 2000. 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
Fresno Olive Street (1980-1989) and Fresno 1st Street (1990-2000)



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 1-hour average ozone concentration measured in Fresno was 0.135 ppm. Since the most stringent ambient air quality standard is the state standard of 0.09 ppm, the 1999 normalized concentration is 0.135/0.09 = 1.50.
Source: (CARB 2000).

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

Ozone

In the presence of ultraviolet radiation, both NO_x and VOC go through a number of complex chemical reactions to form ozone. **AIR QUALITY Table 3** summarizes the best representative ambient ozone data collected from three different monitoring stations close to the project site. The table includes the maximum 1-hour and 8-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 San Joaquin Valley air basin is classified as an extreme nonattainment area for ozone because it violates both National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS).

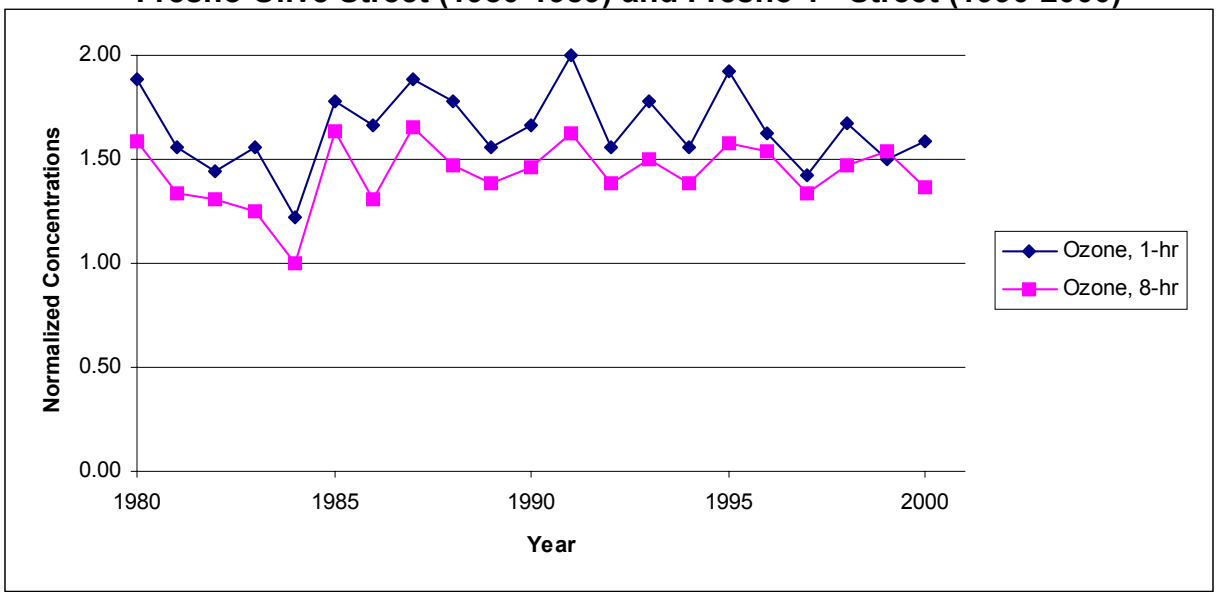
AIR QUALITY Table 3
Ozone Air Quality Summary, 1991-2000 (ppm)

Year	Fresno 1st Street				Fresno Drummond Street				Hanford S. Irwin Street			
	Days Above CAAQS 1-Hr	Max. 1-Hr Avg.	Days Above NAAQS 8-Hr	Max. 8-Hr Avg.	Days Above CAAQS 1-Hr	Max. 1-Hr Avg.	Days Above NAAQS 8-Hr	Max. 8-Hr Avg.	Days Above CAAQS 1-Hr	Max. 1-Hr Avg.	Days Above NAAQS 8-Hr	Max. 8-Hr Avg.
1991	76	0.180	72	0.130	44	0.150	34	0.118	---	---	---	---
1992	56	0.140	42	0.111	44	0.140	30	0.100	---	---	---	---
1993	59	0.160	54	0.120	27	0.150	17	0.107	---	---	---	---
1994	56	0.140	51	0.111	17	0.114	6	0.092	9	0.119	12	0.102
1995	65	0.173	53	0.126	20	0.120	9	0.097	2	0.096	1	0.085
1996	59	0.146	49	0.123	45	0.154	34	0.122	78	0.144	81	0.121
1997	30	0.128	23	0.107	19	0.131	11	0.099	23	0.126	26	0.106
1998	46	0.151	44	0.118	49	0.148	41	0.115	27	0.143	31	0.113
1999	53	0.135	45	0.123	38	0.132	28	0.108	28	0.140	25	0.111
2000	48	0.143	41	0.109	37	0.131	24	0.104	48	0.124	51	0.110

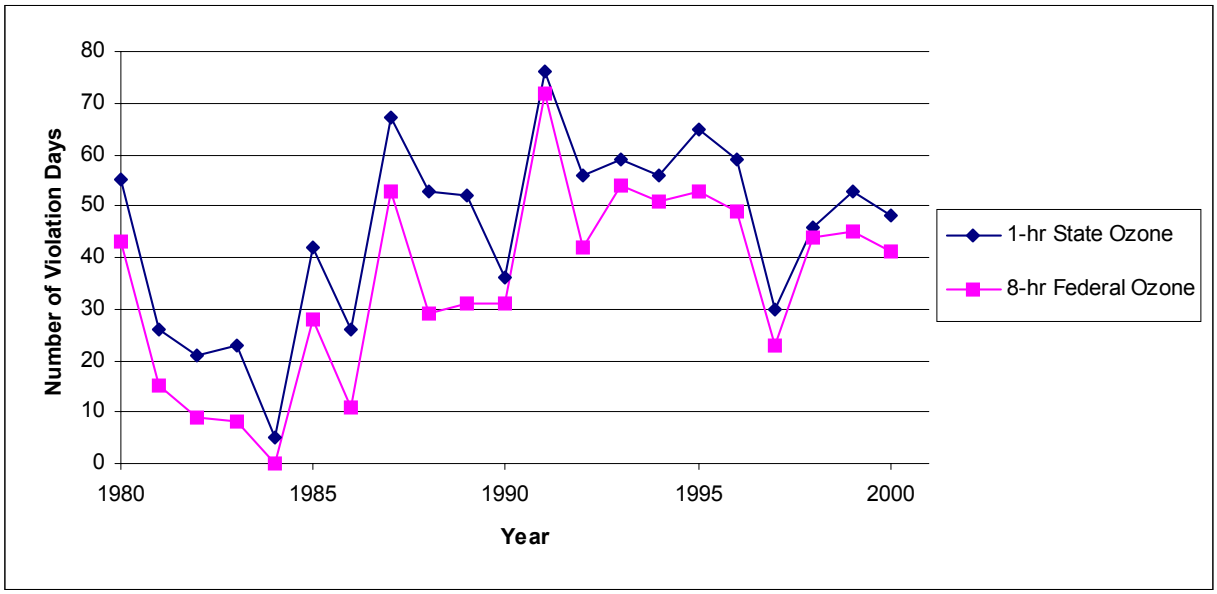
California Ambient Air Quality Standard (CAAQS): 1-Hr, 0.09 ppm
National Ambient Air Quality Standard (NAAQS): 1-Hr, 0.12 ppm; 8-Hr, 0.08 ppm
Source: CARB web site, http://www.arb.ca.gov/adam/, Accessed November 2001.
Source: CARB Air Quality Data CD, November 2000 (1980-1999).

The year 1980 to 2000 trends for the maximum 1-hour and 8-hour ozone concentrations, referenced to the most stringent standard, and the number of violations of the California 1-hour standard and the Federal 8-hour standard for the Fresno Olive Street (1980-1989) and Fresno 1st Street (1990-2000) monitoring stations are shown in **AIR QUALITY Figure 2** and **Figure 3**, respectively.

AIR QUALITY Figure 2
Normalized Ozone Air Quality Maximum Concentration
Fresno Olive Street (1980-1989) and Fresno 1st Street (1990-2000)



AIR QUALITY Figure 3
Ozone Air Quality Violations
Fresno Olive Street (1980-1989) and Fresno 1st Street (1990-2000)



As these two figures show, since the 1-hour ozone concentrations peaked in 1991 there has been an overall gradual downward trend for both maximum ozone concentrations and the number of violations of air quality standards.

Inhalable Particulate Matter (PM_{10})

As **AIR QUALITY Table 4** indicates, the project area annually experiences a number of violations of the state 24-hour PM_{10} standard. The federal 24-hour standard, however, is generally met. Annual average PM_{10} levels are above the state standard, except for 1998. Annual average PM_{10} levels are generally above the federal standard. The San Joaquin Valley air basin is considered to be in nonattainment of both federal and state PM_{10} standards.

PM_{10} 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 matters 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 PM_{10}, and should be even a higher contributor to particulate matter of less than 2.5 microns ($PM_{2.5}$). 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 would even more significant.

The air agencies in California are now deploying $PM_{2.5}$ ambient air quality monitors throughout the state. $PM_{2.5}$ ambient air quality attainment plans, if needed, are due to the U.S. EPA by 2005.

The highest PM concentrations are measured in the winter. During wintertime high PM episodes, the contribution of ground level releases to ambient PM concentrations is disproportionately high. The contribution of wood-smoke particles to the $PM_{2.5}$ concentrations may be even higher, considering that most of the wood-smoke particles are smaller than 2.5 microns.

AIR QUALITY Table 4

PM_{10} Air Quality Summary, 1991-2000 ($\mu g/m^3$)

Year	Fresno 1st Street				Fresno Drummond Street				Hanford S. Irwin Street			
	Days * Above CAAQS	Max. Daily Avg.	Annual Geo. Mean	Annual Arith. Mean	Days * Above CAAQS	Max. Daily Avg.	Annual Geo Mean	Annual Arith. Mean	Days * Above CAAQS	Max. Daily Avg.	Annual Geo Mean	Annual Arith. Mean
1991	174	147	47.7	60.0	174	152	52.1	66.1	---	---	---	---
1992	114	120	44.0	48.8	162	116	47.5	52.1	---	---	---	---
1993	132	129	37.5	46.7	150	152	44.3	53.0	36	192	69.8	---
1994	48	125	33.8	39.0	150	127	43.2	49.7	156	116	44.3	50.1
1995	136	122	37.9	44.5	138	126	40.0	48.8	150	185	43.6	52.9
1996	57	144	33.0	37.0	84	121	33.8	39.3	105	120	34.7	40.8
1997	72	124	37.1	42.6	108	121	41.5	46.7	102	143	41.3	46.2
1998	60	141	27.1	33.7	84	132	31.2	39.3	90	146	29.8	39.2
1999	114	154	35.8	44.6	108	162	42.1	53.1	102	143	41.6	53.4
2000	66	138	33.5	40.3	114	130	39.6	42.7	102	119	41.9	49.0

California Ambient Air Quality Standard: 24-Hr, 50 $\mu g/m^3$; Annual Geometric, 30 $\mu g/m^3$
National Ambient Air Quality Standard: 24-Hr, 150 $\mu g/m^3$; Annual Arithmetic, 50 $\mu g/m^3$
Source: CARB web site, http://www.arb.ca.gov/adam/, Accessed November 2001.
Source: CARB Air Quality Data CD, November 2000 (1980-1999).

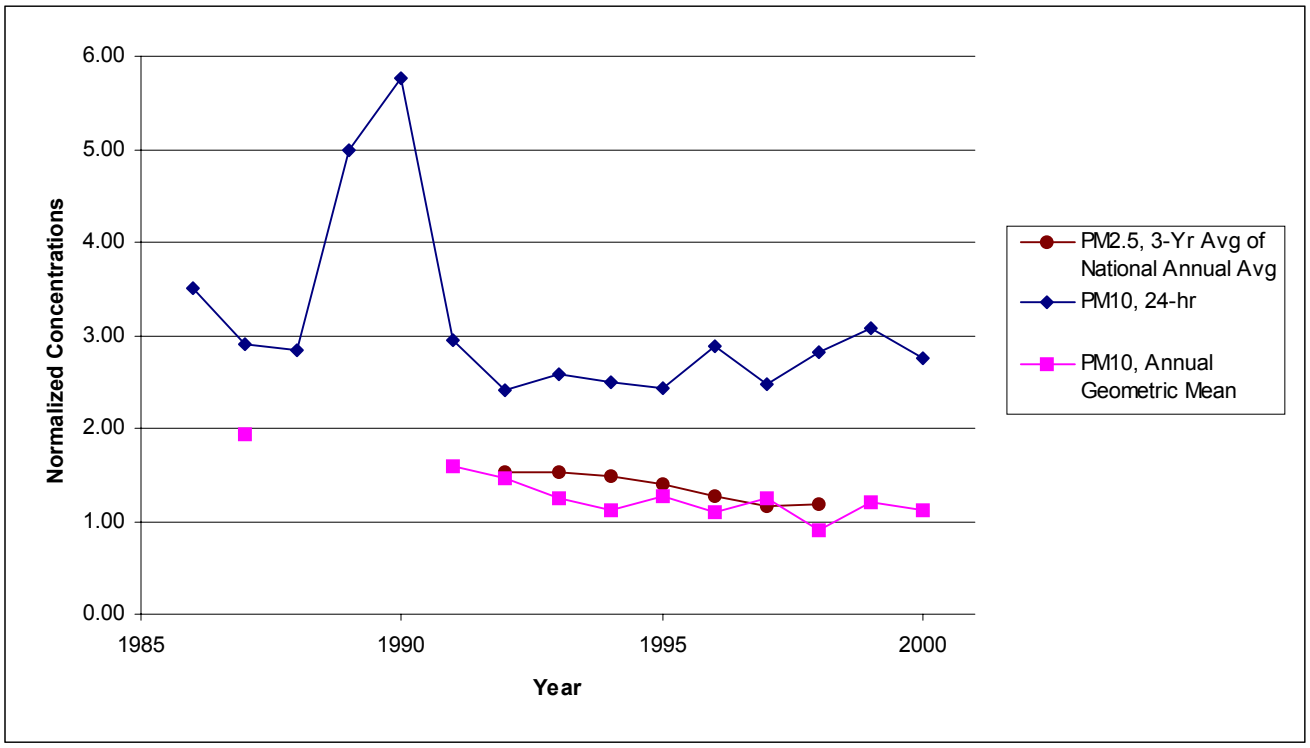
* Days above the state standard (calculated): Because PM_{10} is monitored approximately once every six days, the potential number of violation days is calculated by multiplying the actual number of days of violations by six.

The year 1986 to 2000 trends for the maximum 24-hour PM_{10}, Annual Geometric Mean PM_{10} and 3-Year Average of Annual Arithmetic Mean $PM_{2.5}$ concentrations, referenced to the most stringent standard, and the number of violations of the California 24-hour PM_{10} standard for the Fresno Olive Street (1986-1989) and Fresno 1st Street (1990-2000) monitoring stations are shown in **Air Quality Figure 4** and **Figure 5**, respectively.

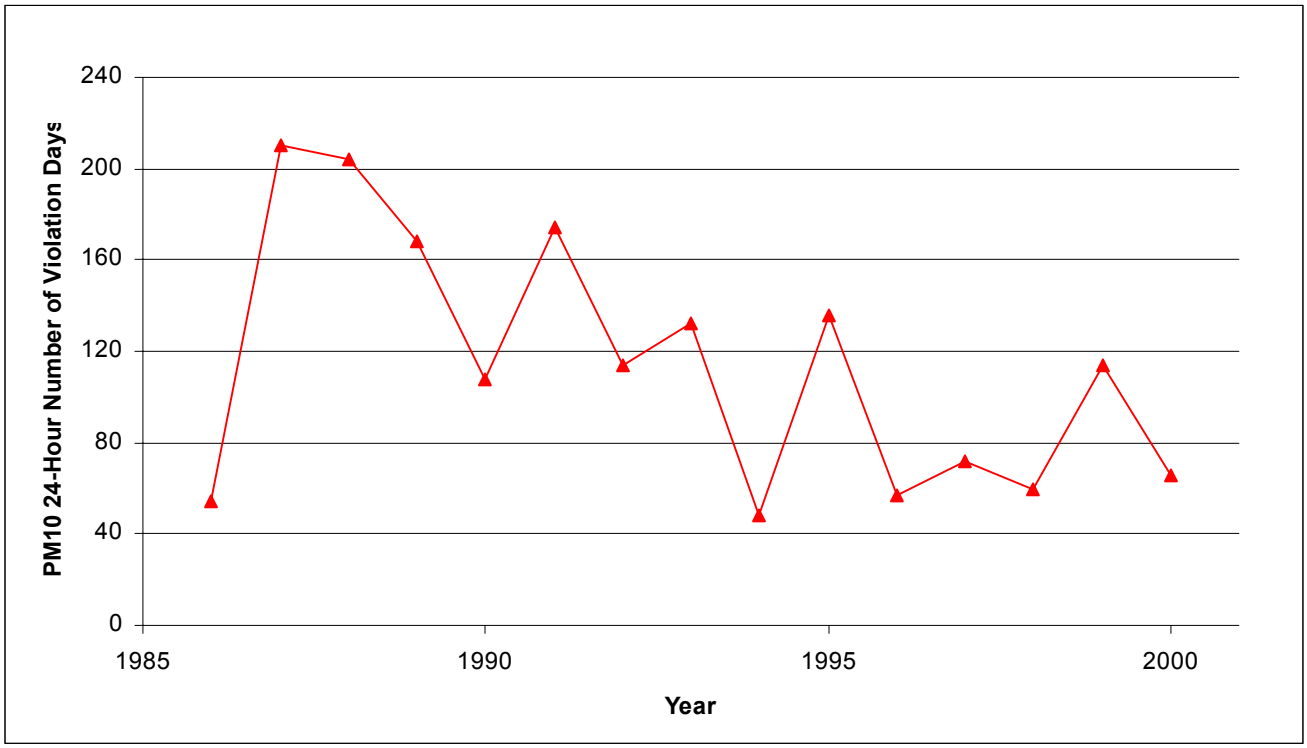
As the two figures show, there is an overall gradual downward trend for both maximum 24-Hour PM_{10} concentrations and Annual Geometric Mean PM_{10} concentrations.

As these two figures show there is an overall gradual downward trend for Annual Geometric Mean PM_{10} concentrations, maximum 24-Hour PM_{10} concentrations and number of violations of the California 24-Hour Standard.

AIR QUALITY Figure 4
Normalized PM_{10} and $PM_{2.5}$ Air Quality Maximum Concentrations
Fresno Olive Street (1980-1989) and Fresno 1st Street (1990-2000)



AIR QUALITY Figure 5
PM_{10} 24-Hour Air Quality Violations
Fresno Olive Street (1980-1989) and Fresno 1st Street (1990-2000)



Inhalable Particulate Matter ($PM_{2.5}$)

As **AIR QUALITY Table 5** indicates, the 98th percentile 24-hour average $PM_{2.5}$ concentration levels have been declining and are below the proposed NAAQS of 65 $\mu g/m^3$. The 3-year average of annual arithmetic means (national annual average) continues to decline through the 1990s, but remains higher than the proposed NAAQS of 15 $\mu g/m^3$ as shown in **AIR QUALITY Figure 4**. Attainment for $PM_{2.5}$ will be based on the entire air basin. If attainment classification were to take effect now using current ambient air quality data, the SJVAB would be found to be in non-attainment. However, the $PM_{2.5}$ standards will not take effect until the legal challenges of these standards have been resolved.

AIR QUALITY Table 5

$PM_{2.5}$ Air Quality Summary, 1991-1998 ($\mu g/m^3$) [a]

Year	Fresno 1st Street					Corcoran Van Dorsten Avenue (V) and Patterson Avenue (P)					
	Max. Daily Avg.	98th Percentile of Max. Daily Avg.	3-Yr. Avg. 98th Percentile of Max. Daily Avg.	National Annual Avg.	3-Yr. Avg. of National Annual Avg.	V or P	Max. Daily Avg.	98th Percentile of Max. Daily Avg.	3-Yr. Avg. 98th Percentile of Max. Daily Avg.	National Annual Avg.	3-Yr. Avg. of National Annual Avg.
1991	92	91.9	---	25.9	---	V	111	111.1	107	21.3	18.1
1992	71	68.0	79	21.6	23.0	V	81	81.0	102	22.8	22.2
1993	92	74.0	78	21.5	23.0	V	72	64.0	85	17.8	20.6
1994	80	68.0	70	23.2	22.1	V	77	69.0	71	18.4	19.7
1995	65	61.0	68	18.0	20.9	V	53	49.0	61	19.3	18.5
1996	56	41.0	57	15.9	19.0	V	63	37.0	52	13.0	16.9
						P	22	22.0	---	---	---
1997	105	65.0	56	18.7	17.5	V	63	38.0	41	14.5	15.6
						P	60	38.0	---	13.7	---
1998	88	52.0	53	19.2	17.9	V	24	24.0	33.0	10.0	12.5
						P	87	55.0	38.3	14.0	---

National Ambient Air Quality Standard: 3-Year Average - 98th Percentile of 24-Hr Avg. Concentrations, 65 $\mu g/m^3$;
3-Year Average of Annual Arithmetic Mean (National Annual Average), 15 $\mu g/m^3$
Source: CARB web site, http://www.arb.ca.gov/adam/, Accessed November 2001.
Note(s):
a. Incomplete data is available for 1999. No data is available for 2000.

Carbon Monoxide (CO)

As **AIR QUALITY Table 6** shows, the maximum one-hour and eight-hour CO concentrations in the Fresno 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 source 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 various Fresno air monitoring stations, there have been no violations of California Ambient Air Quality Standards or National Ambient Air Quality Standards since 1991 (one day the entire year) for the one-hour and the eight-hour CO standards (see **AIR QUALITY Table 6**).

The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level in what is known as the stable boundary layer. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. 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 morning and afternoon. Carbon monoxide concentrations in Fresno 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 compliance with the CO ambient air quality standards.

AIR QUALITY Table 6
CO Air Quality Summary, 1991-2000 (ppm)

Year	Fresno 1st Street		Fresno Drummond Street		Fresno Sierra Skypark #2	
	Maximum 1-Hr Average	Maximum 8-Hr Average	Maximum 1-Hr Average	Maximum 8-Hr Average	Maximum 1-Hr Average	Maximum 8-Hr Average
1991	15.0	10.38	10.0	7.88	7.0	3.43
1992	13.0	7.63	9.0	7.00	5.0	3.14
1993	11.0	6.88	8.0	5.25	5.0	2.71
1994	11.9	8.10	9.6	6.04	4.9	3.23
1995	10.3	7.28	6.4	4.80	3.8	2.49
1996	10.0	6.83	6.0	4.40	4.3	3.72
1997	8.7	5.69	6.3	4.10	4.1	2.83
1998	9.0	5.88	6.6	4.44	3.8	2.61
1999	8.7	5.53	11.9	4.89	3.5	2.29
2000	---	5.24	---	3.53	---	2.19

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
Source: CARB web site, http://www.arb.ca.gov/adam/, Accessed November 2001.
Source: CARB Air Quality Data CD, November 2000 (1980-1999).

Nitrogen Dioxide (NO_2)

As shown in **AIR QUALITY Table 7** the maximum one-hour and annual concentrations of NO_2 at the Fresno and Kings County air monitoring stations are lower than California Ambient Air Quality Standards. Approximately 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 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) disperse pollutants, preventing the accumulation of NO_2 to levels approaching the 1-hour ambient air quality standard. The formation of NO_2 in the summer with the help of the 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 will 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 7
NO_2 Air Quality Summary, 1991-2000 (ppm)

Year	Fresno 1st Street		Fresno Drummond Street		Hanford S. Irwin Street	
	Maximum 1-Hr Average	Maximum Annual Average	Maximum 1-Hr Average	Maximum Annual Average	Maximum 1-Hr Average	Maximum Annual Average
1991	0.120	0.023	0.110	0.025	---	---
1992	0.100	0.020	0.100	0.023	---	---
1993	0.120	0.023	0.120	0.023	---	---
1994	0.119	0.022	0.099	0.023	0.082	0.015
1995	0.104	0.023	0.087	0.021	0.094	0.015
1996	0.093	0.021	0.109	0.021	0.066	0.014
1997	0.092	0.021	0.083	0.020	0.080	0.014
1998	0.112	0.020	0.088	0.020	0.086	0.014
1999	0.103	0.023	0.108	0.024	0.086	0.016
2000	0.094	0.021	0.083	0.020	0.072	0.014

California 1-Hr Ambient Air Quality Standard: 0.25 ppm
National Annual Ambient Air Quality Standard: 0.053 ppm
Source: CARB web site, http://www.arb.ca.gov/adam/, Accessed November 2001.
Source: CARB Air Quality Data CD, November 2000 (1980-1999).

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 combusted. By contrast fuels high in sulfur content such as lignite (a type of coal) emit very large amounts of SO_2 when combusted.

Sources of SO_2 emissions within the San Joaquin Valley air basin come from every economic sector and include a wide variety of fuels; gaseous, liquid and solid. The San Joaquin Valley air basin is designated attainment for all the SO_2 state and federal ambient air quality standards. **AIR QUALITY Table 8** shows the historic 1-hour, 24-hour and annual average SO_2 concentrations collected from three different monitoring stations close to the project site. As **AIR QUALITY Table 8** shows, concentrations of SO_2 are far below the state and federal SO_2 ambient air quality standards.

Visibility

The conditions of visibility in the region of the project site are dependent upon the relative humidity natural to the area 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.

AIR QUALITY Table 8
SO_2 Air Quality Summary, 1991-2000 (ppm)

Year	Fresno 1st Street			Bakersfield 5558 California Avenue		
	Maximum 1-Hr Avg.	Maximum 24-Hr Avg.	Annual Average	Maximum 1-Hr Avg.	Maximum 24-Hr Avg.	Annual Average
1991	0.030	0.0130	0.0036	---	---	---
1992	0.030	0.0100	0.0021	---	---	---
1993	0.010	0.0100	0.0024	---	---	---
1994	0.017	0.0115	0.0039	0.020	0.0067	0.0027
1995	0.014	0.0105	0.0037	0.026	0.0149	0.0028
1996	0.015	0.0095	0.0021	0.059	0.0105	0.0022
1997	0.010	0.0026	0.0004	0.011	0.004	0.0020
1998	---	---	---	---	---	---
1999	---	---	---	0.011	0.0063	0.0032
2000	---	---	---	---	0.003	0.003

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
Source: CARB web site, http://www.arb.ca.gov/adam/, Accessed November 2001.
Source: CARB Air Quality Data CD, November 2000 (1980-1999).

The San Joaquin Valley Air Basin is currently designated as unclassified for visibility reducing particles.

Summary

In summary, staff recommends the background ambient air concentrations in **AIR QUALITY Table 9** for the modeling and impacts analysis. The maximum criteria pollutant concentration from the past three years (1998-2000) from the following representative monitoring stations are used to determine the background value: Fresno - 1st Street, Fresno - Drummond Street, Fresno - Sierra Skypark #2, Hanford - S. Irwin Street, Corcoran - Van Dorsten Avenue, Corcoran - Patterson Avenue, and Bakersfield - 5558 California Avenue.

The project site is located at the southern edge of the town of San Joaquin in a predominately rural area between the I-5 freeway and Hwy 99. Where possible the recommended background concentrations come from nearby monitoring stations with similar characteristics. Monitoring stations located within larger urban areas were not considered representative of this site. The recommended ozone, NO_2, and PM_{10} background concentrations are from the Hanford S. Irwin Street monitoring station. The recommended CO background concentrations are from the Fresno Sierra Skypark #2 monitoring station. The recommended SO_2 background concentration is from the

Bakersfield monitoring site, which is the only monitoring site within the SJVAB to have monitoring data within the last three years.

AIR QUALITY Table 9
Staff Recommended Background Concentrations for SJVEC (ppm)

Pollutant	Averaging Time	1998	1999	2000	Most Restrictive Ambient Air Quality Standard
Ozone	1 hour	0.143	0.140	0.124	0.09
	8 hour	0.113	0.111	0.110	0.08
PM_{10} ($\mu g/m^3$)	24 hours	**146**	143	119	50
	Annual Geometric Mean	29.8	41.6	**41.9**	30
	Annual Arithmetic Mean	39.2	53.4	49.0	50
NO_2	1 hour	0.086	**0.086**	0.072	0.25
	Annual	0.014	**0.016**	0.014	0.053
CO	1 hour	**3.8**	3.5	---	20
	8 hour	**2.61**	2.29	2.19	9
SO_2	1 hour	---	**0.011**	---	0.25
	3 hour [b]	---	**0.010**	---	0.5
	24 hours	---	**0.0063**	0.003	0.04
	Annual	---	**0.0032**	0.003	0.03

Note(s):
a. Bold values are the background concentrations used throughout the following air quality analysis.
b. 3-hour SO_2 value assumed to equal 90% of 1-hour SO_2 value.

PROJECT DESCRIPTION AND EMISSIONS

CONSTRUCTION

The SJVEC would include the following major elements at the project site:

- Three Siemens-Westinghouse 501FD (or equivalent) combustion turbine generators with duct-fired heat recovery steam generators (HRSG) driving one steam turbine generator (STG).
- A 16-cell cooling tower using reclaimed water.
- A 370-horsepower (hp) diesel firewater pump.
- A 1,040-kilowatt (kW) natural gas-fired emergency generator.
- A 230-kilovolt (kV) switchyard.
- A deaerating surface condenser.
- A 125,000 pound-per-hour (lb/hr) forced-draft auxiliary boiler

The SJVEC would also include the following linear ancillary projects off the project site:

- An approximately 1,500 feet long, 230-kV electrical transmission line.
- Rerouting of approximately 2,900 feet of the 70-kV subtransmission line that crosses the project site.

- An approximately 20 mile, 24-inch natural gas supply pipeline.
- A 21 mile, 27 inch reclaimed water supply pipeline.
- A 1 mile long domestic water supply pipeline.
- A 2.5 mile sanitary sewer line.

Construction activities for the SJVEC, both on-site or off-site, would generate air emissions from earth moving activities and construction equipment. On-site construction is expected to last approximately 24 months, with the highest daily dust emissions occurring during the 7th month and the highest daily exhaust emissions occurring during the 16th month. Off-site construction of the natural gas pipeline and reclaimed water pipeline is expected to last 12 months. Construction of the new 230-kV transmission line interconnect is expected to last one month.

project site

The power plant itself would take approximately 24 months to construct. The power plant project construction consists of three major areas of activity: 1) civil/structural construction, 2) mechanical construction, and 3) electrical construction. The largest fugitive dust emissions are generated during the civil/structural activity, where work such as clearing, grading, site preparation, foundations, and backfilling operations occur. These types of activities require the use of large earth moving equipment, which generate considerable combustion emissions themselves, along with creating fugitive dust emissions. The mechanical construction includes the installation of the heavy equipment, such as the combustion and steam turbines, the heat recovery steam generators, pumps and piping. The use of large cranes to install such equipment generates significantly more emissions than other construction equipment onsite. Electrical equipment installation involves such items as transformers, switching gear, instrumentation and wiring. This is a relatively small emissions generating activity compared to early construction activities. SJVEC estimates for the highest emissions during on-site construction, based on the 7th and 16th months, are shown in **AIR QUALITY Table 10** and **AIR QUALITY Table 11**, respectively. Annual on-site construction heavy equipment exhaust and fugitive dust emissions based on the average equipment mix during the 24-month construction period are summarized in **AIR QUALITY Table 12**.

AIR QUALITY Table 10
Maximum Daily Emissions During On-Site Construction
(Month 7; Maximum Dust Emissions), lbs/day

	NO_x	CO	VOC	SO_x	PM_{10}
On-Site					
Construction Equipment	154.74	39.49	11.01	4.40	10.02
Fugitive Dust	---	---	---	---	54.86
Off-site					
Worker Travel	59.71	713.83	57.00	0.04	1.21
Truck Deliveries	39.23	24.54	3.52	1.62	2.29
Rail Deliveries	0	0	0	0	0
Total Emissions	253.67	777.87	71.53	6.06	68.37

From Data Response, Set 1A (SJVEC 2002a) Table 8.1D-1R, page 4 and AFC (SJVEC 2001a), page 8.1D-9-18, and Second Round Response tables from Nancy Matthews emailed 3/28/02.

AIR QUALITY Table 11
Maximum Daily Emissions During On-Site Construction
(Month 16; Maximum Exhaust Emissions), lbs/day

	NO_x	CO	VOC	SO_x	PM_{10}
On-Site					
Construction Equipment	201.00	60.62	16.57	5.62	14.99
Fugitive Dust	---	---	---	---	19.46
Off-site					
Worker Travel	59.71	713.83	57.00	0.04	1.21
Truck Deliveries	39.23	24.54	3.52	1.62	2.29
Rail Deliveries	15.82	1.56	0.59	1.01	0.39
Total Emissions	315.76	800.55	77.68	8.29	38.34

From AFC (SJVEC 2001a) Appendix 8.1D, Table 8.1D-2, page 8.1D-3, AFC (SJVEC 2001a), page 8.1D-10 to 18, and Second Round Response tables from Nancy Matthews emailed 3/28/02.

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

	NO_x	CO	VOC	SO_x	PM_{10}
On-Site					
Construction Equipment	18.06	6.62	1.70	0.50	1.49
Fugitive Dust	---	---	---	---	5.29
Off-site					
Worker Travel	3.96	47.39	3.78	0.00	0.08
Truck Deliveries	2.18	1.37	0.20	0.09	0.13
Rail Deliveries	0.36	0.04	0.01	0.02	0.01
Total Emissions	24.57	55.41	5.69	0.62	7.00

From AFC (SJVEC 2001a) Appendix 8.1D, Table 8.1D-3, page 8.1D-3, and Second Round Response tables from Nancy Matthews emailed 3/28/02.

linear facilities

The planned linear facilities include the natural gas pipeline, reclaimed water supply pipeline and the 230-kV transmission line interconnect. The construction of all linear facilities is not expected to last longer than 12 months.

The natural gas pipeline would connect to the PG&E main pipeline system at a point located west of the project site, approximately 4 miles east on Interstate 5 adjacent to Manning Avenue. The pipeline would run east along Manning Avenue, south on El Dorado Avenue and then east of Springfield Avenue to the project site. Open trench construction would be performed in approximately 500-foot long sections over a short duration to minimize fugitive dust and construction equipment combustion emissions. Either horizontal directional drilling or “jack and bore” would be used for crossing under the California Aqueduct, Beta Main Canal, and the Fresno Slough.

The reclaimed water supply pipeline would draw reclaimed water from under the infiltration ponds of the Fresno-Clovis Wastewater Treatment Facility (WWTF) approximately 20 miles northeast of the project site. The pipeline route starts at North Avenue and an extension of Grantland Avenue, runs west along North Avenue, south along Chateau Fresno Avenue, west along Lincoln Avenue, south along Jameson Avenue, west along Manning Avenue, and south along Placer Avenue to the project site.

The 230-kV transmission line interconnect would be approximately 1,500 feet long and would connect to PG&E's Panoche-McCall and Panoche-Kearney 230-kV transmission lines, located to the south of the project site. The transmission line interconnection would involve construction of two double-circuit 230-kV lines approximately 1,300 and 1,500 feet long looping the SJVEC switchyard into the 230-kV lines near the Helm Substation. The proposed connection would align in a north/south direction and cross open farmland.

AIR QUALITY Table 13 shows maximum daily emissions expected from the construction of the natural gas pipeline, reclaimed water supply pipeline and the transmission line interconnect.

AIR QUALITY Table 13
Maximum Daily Emissions During Pipeline and Transmission Line Interconnect Construction, lbs/day

	NO_x	CO	VOC	SO_x	PM_{10}
Natural Gas Pipeline					
On-Site					
Construction Equipment	44.6	14.3	3.3	1.5	2.2
Fugitive Dust	---	---	---	---	4.2
Off-site					
Truck Deliveries	18.6	11.6	1.7	0.8	1.0
Total Emissions	63.2	25.9	5.0	2.3	7.4
Water Pipeline					
On-Site					
Construction Equipment	49.6	18.1	3.9	1.8	2.5
Fugitive Dust	---	---	---	---	5.4
Off-site					
Truck Deliveries	27.8	17.4	2.5	1.2	1.6
Total Emissions	77.4	35.5	6.4	3.0	9.5
Transmission Line Interconnect					
On-Site					
Construction Equipment	60.9	12.5	3.9	1.8	2.8
Fugitive Dust	---	---	---	---	1.1
Off-site					
Truck Deliveries	46.4	29.0	4.2	1.9	2.6
Total Emissions	107.3	41.5	8.1	3.7	6.5

From AFC (SJVEC 2001a) Appendix 8.1D, Table 8.1D-4, page 8.1D-4.

Total construction emissions are summarized in **AIR QUALITY Table 14**.

AIR QUALITY Table 14
Total Emissions During Construction Period, tons

	NO_x [e]	CO [e]	VOC [e]	SO_x [e]	PM_{10} [e]
On-Site					
Construction Equipment [a]	36.12	13.24	3.40	1.00	2.98
Fugitive Dust [b]	---	---	---	---	10.58
Off-site					
Worker Travel, Deliveries [c]	13.02	97.58	7.98	0.24	0.44
Natural Gas Pipeline [d]					
On-Site					
Construction Equipment	5.58	1.79	0.42	0.19	0.28
Fugitive Dust	---	---	---	---	0.77
Off-site					
Truck Deliveries	2.32	1.45	0.21	0.10	0.13
Water Pipeline [d]					
On-Site					
Construction Equipment	6.20	2.26	0.49	0.22	0.32
Fugitive Dust	---	---	---	---	0.98
Off-site					
Truck Deliveries	3.48	2.18	0.31	0.14	0.20
Transmission Line Interconnect [d]					
On-Site					
Construction Equipment	7.61	1.56	0.48	0.22	0.35
Fugitive Dust	---	---	---	---	0.21
Off-site					
Truck Deliveries	5.80	3.63	0.52	0.24	0.33
Total Construction Emissions	80.13	123.69	13.81	2.35	17.57

Notes:
a. Construction equipment emissions based on average number of units operating over a 2-year period.
b. Fugitive dust emissions based on average of daily emissions during Months 7, 9, 15, and 16. Assumed 250 days per year for construction activities and 365 days per year for windblown dust over a 2-year period.
c. Worker Travel based on 158 round trips per day, 70-mile average round trip distance, and 250 days per year over a 2-year period. Truck deliveries based on 2225.50 deliveries per year and 70-mile average round trip distance over a 2-year period. Each rail delivery is based on 4 rail cars per day with an average of 45.8 deliveries per year over a 2-year period.
d. Linear facility construction emissions based on daily emissions assuming 250 days per year for construction activities and 365 days per year for fugitive dust emissions over a 1-year period.
e. The basis for emission factors are provided in the AFC (SJVEC 2001a), Appendix 8.1D, page 8.1D-19.

OPERATIONAL PHASE

The project is expected to have an overall annual availability of 92 to 98 percent.

Equipment description

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

- Three Siemens-Westinghouse 501FD (or equivalent) combustion turbine generators (CTGs), rated at 180 MW (nominal at site design conditions). Each CTG would be equipped with dry, low-NO_x combustors and steam injection power augmentation capability

- Three heat recovery steam generators (HRSG) equipped with duct burners rated at 746 MMBtu/hr (higher heating value, or HHV, each)
- One 570-MW (nominal) condensing steam turbine generator (STG).
- A continuous emission monitoring (CEM) system for NO_x, CO, and oxygen.
- Deaerating surface condenser.
- A 125,000 pound-per-hour (lb/hr) forced-draft ABCO Industries, Inc. D-Type natural gas-fired auxiliary boiler or equivalent, to provide saturated steam at 400 pounds-per-square inch gauge (psig) as needed for auxiliary purposes, served by a feedwater deaerator and boiler feedwater pump system.
- A 227,163-gpm 16-cell mechanical/induced draft evaporative cooling tower using reclaimed water.
- One 1,100-kW emergency electrical generator powered by a 1,529-horsepower (hp) Cummins Model QSV81G or equivalent lean burn natural gas-fired internal combustion (IC) engine.
- One 370 hp firewater pump powered by a 300 hp Cummins Model 6CTA8.3-FA diesel-fired emergency IC engine.
- An electric motor-driven gas compressor to boost the natural gas pressure at the fence line when the pressure falls below 550 psig.

Facility Operation

Calpine Corporation has proposed to build and operate the San Joaquin Valley Energy Center LLC (SJVEC) located on an 85-acre parcel in an industrial area near the intersection of West Manning Avenue and South Colorado Avenue in the City of San Joaquin in Fresno County, California. The power plant and switchyard site would occupy approximately 25 acres near the southeast corner of the 85-acre parcel. The site is located adjacent and to the west of the intersection of W. Colorado Avenue and Springfield Avenue. The power plant would be accessed via a new road built off Colusa Avenue on the west side of the project site. The new road would be an extension of Cherry Lane.

The SJVEC would use three stationary, natural gas-fired combustion turbines for power production. Each combustion turbine generator (CTG) would generate an average of 180 MW at base load under average ambient conditions. Each CTG would feature dry low-NO_x combustors for emission control. The CTG exhaust gases would be used to generate steam in three heat recovery steam generators (HRSG). Each HRSG would be equipped with a selective catalytic reduction (SCR) emission control system that uses ammonia vapor in the presence of a catalyst to reduce the NO_x concentration in the exhaust gases. An oxidation catalytic converter would also be incorporated into the emissions control system to control carbon monoxide (CO) and volatile organic compound (VOC) emissions. Steam from the HRSGs would be routed to a condensing steam turbine generator (STG), which would produce approximately 550 MW when the CTGs are operating at base load at average ambient conditions with maximum duct firing of the HRSGs. The total net generating capacity of the power plant would be 1,060 MW with an overall annual availability of 92 to 98 percent. For base load under average ambient conditions with no duct firing of the HRSGs or power augmentation,

each CTG will generate an average of 180 MW and the steam turbine will produce approximately 292 MW for a total net generating capacity of 821 MW.

Accessories for each CTG include inlet air foggers and filters, double lube oil cooler, compressor wash system, fire detection and protection system, fuel heating system and acoustical enclosures. Major components of each HRSG include a low-pressure (LP) economizer, LP drum, LP evaporator, LP superheater, intermediate-pressure (IP) economizer, IP evaporator, IP superheaters/reheaters, high-pressure (HP) economizers, HP evaporator, HP drum, and HP superheaters. An auxiliary boiler would provide up to 125,000 lb/hr of saturated steam at 400 psig for HRSG HP steam drum warming when the turbines are offline (to reduce startup times), for condenser hotwell warming, steam turbine gland steam sealing, and sparging steam for freeze protection when the plant is offline (SJVEC 2001c, DR #27, page 13). The steam turbine system consists of an STG with reheat, gland steam system, lubricating oil system, hydraulic control system, and steam admission/induction valving. An electric superheater would provide the steam turbine gland steam.

The SJVEC design includes a 16-cell counter-flow mechanical-draft evaporative cooling tower. Reclaimed water for the cooling tower and process makeup water would be provided by Fresno-Clovis WWTF, and will come from six new reclamation wells located at the Fresno WWTP effluent disposal ponds. Cooling tower blowdown would be discharged to a zero-liquid discharge treatment system, where most of the water would be reclaimed for reuse within the plant. Filtered cooling tower blowdown water would be used for service water.

The SJVEC would have three operators per 12-hour rotating shift, plus three relief operators and one chemical technician, seven maintenance technicians, and seven administrative personnel during the standard 8-hour workday. The facility would be operated 7 days a week, 24 hours per day. SJVEC would sell all or part of its generation under contract. Available generation not sold under contract would be available for sale on the spot market. Operation of the SJVEC therefore depends on the quantity of electricity sold through contracts and the ability of SJVEC to sell into the competitive spot market. The project is expected to have an annual plant availability of 92 to 98 percent. However, the exact operational profile of the plant cannot be defined, because the facility will be operated to satisfy demand. The facility could be operated in one or all of the following modes: (1) Base Load – operated at maximum continuous output; (2) Load Following – operated to meet contractual loads and available spot sales; (3) Partial Shutdown – operated with one or two CTG(s)/HRSG(s) shut down; and (4) Full Shutdown due to equipment malfunction, fuel supply interruption, transmission line disconnect, scheduled maintenance, or if the market price of electricity falls below SJVEC incremental cost of generation.

Emission Controls

The exclusive use of pipeline-quality natural gas, a relatively clean-burning fuel, would limit the formation of VOC, PM_{10}, and SO_2 emissions. Natural gas contains very little noncombustible gas or solid residues and a small amount of reduced sulfur compounds including mercaptan, thus resulting in relatively low emissions of the above-mentioned pollutants. There would be no distillate fuel oil firing at SJVEC except in the fire pump engine.

Each CTG would be equipped with a dry low NO_x combustion system to control NO_x and VOC concentrations in the exhaust gas. Dry low NO_x combustors would generate approximately 25 parts per million by volume, dry (ppmvd) NO_x at 15 percent oxygen (O_2) and VOCs at or below 2.0 ppmvd at 15 percent O_2. Post-combustion NO_x control would be provided using a selective catalytic reduction (SCR) system. The SCR system will use aqueous ammonia to further reduce NO_x emissions to 2.5 ppmvd at 15 percent O_2 on a one-hour average basis. Average annual NO_x emissions would be no greater than 2.0 ppmvd at 15 percent O_2 (excluding startups and shutdowns) from the gas turbines/HRSGs. Ammonia slip would be limited to 10 ppmvd at 15 percent O_2 from the gas turbines/HRSGs. Carbon monoxide (CO) would be controlled at the CTG combustor and by an oxidation catalyst, and would be limited to no greater than 6 ppmvd at 15 percent O_2. Particulate emissions would be controlled using natural gas as the sole fuel for the CTG.

The auxiliary boiler would be equipped with a low NO_x combustor, an SCR system, and a CO catalyst to reduce pollutant concentrations in the exhaust gas. NO_x emissions would be controlled to less than 9 ppmvd at 3 percent O_2, CO to 50 ppmvd at 3 percent O_2 and VOC to 10 ppmvd at 3 percent O_2. The ammonia slip would be limited to 10 ppmvd at 3 percent O_2.

Three 145-foot-tall, 20-foot diameter stacks would release the HRSG exhaust gas into the atmosphere. The auxiliary boiler would exhaust to the atmosphere through a freestanding 120-foot-tall, 3.5-foot diameter steel stack. Continuous emission monitors (CEMs) would be installed on the three HRSG stacks and the auxiliary boiler stack to monitor NO_x, CO, oxygen, and carbon dioxide concentrations 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 major project components. The emission rates for the combustion gas turbines with no duct firing, the combustion gas turbines with duct firing, the auxiliary boiler and cooling tower emission are provided in **AIR QUALITY Table 15.**

AIR QUALITY Table 15
Maximum Pollutant Emission Rates, lb/hr

Pollutant	Each Gas Turbine No Duct Firing [a]	Each Gas Turbine With Duct Firing [b]	Auxiliary Boiler [c]	Cooling Tower [d]	Emergency Generator	Diesel Fire Pump
NO_x	17.83 [e]	23.77 [e]	1.80	---	2.63	3.89
CO	17.37	23.14	6.20	---	8.43	2.35
VOC	3.48	6.63	0.69	---	1.42	0.48
PM_{10}	9.0	11.5	3.30	1.08	0.10	0.17
SO_2	1.38	1.84	0.11	---	0.01	0.11
NH_3	26.41	35.19	0.74	---	---	---

From AFC (SJVEC 2001a) Tables 8.1-16, 8.1-17, 8.1-18 on pages 8.1-24 to 25 and Appendix 8.1A Table 8.1A-1 to 5, Data Adequacy (SJVEC 2001b) Attachment 12-AQ-9, Table 8.1A-8, revised 3/21/02, CO Emissions Limits (SR 2002a), and PDOC (SJVAPCD 2002a) pages 17-25.
Note(s):
a. Estimated at 32°F and 100% load with no duct firing (Table 8.1A-1, revised 3/21/02, Case 4).
b. Estimated at 100°F and 100% load with duct firing and power augmentation (Table 8.1A-1, revised 3/21/02, Case 1).
c. Emission rates shown reflect the highest value at any operating load (Table 8.1A-2).
d. Cooling tower operating at maximum output.
e. Maximum 1-hour NO_x emission rate at 2.5 ppm NO_x @ 15%O_2.

Expected event emission rates during startup and shutdown events are summarized in **AIR QUALITY Table 16**.

Air Quality Table 16
SJVEC Facility Criteria Pollutant Emission Rates
During Startup and Shutdown, lb/hr

Pollutant [c]	Turbine [a]	Auxiliary Boiler [b]
NO_x	80	10
CO (Cold / Hot Start)	(838 / 902)	12.5
VOC	16	---

From Data Adequacy (SJVEC 2001b) Attachment 12-AQ-9, Table 8.1A-8, revised 3/21/02 and PDOC (SJVAPCD 2002a) page 15.
Note(s):
a. Estimated based on vendor data and source test data provided in SJVEC AFC Appendix 8.1A, Tables 8.1A-7a and 8.1A-7b. Estimated time is 3 hours for a cold start and 1 hour for a hot start.
b. Calculated at uncontrolled levels of 50 ppmv NO_x at 3 percent O_2 and 100 ppmv CO at 3 percent O_2.
c. Emission for pollutants not shown here during startups and shutdowns are assumed to be equal to the maximum hourly emissions during baseload facility operation.

AIR QUALITY Table 17 summarizes the maximum (worst-case) estimated levels of the different criteria pollutants from the turbine, auxiliary boiler, emergency diesel generator, fire pump engine and cooling tower. To assess worst-case hourly emissions, the following assumptions were made:

Maximum Hourly Emissions:

For NO_x, CO and VOC:

- One turbine is in hot startup mode.
- Maximum NOx emission rate for each turbine with duct firing will be 2.50 ppm.
- Two turbines operate at 100 percent load with duct firing.
- Auxiliary boiler operates at full load.

- Fire pump testing (NO_x) or emergency generator testing (CO and VOC).

For SO_2, PM_{10} and NH_3:

- Three turbines operate at 100 percent load with duct firing.
- Auxiliary boiler operates at full load.
- Fire pump testing (PM10 and SO2).
- Cooling tower operates at maximum output.

Air Quality Table 17
SJVEC Worst-Case Hourly Emissions

	Maximum Hourly, lb/hr					
	NO_x	**SO_2**	**CO**	**VOC**	**PM_{10}**	**NH_3**
Turbine (1) Startup [a]	80	NA[a]	902	16	NA[a]	NA[a]
Turbines With Duct Firing	47.54	5.52	46.28	13.26	34.50	105.57
Auxiliary Boiler	1.80	0.11	6.20	0.69	3.30	0.74
Emergency Generator[b]	NA[b]	NA[b]	8.43	1.42	NA[b]	---
Fire Pump Engine[b]	2.92	0.08	NA[b]	NA[b]	0.13	---
Cooling Tower	0	0	0	0	1.08	---
Total	132.3	5.7	962.9	31.4	39.0	106.3

From Data Adequacy (SJVEC 2001b) Attachment 12-AQ-9, Table 8.1A-8, revised 3/21/02, CO Emissions Limits (SR 2002a), and PDOC (SJVAPCD 2002a) pages 17-25.
Note(s):
a. Maximum SO_2, PM_{10}, and NH_3 emissions are shown in the following row based on three turbines operating at full load with duct firing.
b. Only one emergency engine will be tested during any one hour; therefore, the maximum hourly emissions are determined by which emergency engine has the higher emissions per pollutant.

AIR QUALITY Table 18 summarizes the maximum (worst-case) estimated levels of the different criteria pollutants from the turbine, auxiliary boiler, emergency diesel generator, fire pump engine and cooling tower. To assess worst-case daily emissions, the following assumptions were made:

Maximum Daily Emissions:

For NO_x, CO and VOC:

- Each turbine operates in startup/shutdown mode for 4 hours (one cold, one hot start).
- Maximum NOx emission rate for each turbine with duct firing will be 2.50 ppm.
- Each turbine operates at full load with duct firing for 16 hours.
- Each turbine operates at full load without duct firing for remaining 4 hours.
- Auxiliary boiler operates at full load for 24 hours.
- Either the emergency generator or the fire pump engine is tested (higher value used).

For SO_2, PM_{10} and NH_3:

- Each turbine operates at full load with duct firing for 24 hours.
- Auxiliary boiler operates for 24 hours.

- Testing of emergency generator (1 hour) and fire pump (0.75 hour).
- Cooling tower operates at maximum output for 24 hours.

Air Quality Table 18
SJVEC Worst-Case Daily Emissions

	Maximum Daily, lb/day					
	NO_x	**SO_2**	**CO**	**VOC**	**PM_{10}**	**NH_3**
Turbines (3 max) No Duct Firing With Startup [a]	**1,174.0**	NA[a]	**10,456.4**	233.7	NA[a]	NA[a]
Turbines (3 max) With Duct Firing	1,141.0	**132.3**	1,110.7	**318.3**	**828**	**2,533.7**
Auxiliary Boiler	43.3	2.7	148.8	16.6	79.2	17.8
Emergency Generator	2.63	0.01	8.43	1.42	0.10	---
Fire Pump Engine	2.92	0.08	1.76	0.36	0.13	---
Cooling Tower	0	0	0	0	25.9	---
Total	2,363.9	135.1	11,726.1	570.4	933.3	2,551.5

From Data Adequacy (SJVEC 2001b) Attachment 12-AQ-9, Table 8.1A-8, revised 3/21/02, CO Emissions Limits (SR 2002a), and PDOC (SJVAPCD 2002a) pages 17-25.
Note(s):
a. Maximum SO_2, PM_{10}, and NH_3 emissions are shown in the following row based on three turbines operating at full load with duct firing for 24 hour/day.

AIR QUALITY Table 19 summarizes the annual estimated levels of the different criteria pollutants from the turbine, auxiliary boiler, emergency diesel generator, fire pump engine and cooling tower. To assess the annual emissions, the following assumptions were made:

Annual Emissions:

For NO_x, CO and VOC:

- Each turbine operates in startup or shutdown mode for 416 hours (52 cold, 260 hot starts) per year.
- Average annual NOx concentration will be 2.0 ppm.
- Each turbine operates at full load with duct firing for 5,100 hours per year.
- Each turbine operates at full load without duct firing for remaining 3,244 hours.
- Auxiliary boiler operates for 3,000 hours per year.
- Emergency generator operates for 200 hours per year.
- Fire pump engine operates for 100 hours per year.

For SO_2 and PM_{10} and NH_3:

- Each turbine operates at full load with duct firing for 5,100 hours per year.
- Each turbine operates at full load without duct firing for 3,660 hours per year.
- Auxiliary boiler operates for 3,000 hours per year.
- Emergency generator operates for 200 hours per year.
- Fire pump engine operates for 100 hours per year.

- Cooling tower operates at maximum output for 8,760 hours.

Air Quality Table 19
SJVEC Annual Emissions

	Maximum Annual, tons/year					
	NO_x	SO_2	CO	VOC	PM_{10}	NH_3
Turbines (3 max) No Duct Firing With Startup [a]	119.33	7.58	632.4	26.92	49.41	145.0
Turbines (3 max) With Duct Firing	145.47	14.08	177.0	50.72	87.98	269.2
Auxiliary Boiler [b]	2.71	0.17	9.30	1.04	4.95	1.11
Emergency Generator	0.263	0.001	0.843	0.142	0.010	---
Fire Pump Engine	0.195	0.006	0.118	0.024	0.009	---
Cooling Tower	0	0	0	0	4.73	---
Total	268.0	21.8	819.7	78.8	147.1	415.3

From Data Adequacy (SJVEC 2001b) Attachment 12-AQ-9, Table 8.1A-8, revised 3/21/02, CO Emissions Limits (SR 2002a), and PDOC (SJVAPCD 2002a) pages 17-25.
a. Maximum SO_2, PM_{10}, and NH_3 emissions are shown in the following row based on three turbines operating at full load with duct firing for 5,100 hour/year.
b. Auxiliary boiler annual emissions do not include startup/shutdown emissions.

INITIAL COMMISSIONING

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

Startup and commissioning for the SJVEC CTG/HRSGs is estimated to last no less than three months from first fire to completion of acceptance testing of all three CTGs (SJVEC 2002a, DR #20, page 10). Each CTG would typically be commissioned on a slightly staggered schedule to best utilize onsite personnel and resources. Normally, only one CTG is in operation at any given time. When multiple CTGs are operating during the commissioning period (up to three), only one turbine may be out of compliance with its air quality permit conditions. The Applicant expects to prepare and submit a commissioning plan prior to commencement of commissioning providing more project-specific details.

The Applicant has stated they would minimize emissions of CO, NO_x, and other pollutants from the SJVEC by limiting the test time of each commissioning activity to the shortest duration feasible. The NO_x and CO catalyst are proposed to be installed at the earliest possible time in the testing cycle, consistent with manufacturer's recommendations.

Prior to initial startup of each CTG/HRSG, a continuous emissions monitoring (CEM) system would be installed, tested, and calibrated to measure criteria pollutants during startup and commissioning.

The range of commissioning tests for each CTG/HRSG at the SJVEC includes the following: 1) full speed no load test; 2) partial (60 percent) load test; 3) full load test with no SCR; 4) full load test with partial SCR; 5) full load test with full SCR; and 6) hot

startup testing. The Applicant has estimated the initial commissioning emissions in **AIR QUALITY Table 20**.

AIR QUALITY Table 20
Initial Turbine Commissioning Emissions

Commissioning Activities	Operation Duration [a]	Fuel Use [b]	NO_x	CO	VOC	PM_{10}	SO_x
(per CTG/HRSG)	(Hours)	(MMBtu/h, HHV)	Hourly Emissions, lb/hr				
Full Speed, No Load Test	72	355	125.0	180.0	17.0	9.0	0.25
60% Load Test	144	1,331	128.0	385.0	16.0	9.0	0.95
Full Load Test, No SCR	48	1,968.5	189.0	46.0	3.48	9.0	1.40
Full Load Test, Partial SCR	24	1,968.5	103.4	26.1	3.48	9.0	1.40
Full Load Test, Full SCR	600	1,968.5	17.83	26.1	3.48	9.0	1.40
Hot Starts	6	---	80.00	902.0	16.0	11.5	1.84
Total	2,682		150,491	276,919	17,896	24,182	3,313

From Data Response, Set 2A (SJVEC 2002b) Attachment AQ-157.
Note(s):
a. Hours of operation based on information provided by Calpine.
b. Fuel Use: No load test based on information provided by Calpine; 60% Load test based on 60% fuel use for a GE 501F CTG at 36°F, Full load test based on baseload fuel use for a GE 501F CTG at 36°F.

Although Table 20 would suggest that the period of time (2682 hours) of initial commissioning would seem long, that figure represents the hours for all three turbines. Each turbine was estimated to operate approximately 894 hours under initial commissioning; 600 hours of that time would be fully abated with control technology. Unabated emissions would be on the order of about 300 hours per turbine. This unabated emissions scenario and the types of tests planned is consistent with a detailed commissioning scenario submitted to the CEC for a similar project, the Duke Moss Landing Power Plant Project (Duke 2002).

PROJECT IMPACTS

MODELING APPROACH

The Applicant performed an air dispersion modeling analysis to evaluate the project's potential impacts on the existing ambient air pollutant levels, both during construction and operation. An air dispersion modeling analysis usually starts with a conservative screening level analysis. Screening models use very conservative assumptions, such as for the meteorological conditions, which may or may not actually occur in the area. The impacts calculated by screening models, therefore, can be double or more than the actual or expected impacts. If the screening level impacts are significant, refined modeling analysis is performed. A major difference in the refined modeling is that hour-by-hour meteorological data collected in the vicinity of the project site is used.

The Applicant has used the U.S. EPA's Industrial Source Complex (ISC), Short-Term Model (ISCST3, Version 00101), to estimate the impacts of the project's NO_X, PM_{10}, CO and SO_X emissions resulting from project construction and operation. The ISC model is

a steady-state Gaussian plume model, appropriate for regulatory use, that can be used to assess pollution concentrations from a wide variety of emission sources.

The Applicant has used the SCREEN3 model to determine worst-case 1-hour NO_2, CO and SO_2 impacts under fumigation conditions. The SCREEN3 model is a steady-state Gaussian plume model, appropriate for the screening level modeling of single point sources to assess worst-case impacts.

For 1-hour average operating NO_x modeling, 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 using ozone concentration files to determine maximum 1-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 1-hour NO_2 modeling.

For 1-hour average construction NO_x modeling, the Applicant provided a refined modeling analysis using a non-regulatory ozone limiting method (OLM) modeling approach. The Applicant used a spreadsheet averaging approach to determine the average ozone concentrations for NO to NO_2 conversion. The Applicant could not use the approved OLM approach because all construction emissions were modeled as area sources. Staff remodeled the construction emissions using a combination of point sources, volume sources, and an area source and was able to use the approved OLM modeling approach.

A description of the Applicant's modeling analyses is provided in Section 8.1.5.1.2 of the AFC (SJVEC 2001a, pages 8.1-30 to 42) and in the Appendices (SJVEC 2001a, Appendix 8.1B - Modeling Analysis and Appendix 8.1D - Construction Phase Impacts). The Applicant utilized hourly meteorological data collected at Lemoore Naval Air Station, for the years 1992 to 1995 and 1997, as recommended by SJVAPCD. Due to missing data, the 1996 data set was not used and was substituted with the 1997 data set (SJVEC 2001b, page 4 to 5).

Staff's analysis of the meteorological data set determined that there are apparent problems with how the meteorological data set was processed. Staff has determined that some of the missing data was not filled correctly, with missing wind speed data being improperly set to zero. This caused associated problems with stability class determination, which caused the overestimation of short-term impacts and the very slight underestimation of annual impacts. Staff attempted to correct the most significant of the improper wind speed assignments through the correction of 56 wind speeds and 54 associated stability class assignments in 69 hours of the meteorological data set. The staff's modeling analysis uses this corrected meteorological data.

CONSTRUCTION IMPACTS

The following section discusses the project's short-term direct construction ambient air quality impacts, as estimated by the Applicant and, as necessary, separately estimated by CEC staff.

Applicant Construction Impact Analysis

The Applicant modeled the emissions of the SJVEC onsite construction activities. This analysis was completed using the ISCST3 (Version 00101) model. The exhaust and fugitive dust emissions were modeled as single area sources that covered the total area of the construction site (SJVEC 2001a, Appendix 8.1D, page 8.1D-5). The emissions were modeled using hourly temporal factors when modeling the short-term averaging periods (i.e. 1-hour through 24-hour). It was assumed that all of the equipment that operated during a particular month would operate for a full eight hours five days a week during that month. However, the Applicant has determined that construction will be expected to occur from 7 am to 3:30 pm, five days per week. If project construction is accelerated, the Applicant expects to extend this to a 10-hour day that would last from 7 am to 5 pm (SJVEC 2002b, DR#151, page 3). **AIR QUALITY Table 21** provides the results of this modeling analysis.

AIR QUALITY Table 21
SJVEC 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]	1-Hour	216.1	161.7	377.8	470	CAAQS	80
	Annual	36.7	30.2	66.9	100	NAAQS	67
PM_{10}	24-Hour	118.4	**146**	**264.4**	50	CAAQS	**529**
	Annual	25.7	**41.9**	**67.6**	30	CAAQS	**225**
CO	1-Hour	415.0	4,370	4,785	23,000	CAAQS	21
	8-Hour	150.5	2,900	3,051	10,000	CAAQS	31
SO_2	1-Hour	38.5	28.8	67.3	655	CAAQS	13
	3-Hour	21.7	26.0	47.7	1,300	NAAQS	4
	24-Hour	7.3	16.5	23.8	105	CAAQS	23
	Annual	1.4	8.5	9.9	80	NAAQS	12

From AFC (SJVEC 2001a) Appendix 8.1D, Table 8.1D-6, page 8.1D-6.
Note(s):
a. 1-hour NO_x value was modeled using OLM_ISC. The annual value is multiplied by the Annual NO_x Ratio Method (ARM) of 0.75.
b. Background values have been adjusted per staff recommended background concentrations shown in Table 9.

As can be seen from the modeling results provided in **AIR QUALITY Table 21**, the construction PM_{10} (24-hour and annual) impacts exceed the ambient air quality standards and are therefore significant. The Applicant's results show that over 80 percent (98.7 $\mu g/m^3$ out of 118.4 $\mu g/m^3$) of the maximum modeled 24-hour PM_{10} concentrations from construction activities are due to fugitive dust from construction activities rather than to exhaust from construction equipment. On an annual average basis, the exhaust contribution is only about 15 percent of the total PM_{10} impact.

The potential ambient air quality impacts associated with the construction of the natural gas pipeline, recycled water pipeline and the transmission line interconnect are expected to be minimal since construction would occur for a short duration, require minimal equipment, and would generally occur along public roads and utility right-of-ways over a large geographical area (SJVEC 2001a, Appendix 8.1D, page 8.1D-7). Therefore, these activities were not included in the Applicant's construction impact modeling analysis.

Staff Construction Impact Analysis

Staff remodeled the construction emissions using a combination of point sources, volume sources, and an area source. Additionally, staff used the corrected meteorological file in its modeling analysis. Staff modeled the Applicant's suggested 7 am to 5 pm daily construction schedule, as well as an unlimited daily construction schedule to assess the potential short-term averaging period construction impacts that could occur without any restrictions to the construction schedule. **AIR QUALITY Tables 22** and **23** provide the results of this modeling analysis.

Air Quality Table 22
SJVEC Ambient Air Quality Impact
Staff Construction ISC Modeling Results
7 am to 5 pm Construction Schedule

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]	1-Hour	317.9	161.7	**479.6**	470	CAAQS	**102**
	Annual	7.3	30.2	37.5	100	NAAQS	38
PM_{10}	24-Hour	64.9	**146**	**211**	50	CAAQS	**422**
	Annual	11.0	**41.9**	**52.9**	30	CAAQS	**176**
CO	1-Hour	217	4,370	4,587	23,000	CAAQS	20
	8-Hour	119	2,900	3,019	10,000	CAAQS	30
SO_2	1-Hour	20.0	28.8	48.8	655	CAAQS	7
	3-Hour	12.9	26.0	38.9	1,300	NAAQS	3
	24-Hour	5.1	16.5	21.6	105	CAAQS	21
	Annual	0.32	8.5	8.8	80	NAAQS	11

Note(s):
a. 1-hour NO_x value was modeled using NOx-OLM. The annual value is multiplied by the Annual NO_x Ratio Method (ARM) of 0.75.
b. Background values have been adjusted per staff recommended background concentrations shown in Table 9.

Air Quality Table 23
SJVEC Ambient Air Quality Impact
Staff Construction ISC Modeling Results
Unlimited Daily Construction Schedule – Short Term Impacts

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]	1-Hour	317.9	161.7	**479.6**	470	CAAQS	**102**
PM_{10}	24-Hour	184.0	**146**	**330**	50	CAAQS	**660**
CO	1-Hour	272	4,370	4,642	23,000	CAAQS	20
	8-Hour	148	2,900	3,048	10,000	CAAQS	30

SO_2	1-Hour	25.2	28.8	54.0	655	CAAQS	8
	3-Hour	16.1	26.0	42.1	1,300	NAAQS	3
	24-Hour	6.8	16.5	23.3	105	CAAQS	22

Note(s):
a. 1-hour NO_x value was modeled using OLM_ISC.
b. Background values have been adjusted per staff recommended background concentrations shown in Table 9.

As Tables 22 and 23 show the predicted maximum fence line construction NO_2 impacts have the potential to nominally exceed the 1-hour CAAQS. However, the ozone limiting method does not consider the time it takes for the NO to NO_2 conversion or the mixing and consumption of the ozone that takes place in the NO to NO_2 conversion. The receptors show to have modeled impacts that could exceed the 1-hour CAAQS all occurred adjacent to the project's fence line. However, the actual amount of ozone mixing into the plume, and the time from the tailpipe to the receptor point would both be inadequate to result in the NO to NO_2 conversion predicted by the model. A violation of the state 1-hour NO_2 standard is unlikely to occur. Therefore, staff does not consider the project's 1-hour NO_2 construction impacts to be significant.

Staff's construction modeling analysis indicates that the maximum CO and SO_2 impacts will remain well below the CAAQS and NAAQS; therefore, there are no significant construction impacts for these two pollutants.

The predicted maximum 24-hour and annual PM_{10} concentrations are potentially significant. Additionally, as shown in Table 23 increasing the construction schedule greatly increases the predicted maximum 24-hour concentrations. The maximum project 24-hour construction PM_{10} impacts are predicted to occur at the fence line and they decrease with distance. However, the maximum PM_{10} concentrations predicted to occur within the residential areas of the City of San Joaquin are over 30 ug/m^3 for an unlimited construction schedule, and over 10 ug/m^3 for a 7 am to 5 pm construction schedule. Additionally, the more hazardous diesel equipment exhaust PM_{10} impacts were found to be over 5 ug/m^3 within the City of San Joaquin. Therefore, staff is recommending appropriate mitigation to minimize the construction emissions and to otherwise mitigate the construction 24-hour PM_{10} ambient air quality impacts.

The annual PM_{10} construction impacts decrease very rapidly with distance and the predicted concentrations within the residential areas of the City of San Joaquin are approximately 0.25 ug/m^3. The maximum residential impact of approximately 1.5 ug/m^3 is predicted to occur at a single residential receptor located approximately 1,000 feet south of the project fence line.

OPERATION IMPACTS

The following section discusses the project's direct ambient air quality impacts, as estimated by the Applicant, and evaluated by CEC staff. The Applicant performed direct impact modeling analyses, including operations impact modeling and fumigation 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. The impact modeling analysis

included both maximum operating and startup/shutdown scenarios to determine maximum short-term and annual emission impacts. Turbine emission rates were calculated from equipment vendor estimates for five load conditions:

- Case 1 – 100°F ambient temperature, 100 percent load with duct firing and power augmentation,
- Case 2 – 100°F, 70 percent load,
- Case 3 – 61°F, 100 percent load,
- Case 4 – 32°F, 100 percent load, and
- Case 5 – 32°F, 70 percent load.

Because the emergency generator and fire pump will not be tested during the same hour, screening was performed to determine which had the higher impacts for each pollutant during that averaging period. The fire pump had higher impacts for 1-hr CO and 1-hr SO_2 while the emergency generator had higher 1-hour NO_x impacts. Fire pump operation will be restricted to 45 minutes out of any hour and 100 hours per year. Emergency generator operation will be limited to 200 hours per year. The auxiliary boiler operates at full load 24 hours per day on the worst-case day and 3,000 hours per year. Startup emissions assume one turbine in startup and two turbines at peak load.

The ISCST3 model (Version 00101) was used for the refined modeling analysis. One-hour NO_2 impacts were modeled using ISC3_OLM model (Version 96113). For this refined modeling analysis, the Applicant conducted a Good Engineering Practice (GEP) stack height analysis using the Building Profile Input Program (BPIP) Version 98086, and downwash effects were modeled for the facility using the ISCST3 model. Five years of meteorological data (1992 to 1995 and 1997) from Lemoore Naval Air Station were used in the modeling analysis.

The Applicant's predicted maximum concentrations of the non-reactive pollutants are summarized in **AIR QUALITY Table 24.**

Air Quality Table 24
SJVEC Ambient Air Quality Impact
Applicant Operational Impact ISC Modeling Results

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$) [a]	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	1-Hour	39.9 [c]	161.7	201.6	470	CAAQS	43
	Annual	0.6 [d]	30.2	30.8	100	NAAQS	31
PM_{10}	24-Hour	4.9	**146**	**151**	50	CAAQS	**302**
	Annual	0.5	**41.9**	**42.4**	30	CAAQS	**141**
CO	1-Hour	1,080.4	4,370	5,450	23,000	CAAQS	24
	8-Hour	138.3	2,900	3,038	10,000	CAAQS	30
SO_2	1-Hour	20.7	28.8	49.5	655	CAAQS	8
	3-Hour	4.6	26.0	30.6	1300	NAAQS	2
	24-Hour	0.4	16.5	16.9	105	CAAQS	16
	Annual	0.03	8.5	8.53	80	NAAQS	11

From AFC (SJVEC 2001a) Table 8.1-29, page. 8.1-40.
Note(s):

a. Worst-case impact for applicable averaging time, including fumigation and startup.
b. Background values have been adjusted per staff recommended background concentrations shown in Table 9.
c. The worst-case 1-hr NO2 impact does not include the diesel fire pump and emergency generator. The maximum 1-hr NO2 impact modeled with the emergency equipment was found to be 251.7 $\mu g/m^3$.
d. Modeled annual NO_x corrected to NO_2 using ARM default value of 0.75.

The Applicant's modeling results indicate that the project's operational impacts would not create violations of NO_2, SO_2 or CO standards, but could further exacerbate violations of the PM_{10} standards. In light of the existing PM_{10} non-attainment status for the project site area, the modeled impacts are considered to be significant and therefore must be mitigated. Staff's modeling analysis, which includes updated emission estimates for the SJVEC and revised meteorological files is presented in Tables 26 through 28.

The Applicant provided a commissioning modeling analysis to determine maximum 1-hour NO_2 concentrations; however, the maximum hourly commissioning NO_x emissions basis was revised since that analysis was performed and staff has concerns that the NO_x OLM modeling approach may underestimate the initial NO_2/NO_x ratio at the point of exhaust. Therefore, the results of that analysis are not presented. Staff conducted a separate commissioning emissions modeling, which is presented in Table 28.

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 1-hour standards. The Applicant analyzed the air quality impacts under fumigation conditions from the project turbines, auxiliary boiler, emergency generator and fire pump using the SCREEN3 model. The results of the analysis, as shown in **AIR QUALITY Table 25**, indicate that the fumigation impacts would not exceed applicable 1-hour AAQS.

Air Quality Table 25
Maximum 1-Hour SJVEC Fumigation Impacts, ($\mu g/m^3$)

Pollutant	Maximum Total Impact	Background [a]	Total	Standard	Standard
Concentrations at Turbine Fumigation Location					
CO	32.2	4,370	4,402	23,000	CAAQS
NO_2	24.1	161.7	185.8	470	CAAQS
SO_2	1.18	28.8	30.0	655	CAAQS
Concentrations at Auxiliary Boiler Fumigation Location					
CO	48.2	4,370	4,418	23,000	CAAQS

NO_2	42.4	161.7	204.1	470	CAAQS
SO_2	0.73	28.8	29.5	655	CAAQS

From AFC (SJVEC 2001a) Appendix 8.1-B, Table 8.1B-6, page 8.1B-7.
Note(s):
a. Background values have been adjusted per staff recommended background concentrations shown in Table 9.

Maximum fumigation impacts for the turbines and auxiliary boiler were predicted to occur at about 15 km and 5 km, respectively, from the facility. No fumigation was predicted to occur for the emergency generator or fire pump exhaust due to their short stacks. The impacts under fumigation conditions are expected to be lower than the maximum concentrations calculated by ISC under downwash conditions (SJVEC 2001a, pages 8.1-34 to 35).

Staff has reviewed the fumigation modeling results and has found the input values to be reasonable, but found the output results to be somewhat lower than what staff would have determined for the turbine fumigation (CO – 166 ug/m^3, NO_2 – 44.1 ug/m^3) and somewhat higher than staff would have determined for the auxiliary boiler fumigation (CO – 10.5 ug/m^3, NO_2 – 8.4 ug/m^3). However, staff agrees that there will be no significant ambient air quality impacts due to fumigation.

Staff Operations Impact Analysis

Staff remodeled the operational emissions to incorporate the following revisions that have occurred since the applicant's modeling analysis:

- Revised meteorological data
- Revised engine emission estimate (short-term modeling only)
- Revised commissioning emissions estimate

Staff modeled the "normal" emissions, worst-case start-up emissions (short-term only) and commissioning emissions (1-hour NOx only). Normal emissions are defined as following:

Short-term Averaging Period Assumptions

- The three turbines operating with duct firing from noon to 8 pm and without duct firing from 8 pm through noon.
- Cooling tower operating 24 hours/day.

Annual Averaging Period Assumptions

- All emission sources operating with hourly emissions based on annual average emissions.

The results of the "normal" emissions modeling analysis are shown in **AIR QUALITY Table 26.**

Air Quality Table 26
SJVEC Ambient Air Quality Impact
Staff "Normal" Operational 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 [a]	1-Hour	21.8	161.7	183.5	470	CAAQS	39
	Annual	0.54	30.2	30.7	100	NAAQS	31
PM_{10}	24-Hour	3.8	**146**	**150**	50	CAAQS	**300**
	Annual	0.22	**41.9**	**42.1**	30	CAAQS	**140**
CO	1-Hour	21.3	4,370	4,391	23,000	CAAQS	19
	8-Hour	6.9	2,900	2,907	10,000	CAAQS	29
SO_2	1-Hour	1.7	28.8	30.5	655	CAAQS	5
	3-Hour	1.0	26.0	27.4	1,300	NAAQS	2
	24-Hour	0.25	16.5	16.8	105	CAAQS	16
	Annual	0.03	8.5	8.5	80	NAAQS	11

Note(s):
a. No adjustment to the modeled 1-hour NO_x value was made. The annual modeled NOx concentration value is multiplied by the Annual NO_x Ratio Method (ARM) of 0.75.
b. Background values have been adjusted per staff recommended background concentrations shown in Table 9.

The Applicant's modeling results indicate that the project's operational impacts would not create violations of NO_2, SO_2 or CO standards, but could further exacerbate violations of the PM_{10} standards. In light of the existing PM_{10} non-attainment status for the project site area, the modeled impacts are considered to be significant and therefore must be mitigated.

The maximum PM_{10} 24-hour impacts are predicted to occur approximately 100 meters to the northeast of the fence line in an unpopulated area. The maximum PM_{10} 24-hour impacts predicted to occur in the residential areas of the City of San Joaquin are approximately 1 ug/m^3. The maximum annual PM_{10} concentration is predicted to occur approximately 1 mile south of the project site and the maximum PM_{10} annual impacts predicted to occur in the residential areas of the City of San Joaquin are approximately 0.028 ug/m^3.

Worst-case start-up emissions are based on the maximum emissions profile for each pollutant and are defined as following:

1-Hour Averaging Period Assumptions (NO_x, CO and SO_2)

- One turbine is in start-up mode and the two others are running at full load with duct firing, except for SO_2 where all three turbines are operating at full load with duct firing.
- The auxiliary boiler is operating at full load.
- The emergency generator or firewater pump engine is being tested (whichever is the worst-case for CO and SO_2)

3-Hour Averaging Period Assumptions (SO_2)

- All three turbines operating at full load with duct firing.
- The auxiliary boiler is operating at full load.
- The emergency generator and firewater pump engine are tested.

8-Hour Averaging Period Assumptions (CO)

- All three turbines have undergone start-up and are operating at full load with duct firing for the other 5 hours.
- The auxiliary boiler is operating at full load.
- The emergency generator and firewater pump engine are tested.

24-Hour Averaging Period Assumptions (SO_2)

- All three turbines operating at full load with duct firing.
- The auxiliary boiler is operating at full load.
- The emergency generator and firewater pump engine are tested.

The worst-case emergency engine 1-hour NO_x impacts were modeled separately using NOx_OLM. The results of the worst-case start-up emissions modeling analysis are shown in **AIR QUALITY Table 27.**

Air Quality Table 27
SJVEC Ambient Air Quality Impact
Staff Worst-Case Start-up Short-Term Operational Impact ISC Modeling

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]	1-Hour	156.0	161.7	317.7	470	CAAQS	68
CO	1-Hour	646	4,370	5,738	23,000	CAAQS	22
	8-Hour	124	2,900	3,024	10,000	CAAQS	30
SO_2	1-Hour	20.8	28.8	49.6	655	CAAQS	8
	3-Hour	6.9	26.0	32.9	1,300	NAAQS	3
	24-Hour	0.87	16.5	17.4	105	CAAQS	17

Note(s):
a. Maximum 1-hour Turbine start-up concentrations. The maximum fire pump engine NO_x value was modeled using NOx_OLM and was found to be 234.6 $\mu g/m^3$.
b. Background values have been adjusted per staff recommended background concentrations shown in Table 9.

Commissioning emissions were modeled for three separate high emission events: no load first fire; 60 percent load no SCR; and full load no SCR. The exhaust parameters were determined through linear interpolation of the fuel use estimates provided by the Applicant. Additionally, it was assumed that during the no load first fire case the exhaust temperature is 800°F (i.e. no heat recovery in the HRSG), while the exhaust temperatures for the other cases are based on the normal non-duct firing operating case. The two other turbines were modeled assuming that they were operating at full load with duct firing while the third turbine was being commissioned. The Applicant has stipulated that they will only commission one turbine at a time. The results of the commissioning emissions modeling analysis are shown in **AIR QUALITY Table 28.**

Air Quality Table 28
SJVEC Ambient Air Quality Impact
Staff Commissioning Worst-Case Short-Term Engine Impact ISC Modeling

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]	1-Hour	120.3	161.7	282	470	CAAQS	60

Note(s):
a. Maximum 1-hour Turbine commissioning concentrations. NOx OLM modeling was not performed as modeled impacts did not require refined OLM modeling.
b. Background values have been adjusted per staff recommended background concentrations shown in Table 9.

The worst-case commissioning event was determined to be the 60 percent load no SCR case. The modeling results indicate that the commissioning emissions do not have the potential to cause create significant ambient air quality impacts.

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 PM_{10}. 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 SJVEC do have the potential (if left unmitigated) to contribute to higher ozone levels in the region.

Secondary PM_{10} 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 (EPA or CARB) recommended models or procedures for estimating nitrate or sulfate formation. However, because of the known relationship of NO_x and SO_2 emissions to secondary PM_{10} formation, it can be said that the emissions of NO_x and SO_2 from the SJVEC do have the potential (if left unmitigated) to contribute to higher PM_{10} 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," that remains in the exhaust after passing through the SCR catalyst system. The San Joaquin Valley, as a result of agricultural ammonia emissions, is ammonia rich, meaning that ammonia is not the limiting reactant for secondary PM_{10} formation. This means higher ammonia emissions will not necessarily result in additional secondary PM_{10} formation; however, reducing NO_x emissions will almost certainly reduce secondary PM_{10} formation. While the ammonia emissions are recognized as a necessary by-product of the NO_x control system, staff still encourages the Applicant to control their ammonia slip emissions to the lowest possible extent, while maintaining the guaranteed NO_x emission limit.

The Applicant is proposing to mitigate the project's NO_x and VOC emissions through the use of emission offsets. The NO_x and VOC offsets, even considering the District's

offset thresholds and exempt emission sources, will be provided at greater than a 1:1 ratio. The Applicant is not currently proposing to mitigate the project's SO_2 emissions. Staff is recommending that SO_2 offsets be required at a 1:1 ratio to mitigate the project's SO_2 emissions. With this additional offset mitigation it is staff's determination that the project will not cause significant secondary pollutant impacts.

Odor Assessment

No odor impact is anticipated from the operation of the main power facilities, as no significant emissions of odorous compounds would result from the gas turbines, auxiliary boiler, cooling tower, natural gas compressors, or emergency equipment exhausts under normal operations. The odor threshold for ammonia is approximately 5 to 10 ppm, and the stack emissions of ammonia for the gas turbine and auxiliary boiler exhausts will be limited to 10 ppm on a 24-hour basis. There is the potential for somewhat higher short-term ammonia emission concentrations (i.e. concentration spikes), particularly during startup, shutdown or during load swings. However, after dispersion the maximum ammonia concentrations at ground level will be well below the odor threshold. Odors resulting from accidents could occur; please see the HAZARDOUS MATERIAL section for further discussion of the consequence analysis of ammonia storage and handling accidents.

VISIBILITY IMPACTS

A visibility analysis of the project's gaseous emissions is required under the Federal Prevention of Significant Deterioration (PSD) permitting program. The SJVEC project is considered a new major source for both NO_x and CO. Emissions of SO_2 and VOC from the project would be below the 100 tons per year major source threshold. However, since the project is considered a major source for at least one criteria pollutant, PSD review is required for the entire facility. The Applicant's screening level modeling analysis indicated that the project's impacts are below the PSD significance thresholds (SJVEC 2001a, Table 8.1-32, page 8.1-42), therefore no further analysis was performed. The nearest Class I area is Pinnacles Wilderness, located between 50 and 100 km from the project site.

The EPA has not completed their processing of the SJVEC PSD application and has not received comment on the visibility analysis from the National Forest Service. However, due to the distance to the nearest Class I area, staff considers it likely that the project's visibility impacts to Class I areas would be insignificant.

MITIGATION

Construction Mitigation

As described in the applicable LORS section, District Regulation VIII (i.e. Series 8000) rules limit fugitive dust during the construction phase of a project. Staff will recommend 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

In the AFC (SJVEC 2001a, Appendix 8.1D, page 8.1D-2) the Applicant proposes to implement the following measures to reduce emissions during construction activities. The Applicant's PM_{10} emissions estimates in **AIR QUALITY Tables 10** to **14** and construction modeling results in **AIR QUALITY Tables 21** to **23** assume the use of these emission control measures.

To control exhaust emissions from heavy diesel construction equipment:

- Limit engine idling time and shutdown equipment when not in use (a specific time limit was not provided).
- Perform regular preventative maintenance to reduce engine problems.
- Use CARB low-sulfur and low aromatic fuel for all heavy construction equipment.
- Use low-emitting diesel engines meeting EPA emission standards for construction equipment.

To control fugitive dust emissions:

- Use water application or chemical dust suppressant on unpaved travel surfaces and unpaved parking areas.
- Use vacuum sweeping or water flushing on paved travel surfaces and parking areas.
- Require all trucks hauling loose material to cover the contents or maintain a minimum of two feet of freeboard.
- Limit traffic speed on unpaved roads to 25 miles-per-hour (mph).
- Install sandbags or other erosion control measures.
- Re-plant vegetation in disturbed areas as soon as possible.
- Use gravel pads and wheel washers or wash truck tires leaving the construction site as needed.
- Use wind breaks and/or water or chemical dust suppressant to control wind erosion from disturbed areas.

Adequacy of Proposed Mitigation

The applicant's proposed mitigation was included in the modeling analysis as summarized on **AIR QUALITY Tables 21** to **23**. The modeling analysis shows that the Applicant's mitigated construction PM_{10} impacts are predicted to be significant. Therefore, the Applicant's proposed mitigation is not adequate.

The maximum 24-hour PM_{10} impacts occur to the southeast and northwest of the proposed project site and are highest at the fence line and decrease with distance from the proposed project site. The directions of maximum impact correspond to the prevalent annual wind direction (to the southeast) and the prevalent winter wind direction (to the northwest). The center of the town of San Joaquin is located less than

a mile northwest from the project site. The 24-hour PM_{10} construction impact concentrations, considering no limitations to operating schedule, were determined to be over 20 ug/m^3 up to and just past the center of the town of San Joaquin and over 10 ug/m^3 over all of the inhabited areas of the town. Therefore, additional measures are required to mitigate the PM_{10} construction impacts.

Staff is proposing additional construction mitigation measure to mitigate the construction PM_{10} significant impacts.

Staff Proposed Mitigation

Staff is recommending construction PM_{10} emission mitigation measures that include some of the mitigation measures proposed by the Applicant and several additional construction PM_{10} emission mitigation measures in Conditions of Certification **AQ-C1** through **AQ-C7**.

Staff recommends **AQ-C1** to require the applicant to have an on-site construction mitigation manager and fugitive dust mitigation manager, who together 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-C2**.

Staff recommends fugitive dust mitigation measures be provided in Condition of Certification **AQ-C3**. **AQ-C3** includes the following revisions to, or additions to, the fugitive dust mitigation measures proposed by the Applicant.

- Identification of employee parking area(s) and surface composition of these area(s);
- Use of gravel in high traffic areas and the construction laydown area;
- Covering of soil stockpiles;
- Use of paved access aprons;
- Limit traffic speed to 10 mph;
- Suspension of all earth moving activities under windy (i.e. sustained winds >25 mph) conditions;
- Use of on-site monitoring devices; and
- Restrict idle time, to the extent practical, to no more than 10 minutes.
- Additional mitigation measures to be implemented, if necessary, based on the impacts found during monitoring.

Staff recommends Conditions of Certification **AQ-C4** and **AQ-C6** to require the preparation and implementation of diesel and gasoline powered construction equipment mitigation plans, respectively. **AQ-C4** substantially expands and refines the diesel powered equipment mitigation measures proposed by the Applicant.

Staff recommends Condition of Certification **AQ-C5** to require the Applicant to conduct ambient air monitoring during excavation, earthmoving and grading activities, where differences in the upwind and downwind PM_{10} concentrations of greater than 5 ug/m^3 will trigger additional fugitive dust mitigation measures. Staff has concluded that maintaining the 24-hour construction PM_{10} residential impacts to less than 1 ug/m^3 would constitute a less than significant impact. An analysis of the modeling results indicates that maintaining the fence line construction PM_{10} concentrations, which are the difference in the upwind and downwind concentrations at the fence line, to no more than 5 ug/m^3 would assure that the residential 24-hour impacts would be less than 1 ug/m^3.

Staff recommends Condition of Certification **AQ-C7** to limit the main fugitive dust causing activities (i.e. scraping, grading, trenching and other earthmoving activities to the hours of 7 am to 5 pm; and limits the use of construction equipment rated over 100 brake horsepower to the hours of 7 am to 8 pm.

Staff believes that the construction air quality impacts will be less than significant with the implementation of the mitigation and compliance assurance measures contained in the recommended Conditions of Certification.

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, an oxidation catalyst, air inlet filter cooler, lube oil vent coalescer, and operate exclusively on pipeline quality natural gas to limit turbine emission levels. The AFC (SJVEC 2001a, page 8.1-50 and 8.1E-1), Data Adequacy Response (SJVEC 2001b, Attachment 12-AQ-9, Table 8.1A-8, revised 3/21/02), CO Emissions Limits (SR 2002a), and PDOC (SJVAPCD 2002a) provide the following BACT emission limits for each CTG:

- NO_x: Emissions - 2.5 ppmvd at 15 percent O_2 (1-hour average, excluding startup/shutdown) and 2.0 ppmvd at 15 percent O_2 (annual average, excluding startup/shutdowns), and 17.83 lb/hr with no duct firing and 23.77 lb/hr with duct firing (1-hr rolling average) and 14.26 lb/hr with no duct firing and 19.02 lb/hr with duct firing (annual average)
- CO: Emissions - 4.0 ppmvd at 15 percent O2 and 17.37 lb/hr with no duct firing and 23.14 lb/hr with duct firing (3-hr rolling average, excluding startup/shutdown)
- VOC: Emissions - 2.0 ppmvd at 15 percent O2 and 3.48 lb/hr with no duct firing and 6.63 lb/hr with duct firing (3-hr rolling average, excluding startup/shutdown)
- PM10: Emissions – 9.0 lb/hr with no duct firing and 11.5 lb/hr with duct firing
- SO2: Emissions – 1.38 lb/hr with no duct firing and 1.84 lb/hr with duct firing
- NH3: Emissions - 10 ppmvd at 15 percent O2 (1-hour rolling average) and 26.41 lb/hr with no duct firing and 35.19 lb/hr with duct firing

For the auxiliary boiler, the Applicant would employ low NO_x burners, SCR with ammonia injection, an oxidation catalyst and operate exclusively on pipeline quality natural gas to limit the project's emission levels. The AFC (SJVEC 2001a, page 8.1-50), Data Adequacy Response (SJVEC 2001b, Attachment 12-AQ-9, Table 8.1A-8, revised 3/21/02), and PDOC (SJVAPCD 2002a) provide the following emission rates:

- NOx: Emissions - 9 ppmvd at 3 percent O2 and 1.80 lb/hr
- CO: Emissions - 50 ppmvd at 3 percent O2 and 6.20 lb/hr
- VOC: Emissions - 10 ppmvd at 3 percent O2 and 0.69 lb/hr
- PM10: Emissions – 3.30 lb/hr
- SO2: Emissions – 0.11 lb/hr
- NH3: Emissions – 0.74 lb/hr

For the cooling tower, the Applicant has proposed a high efficiency drift eliminator to reduce the PM10 emissions from the cooling tower. The drift rate for the drift eliminator will be limited to 0.0005 percent.

Additionally, the diesel fire pump and emergency generator must meet SJVAPCD BACT requirements. The Preliminary Determination of Compliance (SJVAPCD 2002a), and Data Adequacy Response (SJVEC 2001b, Attachment 12-AQ-9, Table 8.1A-8, revised 3/21/02), provides the following emissions control technology, or emission limits, or estimated emission rates:

Natural Gas Emergency IC Engines Driving Generators:

- NO_x: Emissions – 2.63 lb/hr, and 0.78 g/hp-hr (grams per horsepower hour)
- CO: Emissions – 8.43 lb/hr, and 2.5 g/hp-hr
- VOC: Emissions – 1.42 lb/hr, and 0.42 g/hp-hr
- PM10: Emissions – 0.10 lb/hr, 0.01 lb/MMBtu, and natural gas fuel
- SO2: Emissions – 0.01 lb/hr, 0.0007 lb/MMBtu, and natural gas fuel.

Diesel Emergency IC Engines Driving Fire Pumps:

- NOx: Emissions – 3.89 lb/hr, and 5.89 g/hp-hr
- CO: Emissions – 2.35 lb/hr
- VOC: Emissions – 0.48 lb/hr
- PM10: Emissions – 0.17 lb/hr, and 0.25 g/hp-hr
- SO2: Emissions – 0.11 lb/hr
- SO2: Fuel sulfur content limit of 0.05 percent sulfur by weight.

Emission Offsets

District Rule 2201 requires that the Applicant provide emission offsets, in the form of banked ERCs, for the project's emissions of NO_x, VOC and PM_{10}. For CEQA compliance, the CEC requires that all non-attainment pollutants and their precursors that do not require offsets by District regulation be mitigated at a minimum 1:1 ratio (i.e. for SJVEC such a pollutant is SO_2). **AIR QUALITY Table 29** shows the Applicant's estimate of the emission liabilities that need to be mitigated. Detailed annual emissions information is provided in **AIR QUALITY Table 19**.

AIR QUALITY Table 29
SJVEC Annual Emission Liability (lb/year)

	NO_x	VOC	PM_{10}	SO_2	CO [b]
Emissions [a]	**535,002**	**157,357**	**294,136**	43,646	1,637,431
Offset Threshold	20,000	20,000	29,200	54,750	200,000
District Offset Liability	515,002	137,357	264,936	---	---
Applicants Offset Proposal	515,038	137,403	264,918	---	---

From Data Adequacy (SJVEC 2001b) Attachment 12-AQ-9, Table 8.1A-8, revised 3/21/02, CO Emissions Limits (SR 2002a), and PDOC (SJVAPCD 2002a).
Note(s):
a. Emissions from the diesel fire pump and emergency generator are exempt from requiring emissions offsets because they do not operate more than 200 hours per year for non-emergency purposes and are not used pursuant to voluntary arrangements with a power supplier to curtail power.
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.

Emergency equipment that is used exclusively as emergency standby equipment for electrical power generation or any other emergency equipment as approved by the APCO that does not operate more than 200 hours per year for non-emergency purposes and is not pursuant to voluntary arrangements with a power supplier to curtail power, is exempt by District rules from providing emission offsets. With the exception of SO_2, a minimum offset ratio of greater than 1:1 is proposed for all non-attainment pollutants and their precursors.

All air pollutant offsets provided for the project are estimated on a quarterly basis. 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. The District requires a 1.2:1 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 District determines appropriate interpollutant offset ratios on a case-by-case basis.

The EPA has imposed, and then has stayed, 2:1 offset ratio sanctions on the District due to initial disapproval, and then conditional approval, of the following rules: Rules 4103 (PM_{10} and PM_{10} precursors), 4354 (NO_x), and 4653 (VOC and NO_x); and Regulation VIII rules (PM_{10} and PM_{10} precursors). The offset ratio sanction stay for Rule 4103 is now permanent. The offset ratio sanctions have been recently stayed for Rules 4354 (April 24, 2002), 4653 (May 7, 2002), and Regulation VIII (April 1, 2002). The offset ratio sanction stays for Rules 4354 and 4653 are scheduled to be permanent 60 days after the initial stay date. The offset ratio sanction stay for Regulation VIII, will

not become permanent until EPA has had time to address public comments on the proposed sanction stay. No other offset sanctions are scheduled to take place until February 2003. Therefore, based on the schedule for this project, it should not be affected by these offset sanctions. If any of these offset sanctions are in affect at the time of the Staff Assessment Addendum, the offset tables will be revised to include the appropriate sanction(s).

As shown in **AIR QUALITY Table 30** through **AIR QUALITY Table 32**, the Applicant has demonstrated that they have purchased or have the rights to purchase ERCs in quantities that are sufficient to offset the project's NO_x, PM_{10}, and VOC emissions. However, USEPA has challenged the validity of two of these ERC sources (USEPA 2002).

NO_x Emission Offsets

AIR QUALITY Table 30 provides a summary of the total project NO_x emissions and identifies the project offset sources. ERC S-1340-2 was generated from converting steam generators to gas fired and adding flue gas recirculation (FGR). ERC S-1280-2 was generated from the shutdown of a gas turbine engine. ERC N-272-2 was generated from the shutdown of emissions units. ERC S-1554-2 was generated from the retrofit of 31 IC Engines with pre-combustion chambers, and the split and transfer from certificate S-1478-2.

AIR QUALITY Table 30
NO_x Offsets Available for the San Joaquin Valley Energy Center

Offset Source Location	Type of Credit	Credit Number	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
Heavy oil western, Taft oilfield	ERCs	S-1340-2	45,681	47,927	46,196	44,813
18405 Hwy 33, McKittrick	ERCs	S-1280-2	20,238	17,410	19,037	19,604
18800 South Spreckels Rd.	ERCs	N-272-2	308	36,838	15,649	308
Elk Hills Gas Plt, Kern County [a]	ERCs	S-1554-2	185,147	188,556	191,964	191,964
Total ERCs Provided	---	---	**251,374**	**290,731**	**272,846**	**256,689**
Total Offsets Provided @1.5:1	---	---	**167,583**	**193,821**	**181,897**	**171,126**
Total Required [b]	---	---	128,751	128,751	128,751	128,751
Total Unadjusted Remaining	---	---	38,832	65,070	53,146	42,375
Balance Remaining * (adjusted for 1.5:1 ratio)	---	---	**58,248**	**97,605**	**79,719**	**63,563**

From Data Response, Set 2A (SJVEC 2002b) Attachment AQ-154a/b, and PDOC (SJVAPCD 2002a).
Note(s):
a. Certificate shared by Pastoria Project.
b. Total Required per Year = (Annual Emissions – Offset) / 4 Quarters = (535,002 - 20,000) / 4 =128,751.
* 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.

Pending approval of these ERC sources, the Applicant is in compliance with the District's NO_x offset requirements and is providing ERCs at a total offset ratio of greater than 1:1. However, USEPA is disputing the validity of ERC certificate S-1554-2 (USEPA 2002). Therefore, the Applicant may have to secure other ERC sources to offset the project's NO_x emissions.

PM_{10} Emission Offsets

AIR QUALITY Table 31 provides a summary of the total project PM_{10} emissions and identifies the project offset sources. ERCs N-208-4 and C-449-4 were generated from the shutdown of entire stationary sources. ERC C-347-4, C-448-4 and S-1693-4 were generated from the shutdown of emissions units. ERC S-1577-4 was generated from the retrofit of screen baskets and cyclones with more efficient cyclones. ERC N-297-4 was generated from the retrofit of a cotton gin with 1D-3D cyclones. ERC S-1578-4 was generated from the replacement of screen baskets with cyclones. ERC C-447-4, S-16664, S-1682-4, S-1683-4, S-1684-4, S-1685-4, S-1686-4, S-1687-4, S-1688-4, S-1689-4, S-1690-4, S-1691-4, and S-1692-4 were generated from the shutdown of cotton gins.

AIR QUALITY Table 31
PM_{10} Offsets Available for the San Joaquin Valley Energy Center

Offset Source Location	Type of Credit	Credit Number	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
18800 South Spreckels Road, Manteca	ERCs	N-208-4	715	8,177	6,581	715
2907 S. Maple Avenue, Fresno	ERCs	C-347-4	50,845	67,976	8,408	42,056
12490 Garzoli, McFarland	ERCs	S-1577-4	489	0	0	23,085
12021 Avenue 328, Visalia	ERCs	S-1578-4	421	0	176	46,954
526 Mettler Frontage Road East, Mettler	ERCs	S-1666-4	0	0	0	18,238
217 W. Terra Bella Avenue, Pixley	ERCs	S-1682-4	1,340	0	0	0
Mesa Gin, near Lost Hills	ERCs	S-1683-4	0	0	0	1,462
18281 Beech Street, Shafter	ERCs	S-1684-4	0	0	0	11,843
12838 Wible Road, Bakersfield	ERCs	S-1685-4	2,953	0	0	8,168
12838 Wible Road, Bakersfield	ERCs	S-1686-4	87	0	721	10,072
2800 Renfro Road, Bakersfield	ERCs	S-1687-4	0	0	610	0
12112 Copus Road, Bakersfield	ERCs	S-1688-4	0	0	0	2,736
16351 Avenue 40, Earlimart	ERCs	S-1689-4	0	0	0	2,604
Weedpatch Hwy / Wheeler Ridger Road	ERCs	S-1690-4	0	0	0	1,830
3 miles North of Twisselman on Hwy 33	ERCs	S-1691-4	0	0	0	856
9213 Old River Road, Bakersfield	ERCs	S-1692-4	0	0	987	14,019
27/29S/27E	ERCs	S-1693-4	1,091	1,103	1,115	1,115
7870 W. Hutchins Road, Dos Palos	ERCs	N-297-4	0	0	101	66,394
5391 W. Lincoln	ERCs	C-447-4	0	0	0	7,953
3570 W. Ashlan Avenue, Fresno	ERCs	C-448-4	1,067	1,067	1,067	1,067
525 W. Third Street, Hanford	ERCs	C-449-4	82	28	373	674
Total ERCs Provided	---	---	**59,090**	**78,351**	**20,139**	**261,841**
Total Offsets Provided @ 1.5:1	---	---	**39,393**	**52,234**	**13,426**	**174,561**
Total Required [a]	---	---	66,234	66,234	66,234	66,234
Difference	---	---	-26,841	-14,000	-52,808	108,327
Distribute Q4 to Q3, Q2 and Q1	---	---	**26,841**	**14,000**	**52,808**	**-93,649**
Total Unadjusted Remaining	---	---	**0**	**0**	**0**	**14,678**
ERC Balance Remaining * (adjusted for 1.5:1 ratio)	---	---	**0**	**0**	**0**	**22,017**

From Data Response, Set 2A (SJVEC 2002b) Attachment AQ-154a/b, and PDOC (SJVAPCD 2002a).

Note(s):
a. Total Required per Year = (Annual Emissions – Offset) / 4 Quarters = (294,136 - 29,200) / 4 = 66,234.
* 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.

Pursuant to Section 4.13.7 of the SJVAPCD, actual emissions reductions for PM that occurred from October through March (Q4 to Q1) may be used to offset increases in PM during any period of the year. Worst-case ambient PM conditions occur during winter and fall (Q4 to Q1). To further encourage the production of ERC credits in Q4 and Q1, the SJVAPCD allows these credits to be applied to any period of the year. For the SJVEC, surplus PM_{10} credits from the 4th quarter (Q4) are therefore applied to the 1st, 2nd, and 3rd quarters (Q1, Q2, and Q3). Thus, pending the approval of the proposed ERCs, the Applicant is in compliance with the District's PM_{10} offset requirements and is providing ERCs at a total offset ratio of greater than 1:1.

VOC Emission Offsets

AIR QUALITY Table 32 provides a summary of the total project VOC emissions and identifies the project offset sources. ERC C-348-1 was generated from the shutdown of emissions units. ERC S-1425-1 was generated from the installation of a cyclic well vent vapor control system. ERC S-1665-1 was generated from equipment modifications and shutdowns. ERC S-1549-1 was generated from the installation of a VOC collection/ condensation system for fire/flood operation.

AIR QUALITY Table 32
VOC Offsets Available for the San Joaquin Valley Energy Center

Offset Source Location	Type of Credit	Credit Number	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
2907 S. Maple Avenue, Fresno	ERCs	C-348-1	30,485	30,519	30,470	30,501
Heavy Oil Western Stationary Source	ERCs	S-1425-1	24,274	24,274	24,274	24,274
South Coles Levee Gas Plant	ERCs	S-1665-1	8,440	8,546	8,621	8,621
Heavy Oil Western Stationary Source, Moco T [a]	ERCs	S-1549-1	4,952	5,873	6,795	6,794
Total ERCs Provided	---	---	**68,151**	**69,212**	**70,160**	**70,190**
Total Offsets Provided @ 1.5:1	---	---	**45,434**	**46,141**	**46,773**	**46,793**
Total Required [b]	---	---	34,340	34,340	34,340	34,340
Total Unadjusted Remaining	---	---	11,094	11,801	12,433	12,453
Balance Remaining (adjusted for 1.5:1 ratio)	---	---	**16,641**	**17,702**	**18,650**	**18,680**

From Data Response, Set 2A (SJVEC 2002b) Attachment AQ-154a/b, and PDOC (SJVAPCD 2002a).
Note(s):
a. Certificate shared by Pastoria Project.
b. Total Required per Year = (Annual Emissions – Offset) / 4 Quarters = (157,357 - 20,000) / 4 = 34,340.
* 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.

Pending approval of these ERC sources, the Applicant is in compliance with the District's VOC offset requirements and is providing ERCs at a total offset ratio of greater than 1:1. However, USEPA is disputing the validity of ERC certificate S-1425-1 (USEPA 2002). Therefore, the Applicant may have to secure other ERC sources to offset the project's VOC emissions.

SO_2 Emission Offsets

SO_2 emission offsets are not required by District Rule 2201 for this project, and the Applicant is not proposing to provide SO_2 emission offsets. However, SO_2 emissions are a precursor to PM_{10}, which is a nonattainment pollutant at the project site area. As part of the CEQA evaluation, the CEC staff recommends that all non-attainment pollutants and their precursors that do not require offsets by District regulation be mitigated at a minimum 1:1 ratio.

Adequacy of Proposed Mitigation

With the exception of the turbine 1-hour NO_x concentration limit, Staff concurs with the Applicant's and the District's determination that the project's proposed emission controls/emission levels meets BACT requirements. Staff believes that the BACT/ Lowest Achievable Emission Rate (LAER) limit for 1-hour NOx concentrations should be 2.0 ppm at 15 percent O_2 rather than 2.5 ppm at 15 percent O_2. The District has indicated that in the FDOC it intends to revise the 1-hour NOx emission limit to 2.0 ppm at 15 percent O_2, and that it intends to revise the hourly VOC emission limit to 1.4 ppm when operating without duct firing. Any revisions to the BACT emission limits provided in the FDOC will be included in a supplement to the Staff Assessment.

The Applicant is proposing to provide adequate offsets for the project's NO_x, VOC and PM_{10} emissions. However, the District does not require offsets for the project's SO_2 emissions, and the Applicant is not proposing to offset these emissions. Staff believes that it is necessary to fully mitigate all non-attainment pollutants and their precursors at a minimum offset ratio of 1:1. CEC staff is aware that SO_2 ERCs are available to the Applicant, thus SO_2 impacts can be fully mitigated by providing the required SO_2 ERCs.

Recently, staff at the USEPA has brought to the attention of CEC staff issues relating to the validity of the ERCs being granted by the SJVAPCD. In their letter to the District dated May 6, 2002 the USEPA questions the validity of VOC certificate S-1425-1 and NO_x certificate S-1554-2 based on being pre-1990 emission reductions. As these ERCs constitute a large fraction of the proposed ERCs for VOC and NOx, their validity is of great concern and staff cannot determine that the proposed offset package provides adequate project mitigation until this issue is resolved. Additionally, USEPA indicated in their comment letter that they had not completed a full review of the all ERCs being proposed for this project and may provide further comment. Staff will continue to work with the USEPA and the District on this issue and will present any revisions to the ERC package in a supplement to the Staff Assessment.

Staff Proposed Mitigation

Staff has provided comment to the SJVAPCD that the BACT/LAER turbine 1-hour NOx emission limit should be 2.0 ppm at 15 percent O_2. Staff has not revised the NOx emission limit, but may do so if the District does not change its BACT determination.

Staff is proposing that the project's SO_2 emissions be offset at a 1:1 ratio. The limits and requirements of staff's recommended operations mitigation measure are provided in Staff's recommended Condition of Certification **AQ-C10** and the District's Conditions of Certification **AQ-1** through **AQ-117**.

CUMULATIVE IMPACTS

To evaluate the cumulative emission impacts of the San Joaquin Valley Energy Facility, District records were evaluated to determine other sources that may cumulatively impact the site area. The following criteria were used to identify other stationary emission sources located within six miles of the SJVEC site that may contribute to cumulative impacts:

- Sources that have received an Authority to Construct (ATC) permit and operation began after 1999.
- Sources that have received an Authority to Construct (ATC) permit but are not yet operational; or
- Sources that have submitted complete ATC applications to the District.

Emissions from existing projects operating prior to and during 1999 are reflected in the background ambient air quality data. Therefore, it was not necessary to include them in the cumulative impact analysis.

A review of District records indicates that there are no new permitted projects or proposed projects with any non-VOC emissions potential of greater than 5 tons per year being permitted within 6 miles of the project site (SJVEC 2001a, page 8.1G-1). These are the types of projects that would have the potential to contribute to cumulative impacts. While there are three other known large power plant projects, including GWF Henrietta, Avenal Combined Cycle, and GWF Hanford Peaker, all proposed within 40 miles of the SJVEC, no significant overlap of the emission plumes from these widely spaced projects would be expected. Therefore, no cumulative modeling analysis was required and no significant cumulative impacts are expected as a result of this project in combination with other known projects.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than 50 percent within a six-mile radius of the proposed SJVEC power plant (please refer to **Socioeconomics Figure 1** in this Staff Assessment), and Census 1990 information that shows the low-income population is less than 50 percent within the same radius. Based on the Air Quality analysis, staff has not identified potential unmitigated significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no Air Quality environmental justice issues related to this project.

The Air Quality analysis indicates that the construction and operation of the project would not have the potential to create significant ambient air quality impacts for NO_2, CO or SO_2. Staff is proposing that the construction PM_{10} emissions be mitigated through the use of fugitive dust emission controls and tailpipe emission controls as outlined in staff Conditions of Certification **AQ-C1** through **AQ-C7**, and District Conditions of Certification **AQ-112** to **AQ-117**. With the implementation of these mitigation measures the construction PM_{10} impacts are considered to be less than significant. Additionally, with the proposed use of BACT and PM_{10} emission reduction credits the operational PM_{10} impacts are considered to be less than significant.

COMPLIANCE WITH LORS

The San Joaquin Valley Air Pollution Control District submitted a Preliminary Determination of Compliance (PDOC) for the SJVEC project on March 29, 2002 (SJVAPCD 2002a). Compliance with all District Rules and Regulations was demonstrated in the PDOC. The District's PDOC conditions are presented in the Conditions of Certification. If changes are made to the District's conditions in the Final Determination of Compliance (FDOC), they will be provided in an addendum to the Staff Assessment.

FEDERAL

Until issues relating to BACT and offsets are resolved compliance with the applicable federal Clean Air Act regulations for the SJVEC project cannot be demonstrated.

The PSD permit has not yet been completed and the PSD application is still in its early stages of review. Therefore, it is possible that project emission limits, or other changes may be necessary to meet federal requirements, and these changes will not occur until after the completion of the CEC licensing process. To address the issue of this continuing permit process, and the potential for permit revision requests, staff has included Conditions of Certification **AQ-C8** and **AQ-C9**.

STATE

Until issues relating to BACT and offsets are resolved compliance with Section 41700 of the California State Health and Safety Code cannot be demonstrated for this project.

LOCAL

The SJVAPCD is the lead agency for managing air quality and coordinating planning efforts within the Fresno County portion of the San Joaquin Valley Air Basin so that the ozone and PM_{10} standards are attained in a timely fashion. The District is responsible for developing that portion of the State Implementation Plan (SIP), and the Air Quality Management Plan (AQMP), that deals 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 U.S. EPA.

The SJVAPCD rules and regulations specify the emissions control and offset requirements for new sources such as the San Joaquin Valley Energy Center Facility. Best Available Control Technology (BACT) will be implemented, and emission reduction credits (ERCs), obtained by the Applicant and approved and certified by the SJVAPCD, will fully mitigate project's nonattainment pollutant (including precursors) emissions so that they would be consistent with the strategies and future emissions anticipated under the AQMP.

The compliance with local regulations is based in part on the PDOC (SJVAPCD 2002a) and in part based on expected comments on the PDOC that will be provided by USEPA. It is possible that other local regulation compliance issues will be raised during the PDOC comment period, or through changes incorporated in the FDOC that may require

revisions to be made the following rule compliance discussion, with those revisions being provided in an addendum to the Staff Assessment.

Rule 1080 – Stack Monitoring

The compliance with this rule is provided for in the Conditions of Certification.

Rule 1081 – Source Sampling

The compliance with this rule is provided for in the Conditions of Certification.

Rule 1100 – Equipment Breakdown

The compliance with this rule is provided for in the Conditions of Certification.

Rule 2010 – Permits Required

By the submission of an AFC and an Authority to Construct (ATC) application for the San Joaquin Valley Energy Center, the Applicant is complying with the requirements of the rule. The PDOC has been completed, the FDOC should be completed sometime in May, and the final permit will be issued upon CEC certification of this project.

Rule 2201 – New and Modified Stationary Source Review Rule

Section 4.1 – Best Available Control Technology

As shown in the PDOC, the Applicant's control technology proposal meets the Best Available Control Technology requirements of this rule as interpreted by the SJVAPCD. However, USEPA is likely to comment that it is their belief that the 1-hour NO_2 emission limit for the turbines, which for this air basin needs to meet Lowest Achievable Emission Rate (LAER) requirements, should be no higher than 2.0 ppm at 15 percent O_2. This issue will need to be resolved before staff can make a determination that the project complies with this rule.

Section 4.2 – Offsets

As shown in the PDOC and as shown above, the Applicant's offset mitigation proposal, in terms of the types and quantities of ERCs proposed, meets the requirements of this rule. However, the specific ERCs being proposed by the Applicant may not be acceptable per USEPA's determination (USEPA 2002), and this issue is currently unresolved. Therefore, staff cannot make a final compliance determination for this rule at this time. Staff will provide a final determination of the compliance with this regulation in a supplement to the Staff Assessment.

Rule 2520 – Federally Mandated Operating Permits

The rule generally requires that an affected source file for a Title V operating permit within 12 months of commencing operation. This requirement is provided as Condition of Certification **AQ-111**.

Rule 2540 – Acid Rain Program

SJVEC will be required to file for a Title IV Acid Rain operating permit to comply with this regulation. This requirement is also provided as Condition of Certification **AQ-58** and staff is recommending in the verification for this condition that the Title IV permit and necessary pollutant allotments be obtained prior to the first firing of the turbines.

Rule 4001 – New Source Performance Standards

The project's emission limits, which are listed in the proposed conditions of certification, are significantly lower than the limits required by the applicable New Source Performance Standard (Title 40, Code of Federal Regulations, Part 60, Chapter 1. Subpart GG).

Rule 4101 – Visible Emissions

The use of pipeline quality natural gas, proper combustion techniques and the PM_{10} BACT limits for the turbines, auxiliary boiler and emergency generator engine, and the use of CARB-certified diesel fuel or very low sulfur diesel fuel and oxidation catalyst (if technologically feasible) for the diesel firewater pump, will guarantee that the visible emissions are well less than No. 1 on the Ringelmann chart (20 percent opacity) for more than 3 minutes in any one hour.

Rule 4102 – Nuisance

The use of pipeline quality natural gas, proper combustion techniques, and the ammonia slip limit of 10 ppm at 15 percent O_2 will ensure the project's emission will not in any way cause a public nuisance.

Rule 4201 – Particulate Matter Concentration

The BACT PM_{10} emission limits for the turbines, auxiliary boiler, emergency generator and firewater pump engines will ensure that their respective particulate matter emissions are well below this rules emission limit of 0.1 gr/dscf of gas calculated to 12 percent carbon dioxide. The estimated turbine emissions are 0.0052 gr/dscf, with emissions for the auxiliary boiler, emergency generator and firewater pump engines expected to be from 3.5 to 7 times lower than the standard.

Rule 4202 – Particulate Matter Emission Rate

Gas and liquid fuels are excluded from the definition of process weight. Therefore, Rule 4202 does not apply to the proposed units.

Rule 4301 – Fuel Burning Equipment

The BACT emission limits for SO_2, NO_x, and PM_{10} for the HRSGs and auxiliary boiler will ensure that their respective emissions of air contaminants are well below the following limits established by this rule: 0.1 grain per dry standard cubic foot of gas calculated to 12 percent of carbon dioxide, 200 lb/hr of SO_2, 140 lb/hr of NO_x, and 10 lb/hr of combustion contaminants.

Rule 4351 – Boilers, Steam Generators, and Process Heaters – Reasonably Available Control Technology

The BACT emission limits for NO_x and CO for the HRSGs and auxiliary boiler will ensure compliance with this rule.

Rule 4701 – Stationary Internal Combustion Engines

Since the emergency generator and the firewater pump engines proposed for this project will be limited to 200 hours per year, or less, of non-emergency operation, they are exempt from this rule.

Rule 4703 – Stationary Gas Turbines

The Conditions of Certification taken from the PDOC include the required monitoring and record keeping requirements of this rule. The project's emission concentrations for NO_x and CO are guaranteed to be below the rule limit requirements of 9 ppm and 200 ppm, respectively.

Rule 4801 – SO_2 Concentration

The use of pipeline quality natural gas will guarantee that the emissions of sulfur compounds are no greater than 0.2 percent by volume calculated as SO_2 on a dry basis.

Rule 7012 – Hexavalent Chromium – Cooling Towers

The project will not use hexavalent chromium containing compounds for treating the cooling tower water. The compliance with this rule is provided for in the Conditions of Certification.

Regulation VIII – Fugitive PM10 Prohibitions

Rule 8011 – General Requirements; Rule 8021 – Construction, Demolition, Excavation, Extraction and Other Earthmoving Activities; Rule 8031 – Bulk Materials; Rule 8041 – Carryout and Trackout; Rule 8051 – Open Areas; Rule 8061 – Paved and Unpaved Roads; Rule 8071 – Unpaved Vehicle/Equipment Traffic Areas; Rule 8081 – Agricultural Sources

Staff proposed Condition of Certification **AQ-C1** requires that the project owner provide a Construction Fugitive Dust Mitigation Plan to be approved prior to construction and require compliance with all appropriate Regulation VIII rules. It should be noted that Rules 8011, 8021, 8031, 8041, 8051, 8061, 8071 and 8081 do not take effect until May 15, 2002. Since construction for the SJVEC will begin after the starting date of these new fugitive dust regulations, the SJVEC Construction Fugitive Dust Mitigation Plan, as required under Condition **AQ-C1**, must address these newly adopted rules. Additionally, proposed Conditions of Certification **AQ-112** to **AQ-117** require compliance with appropriate Regulation VIII rules.

FACILITY CLOSURE

The SJVEC has a planned life of 30 years or more. Eventually the SJVEC will close, as a result of the end of its useful life; through some unexpected situation such as a natural disaster or catastrophic facility breakdown; or if the facility became economically noncompetitive earlier than 30 years, forcing decommissioning. When the facility closes, all sources of air emissions would cease and thus all impacts associated with those emissions would no longer occur.

During the operating life of the facility, temporary facility closure may be required and permanent facility closure would eventually be required. Temporary closure constitutes an unexpected shutdown for a period exceeding the time required for normal maintenance (e.g., for overhaul or replacement of combustion turbines). Cause for temporary closure might include a disruption in the supply of natural gas or damage to the plant from an earthquake, fire, storm, or other event. Permanent closure constitutes

a complete cessation in operations with no intent to restart operations, due to plant age, damage to the plant that is beyond repair, economic conditions, or other reasons.

The Permit to Operate, issued by the District, is required for operation of the facility and the Applicant must pay permit fees annually while it maintains the Permit to Operate. If the Applicant chooses to close the facility and not pay the permit fees, then the Permit to Operate would be cancelled. In that event, the project could not restart and operate unless the Applicant pays the fees to renew the Permit to Operate.

When permanent closure occurs and if it were decided to dismantle the project's equipment and structures, there would likely be fugitive dust emissions associated with this dismantling effort. A Facility Closure Plan shall be submitted to the Energy Commission Compliance Project Manager and should include the specific details regarding how the Applicant plans to demonstrate compliance with the District Rules (i.e. Regulation VIII requirements) regarding fugitive dust emission mitigation.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

No written comments concerning air quality have been received from either the public or from any public agency. The response to any written comments received upon publication of this Staff Assessment will be incorporated in an addendum to the Staff Assessment. Staff attempted to provide information in this staff assessment to answer verbal comments received from the public at the public workshops and hearings for this project.

CONCLUSIONS

The SJVEC, with the implementation of the measures contained in the Conditions of Certification specified below, and resolution of the issues specified below, will not cause or significantly contribute to any new or existing violations of applicable ambient air quality standards. The SJVEC emissions of NO_x, SO_2 and CO will not cause a violation of any NO_2, SO_2 or CO ambient air quality standard, and therefore, their impacts are not significant. The project's air quality impacts from directly emitted PM_{10} and of the ozone precursor emissions of NO_x and VOC and PM_{10} precursors of NO_x and SO_2 could be significant if left unmitigated. The Applicant will reduce emissions to the extent feasible by using Best Available Control Technology, and provide emission offsets, obtained from stationary sources in the San Joaquin Valley Air Basin, for their NO_x, PM_{10}, VOC, and as recommended by staff their SO_2 emissions. The combination of these mitigation measures will reduce the potential for directly emitted PM_{10}, as well as ozone and secondary PM_{10} formation during operation to a level of insignificance.

As pointed out earlier in this analysis, staff has a caveat about the ERC package being proposed for the SJVEC. If, after further review, all parties are satisfied that the credits are valid and calculated correctly, the project's operating emissions are adequately mitigated. On the other hand, if it turns out that a portion of the ERCs will need to be reduced in quantity or replaced in whole, then the SJVEC may not be adequately mitigated unless the Applicant can secure additional ERC certificates. Therefore, at this

time staff cannot determine that the proposed emission reduction package adequately mitigates the project's operational impacts.

Additionally, with the exception noted below, the implementation of the Conditions of Certification, the SJVEC will be constructed and operated in compliance with all applicable laws, ordinances, regulations, and standards identified previously in this Assessment. Staff therefore concludes that, with the recommended Conditions of Certification and resolution of compliance issues, the SJVEC will not create any significant unmitigated direct or indirect adverse air quality impacts.

The District completed their Preliminary Determination of Compliance (PDOC) Evaluation on March 29, 2002 (SJVAPCD 2002a). The Energy Commission staff has incorporated the PDOC conditions into the Staff Assessment. The District recommended conditions are presented here as Conditions **AQ-1** through **AQ-117**. Staff also recommends the inclusion of eleven Conditions of Certification **AQ-C1** through **AQ-C11** to address the construction-related impacts, potential permit revisions, CEQA offset mitigation requirements, and operating record keeping requirements.

Staff has provided the District comments on the PDOC including several comments that directly relate to the PDOC Conditions. The comment issues include the 1-hour NO_2 emission limit, the source testing requirements, ammonia CEMS, and ERC certificates, among others. Changes in the District's conditions that occur between the PDOC and FDOC and any additional conditions considered necessary by staff to address unresolved issues will be provided in an addendum to the Staff Assessment.

Staff cannot recommend certification of the SJVEC at this time. However, after the resolution of the issues noted above it is likely that staff should be able to recommend the project. Therefore, in order to obtain timely comments from the public, concerned public agencies, and the Applicant, the District's PDOC and staff proposed Conditions of Certification have been provided in the Staff Assessment. As noted above, it is likely that some of these conditions will be revised, and the revised conditions will be provided in an addendum to the Staff Assessment.

CONDITIONS OF CERTIFICATION

STAFF CONDITIONS

AQ-C1 The project owner shall submit the resume(s) of their selected Construction Mitigation Manager(s) (CMM) and Fugitive Dust Mitigation Managers(s) (FDMM) to the CEC Compliance Project Manager (CPM) for approval. The project owner shall be responsible for funding the costs of the CMM and FDMM, however the CMM and FDMM shall report to the CPM. The CMM and FDMM shall preferably have a minimum of 8 years experience as follows; however the CPM will consider all resumes submitted regardless of experience:

- 5 years construction experience, as a subcontractor or general contractor.
- Must have an engineering degree or equivalent or an additional 5 years construction experience.
- 1 year construction project management experience.
- 2 years air quality assessment experience.
- Either the CMM or FDMM shall be certified by the State of California for Visible Emissions Evaluation (EPA Method 9), or be able to obtain certification prior to the initiation of construction activities.

The project owner shall make available a dedicated office for both the CMM and FDMM. The CMM shall be responsible for implementing all mitigation measures related to construction equipment combustion emissions, as outlined in Conditions of Certification **AQ-C4 and AQ-C6**. The FDMM shall be responsible for monitoring and enforcing the effectiveness of all mitigation measures for construction as outlined in Conditions of Certification **AQ-C3** and **AQ-C5**. A CMM shall be onsite or available to be onsite at any time, until deemed no longer necessary by the CPM. A FDMM shall be on-site during all construction activities, until deemed no longer necessary by the CPM. The CMM and FDMM shall be granted access to all areas of the main and related linear facility construction sites. The CMM and FDMM shall have the authority to stop construction on either the main power plant or the related linear facility construction sites as warranted by specific mitigation measures. The CMM and/or FDMM may not be terminated prior to the cessation of all construction activities unless approval is granted by the CPM.

Verification: The project owner shall submit the CMM and FDMM resume(s) to the CPM for approval at least 60 days prior to site mobilization.

AQ-C2 The CMM and FDMM shall submit to the CPM for approval, a Monthly Construction Compliance Report (MCCR). The MCCR will, at a minimum, summarize all compliance actions taken germane to Conditions of Certification **AQ-C3 through AQ-C7**. The MCCR shall include, at a minimum, the following elements:

Fugitive Dust Mitigation Monthly Report
(see Condition of Certification AQ-C3, AQ-C5, and AQ-C7)

- Identification of specific mitigation measure performed, the location performed, date performed and date enforced or verified as remaining effective.
- Identification of any transgressions or circumventions of mitigation measure and the actions taken to correct the situation.
- Identification of any observation by the FDMM of dust plumes beyond the property boundary of the main construction site or beyond an acceptable distance from the linear construction site and what actions (if any) where taken to abate the plume.
- A summary report of all ambient air monitoring data.

- Identification of daily fugitive dust producing operations, including the daily schedule for initial site preparation work activities (i.e. scraping, grading, trenching, and other earth moving activities).
- Identification of daily schedule of operation of construction equipment rated over 100 brake horsepower.

Diesel Construction Equipment Mitigation Monthly Report
(see Condition of Certification AQ-C4)

- Identification of any changes, as approved by the CPM, to the Diesel Construction Equipment Mitigation Plan from the initial report or the last monthly report including any new contractors and their diesel construction equipment.
- Copies of all receipts or other documentation indicating type and amount of fuel purchased, from whom, where delivered and on what date for the main and related linear construction sites.
- Identification and verification of all diesel engines required to meet EPA or CARB 1996 off-road diesel equipment emission standards.
- The suitability of the use of a catalyzed diesel particulate filter for a specific piece of construction equipment is to be determined by a qualified mechanic or engineer who must submit a report through the CMM to the CPM for approval. The identification of any suitability report being initiated, pursued or the completed report should be included the monthly report (in the month that it was completed) as should the verification of any subsequent installation of a catalyzed diesel particulate filter.
- Identification of any observation by the CMM of dark plumes emanating from diesel-fire construction equipment beyond the property boundary of the main construction site or beyond an acceptable distance from the linear construction site and what actions (if any) where taken to abate the plume or future expected plumes.

Gasoline Construction Equipment Mitigation Monthly Report
(see Condition of Certification AQ-C6)

- Identification of any change, as approved by the CPM, to the Gasoline Construction Equipment Mitigation Plan from the initial report or the last monthly report, including any new contractors and their gasoline construction equipment.
- Copies of all receipts or other documentation indicating the amount of gasoline purchased, from whom, where delivered and on what date for the main and related linear construction sites.
- Identification and verification of all gasoline engines required to meet California Emission Standards for Small Off-Road Engines, and all gasoline engines required to have catalytic converters and/or meet California on-road emission standards.

- Identification of any observation by the CMM of dark plumes emanating from gasoline-fired construction equipment beyond the property boundary of the main construction site or beyond an acceptable distance from the linear construction site and what actions (if any) where taken to abate the plume or future expected plumes.

Verification: The CMM and FDMM shall submit to the CPM for approval, the Monthly Construction Compliance Report (MCCR) for each month by the 15th (or the following Monday if the 15th is a Saturday or Sunday) of the following month while construction is occurring at the main or related linear construction sites.

AQ-C3 The FDMM shall prepare and submit for approval to the CPM, a Fugitive Dust Mitigation Plan (FDMP) that specifically identifies all fugitive dust mitigation measures that will be employed for the construction of the facility and is administered on site by the full time FDMM.

The construction mitigation measures that shall be addressed in the FDMP include, but are not limited to, the following:

- Identification of the employee parking area(s) and surface type(s) of the parking area(s);
- The frequency of watering of unpaved roads and all disturbed areas;
- Application of chemical dust suppressants;
- Gravel in high traffic areas;
- Paved access aprons;
- Sandbags to prevent run off;
- Posted speed limit signs;
- Wheel washing areas prior to large trucks leaving the project site;
- Methods that will be used to clean tracked-out mud and dirt from the project site onto public roads;
- For any transportation of borrowed fill material,
    1. Vehicle covers;
    2. Wetting of the transported material;
    3. Appropriate freeboard;
- Methods for the stabilization of storage piles and disturbed areas;
- Windbreaks at appropriate locations;
- The suspension of all earth moving activities under windy conditions (sustained winds above 25 mph); and,
- On-site monitoring devices.
- Additional mitigation measures to be implemented at the direction of the FDMM in the event that the standard measures fail to completely control dust from any activity and/or source.

In monitoring the effectiveness of all mitigation measures included in the FDMP, the FDMM shall take into account the following, at a minimum:

- Onsite spot checks of soil moisture content at locations where soil disturbance, movement and/or storage is occurring;

- Visual observations of all construction activities; and

- The results of measurements by portable PM_{10} instruments (as described in **AQ-C5**).

The FDMM shall implement the following procedures for additional mitigation measures if the FDMM determines that the existing mitigation measures are not resulting in adequate mitigation.

1. The FDMM shall direct more aggressive application of the existing mitigation methods within fifteen (15) minutes of making such a determination.

2. The FDMM 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.

3. The FDMM shall direct a temporary shutdown of the source of the emissions if step #2 specified above fails to result in adequate mitigation within one (1) hour of the original determination. The activity shall not restart until one (1) full hour after the shutdown. The project owner may appeal to the CPM any directive from the FDMM to shutdown a source, provided that the shutdown shall go into effect within one (1) hour of the original determination unless overruled by the CPM before that time.

These additional mitigation requirements are triggered by a difference in the upwind and downwind monitored PM_{10} concentration of >5 ug/m^3; visual observation of airborne dust migrating from the construction area(s); visual observation of mud or dirt track-out onto public roads; or other signs of dust mitigation measure ineffectiveness observed by the FDMM.

Verification: At least 30 days prior to site mobilization, the project owner shall provide the CPM with a copy of the Fugitive Dust Mitigation Plan (FDMP) for approval. Site mobilization shall not commence until the project owner receives approval of the FDMP from the CPM.

AQ-C4 The CMM shall prepare and submit to the CPM for approval a Diesel Construction Equipment Mitigation Plan (DCEMP) that will specifically identify diesel engine mitigation measures that will be employed during the construction phase of the main and related linear construction sites. The CMM will be responsible for implementing and maintaining all measures identified in the DCEMP. The DCEMP shall address, at a minimum, the following mitigation measures:

- Catalyzed diesel particulate filters (CDPF);
- CARB certified ultra low sulfur diesel fuel (ULSD), containing 15 ppm sulfur or less;
- Diesel engines certified to meet EPA and/or CARB 1996 or better off-road equipment emission standards.
- Restricting diesel engine idle time, to the extent practical, to no more than 10 minutes.

The Diesel Construction Equipment Mitigation Plan must include the following:

1. A list of all diesel-fueled, off-road, stationary or portable construction-related equipment to be used either on the main or the related linear construction sites. This list will be initially estimated and then subsequently updated, as specific information becomes available. Prior to a contractor gaining access to the main or related linear construction sites, the CMM will submit to the CPM for approval, an update of this list with regard to that contractor's diesel construction equipment.

2. Each piece of construction equipment listed under item #1 of this condition must demonstrate compliance according to the following mitigation requirements, except as noted in items #3, #4 and #5 of this condition:

Engine Size (BHP)	1996 CARB or EPA Certified Engine	Required Mitigation
< 100	NA	ULSD
> or = 100	Yes	ULSD
> or = 100	No	ULSD and CDPF, if suitable as determined by the CMM

3. If the construction equipment is intended to be on-site for ten (10) days or less, then none of the mitigation measures identified in item #2 of this condition are required.

4. The CPM may grant relief from the mitigation measures listed under item #2 of this condition for a specific piece of equipment if the CMM can demonstrate that they have made a good faith effort to comply with the mitigation measures and that compliance is not possible.

5. Any implemented mitigation measure in item #2 of this condition may be terminated immediately if one of the following conditions exists; however the CPM must be informed within ten (10) working days of the termination:

    5.1 The measure is excessively reducing normal availability of the construction equipment due to increased downtime for maintenance, and/or power output due to an excessive increase in back pressure.

    5.2 The measure is causing or is reasonably expected to cause significant engine damage.

    5.3 The measure is causing or is reasonably expected to cause a significant risk to workers or the public.

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

6. All contractors must agree to limit diesel engine idle time on all diesel-powered equipment to no more than ten (10) minutes, to the extent practical.

Verification: The CMM shall submit the initial Diesel Construction Equipment Mitigation Plan (DCEMP) to the CPM for approval at least 30 days prior to site mobilization. The CMM will update the initial DCEMP as necessary, no less than ten (10) days prior to a specific contractor gaining access to either the main or related linear construction sites. The CMM will notify the CPM of any emergency termination within ten (10) working days of the termination.

AQ-C5 The FDMM shall prepare and implement an Ambient Air Monitoring Program (AAMP) to measure PM_{10} emissions during excavation, earthmoving and grading activities. The project owner shall submit the AAMP to the CPM for review and approval. The AAMP shall include, at a minimum, the following:

- The use of real-time PM_{10} monitoring instruments;
- The simultaneous use of upwind and downwind monitors continuously during these activities;
- Description of how the monitors will be used to assess the effectiveness of the mitigation measures implemented under the FDMP, including assessing the potential need for monitoring multiple activities on site simultaneously;

Differences in the upwind and downwind monitored PM_{10} concentrations of greater than 5 ug/m^3 will trigger the additional mitigation requirements identified in Condition of Certification **AQ-C3**.

Verification: The AAMP shall be included as part of the FDMP required by Condition of Certification **AQ-C3**. Monitoring records, including monitoring data from all upwind and downwind monitors, and records of dust suppression measures implemented, shall be maintained on-site throughout construction and shall be made available to the CPM upon request. A summary of the monitoring records and the dust suppression activities shall be included in each MCCR. Any changes to the AAMP or associated protocols require approval from the CPM.

AQ-C6 The project owner shall mitigate, to the extent practical, construction related emission impacts from gasoline-fired construction equipment. Measures that shall be used to mitigate construction impacts are as follows:

- Small off-road gasoline powered construction equipment (i.e. 25 BHP or less) used at the project site and in the construction of the off-site water pipeline shall have been manufactured since 1995 and shall meet California Emission Standards for Small Off-Road Engines (California Code of Regulations Article 1 and Article 3, Chapter 9, Division 3, Title 13).
- Large off-road gasoline powered construction equipment (i.e. over 25 BHP), if any are used at the site, shall be equipped with catalytic converters.
- All on-road gasoline powered construction vehicles, excluding personal vehicles, shall meet California emission standards.

Gasoline Construction Equipment Mitigation Plan:

The Gasoline Construction Equipment Mitigation Plan (GCEMP) shall be submitted to the CPM for approval prior to site mobilization, and must include the following:

- A list of all gasoline fueled, off-road, on-road, stationary or portable construction-related equipment to be used either on the project construction site or the construction sites of the related linear facilities. Equipment used less than a total of 10 consecutive days need not be included in this list.
- Each piece of construction equipment listed under item (1) must demonstrate compliance with the mitigation requirements (A) through (C) listed above.
- If compliance cannot be demonstrated as specified under item (2), then the project owner may appeal for relief to the CPM. However, the owner must demonstrate that they have made a good faith effort to comply as specified under item (2).

Verification: The CMM shall submit the initial Gasoline Construction Equipment Mitigation Plan (GCEMP) to the CPM for approval at least (30) calendar days prior to site mobilization or start of construction on any associated linear facilities. The CMM will update the initial GCEMP as necessary, no less than ten (10) days prior to a specific contractor gaining access to the main or related linear construction sites.

AQ-C7 The project owner shall limit the site preparation fugitive dust causing activities (i.e. scraping, grading, trenching, or other earth moving activities) to the hours of 7 am to 5 pm daily, and shall limit the operation of all construction equipment rated over 100 brake horsepower to the hours of 7 am to 8 pm daily.

Verification: The project owner shall submit the Monthly Construction Compliance Report to the CPM as required in Condition of Certification AQ-C2.

AQ-C8 The project owner shall notify the CPM of any proposed modification by the project owner to any Federal (USEPA) or Local (SJVAPCD) issued air permits concurrent with submitting that proposed modification to any other agency with jurisdiction.

Verification: The project owner shall submit the information on the proposed air permit modification within five (5) working days of the proposed modification being submitted to the permit issuing agency. The project owner shall submit all Federal and Local air permits to the CPM within fifteen (15) days of their receipt.

AQ-C9 The project owner shall notify the CPM of any proposed modification by any agency with jurisdiction to any Federal, State or Locally issued air permits.

Verification: The project owner shall notify the CPM within 10 working days of being notified by any agency with jurisdiction of any proposed modifications to any Federal, State or Locally issued air permits.

AQ-C10 The project owner shall surrender to the District emission reduction credits in the following amounts to mitigate the projects SO_2 emissions:

	Required ERCs (lbs/quarter)			
Pollutant	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
SO_2	10,908	10,908	10,908	10,908

Verification: At least 5 days prior to commencing turbine first fire, the project owner shall provide to the CPM a copy of the documentation from the District proving that the required emission reduction credits have been surrendered.

AQ-C11 The project owner shall submit to the CPM and APCO Quarterly Compliance Reports, no later than 30 days following the end of each calendar quarter, that include operational and emissions information as necessary to demonstrate compliance with Conditions AQ-1 through AQ-117. The Quarterly Operational Report will specifically note or highlight incidences of noncompliance.

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

DISTRICT PRELIMINARY DETERMINATION OF COMPLIANCE CONDITIONS

SJVACPD Permit No. UNIT C-3959-1-0: 180 MW NOMINALLY RATED COMBINED-CYCLE POWER GENERATING SYSTEM #1 CONSISTING OF A SIEMENS-WESTINGHOUSE MODEL 501FD OR EQUIVALENT NATURAL GAS FIRED COMBUSTION TURBINE GENERATOR WITH DRY LOW NOX COMBUSTOR, A SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AN OXIDATION CATALYST, HEAT RECOVERY STEAM GENERATOR #1 (HRSG) WITH A 746 MMBTU/HR DUCT BURNER AND A 570 MW NOMINALLY RATED STEAM TURBINE SHARED WITH C-3959-2 AND C-3959-3.

SJVACPD Permit No. UNIT C-3959-2-0: 180 MW NOMINALLY RATED COMBINED-CYCLE POWER GENERATING SYSTEM #2 CONSISTING OF A SIEMENS-WESTINGHOUSE MODEL 501FD OR EQUIVALENT NATURAL GAS FIRED COMBUSTION TURBINE GENERATOR WITH DRY LOW NOX COMBUSTOR, A SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AN OXIDATION CATALYST, HEAT RECOVERY STEAM GENERATOR #2 (HRSG) WITH A 746 MMBTU/HR DUCT BURNER AND A 570 MW NOMINALLY RATED STEAM TURBINE SHARED WITH C-3959-1 AND C-3959-3.

SJVACPD Permit No. UNIT C-3959-3-0: 180 MW NOMINALLY RATED COMBINED-CYCLE POWER GENERATING SYSTEM #3 CONSISTING OF A SIEMENS-WESTINGHOUSE MODEL 501FD OR EQUIVALENT NATURAL GAS FIRED COMBUSTION TURBINE GENERATOR WITH DRY LOW NOX COMBUSTOR, A SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AN OXIDATION CATALYST, HEAT RECOVERY STEAM GENERATOR #3 (HRSG) WITH A 746 MMBTU/HR DUCT BURNER AND A 570 MW NOMINALLY RATED STEAM TURBINE SHARED WITH C-3959-1 AND C-3959-2.

Conditions of Certification AQ-1 through AQ-58 apply per turbine/HRSG unit unless otherwise identified.

AQ-1 The project owner shall obtain APCO and CPM approval for the use of any equivalent turbine not specifically approved by the Authority to Construct. Approval of an equivalent turbine shall only be made after the APCO's determination that the submitted design and performance data for the proposed turbine is equivalent to the approved turbine. [District Rule 2201]

Verification: The project owner shall submit a request for approval, including specific design and performance data for equivalent turbines not specifically approved by the Authority to Construct, to the APCO and CPM at least 90 days prior to the installation of the turbines.

AQ-2 The project owner's request for approval of an equivalent turbine shall include the following information: turbine manufacturer and model number, nominal megawatt (MW) rating, maximum heat input rating, and manufacturer's guaranteed emission concentrations. [District Rule 2201]

Verification: The project owner shall submit a request for approval for equivalent turbines not specifically approved by the Authority to Construct to the APCO and CPM at least 90 days prior to the installation of the turbines.

AQ-3 The project owner's request for approval of an equivalent turbine shall be submitted to the District and CPM at least 90 days prior to the planned installation date. The project owner shall also notify the District and CPM at least 30 days prior to the actual installation of the District and CPM approved equivalent turbine. [District Rule 2201]

Verification: The project owner shall submit a request for approval for equivalent turbines not specifically approved by the Authority to Construct to the APCO and CPM at least 90 days prior to the installation of the turbines, and notify the District and CPM at least 30 days prior to the actual installation of the approved equivalent turbine.

AQ-4 The owner of the San Joaquin Valley Energy Center (SJVEC) shall minimize the emissions from the gas turbine and heat recovery steam generator to the maximum extent possible during the commissioning period. Conditions **AQ-4** through **AQ-16** shall apply only during the commissioning period as defined below. Unless otherwise indicated, Conditions **AQ-17** through **AQ-58** and conditions **AQ-106** through **AQ-117** shall 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-10) information regarding the types and effectiveness of methods used to minimize commissioning period emissions.

AQ-5 Commissioning activities are defined as, but not limited to, all testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the SJVEC construction contractor to insure safe and reliable steady state operation of the gas turbines, heat recovery steam generators,

steam turbine, auxiliary boiler, and associated electrical delivery systems. [District Rule 2201]

Verification: None.

AQ-6 Commissioning period shall commence when all mechanical, electrical, and control systems are installed and individual system startup has been completed, or when a gas turbine is first fired, whichever occurs first. The commissioning period shall terminate when the plant has completed initial performance testing, is available for commercial operation, and has initiated sales to the power exchange. [District Rule 2201]

Verification: None.

AQ-7 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 CEC CPM as part of the monthly commissioning status report noted in the verification of Condition AQ-10.

AQ-8 At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturer and the construction contractor, the Selective Catalytic Reduction (SCR) system and the oxidation catalyst 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 CEC CPM as part of the monthly commissioning status report noted in the verification of Condition AQ-10.

AQ-9 Coincident with the steady-state operation of the SCR system and the oxidation catalyst, NO_x and CO emissions from this unit shall comply with the limits specified in condition **AQ-32**. [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-10.

AQ-10 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 and the oxidation catalyst, the installation, calibration, and testing of the NO_x and CO continuous emissions monitors, and any activities requiring the firing of this

unit without abatement by the SCR system or oxidation catalyst. [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 any combustion turbine, describing in detail the procedures to be followed for each 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-4 through AQ-16. 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-11 Emission rates from this unit, during the commissioning period, shall not exceed any of the following: NO_x (as NO_2) - 189 lb/hr or 2,268 lb/day; VOC (as methane) - 17 lb/hr or 204 lb/day; CO - 902 lb/hr or 4,620 lb/day; PM_{10} - 276 lb/day; or SO_x (as SO_2) - 44.2 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-10.

AQ-12 Combined emission rates from units C-3959-1, C-3959-2, and C-3959-3, during the commissioning period, shall not exceed any of the following: NO_x (as NO_2) - 349 lb/hr or 3,811.2 lb/day; VOC (as methane) - 49 lb/hr or 572 lb/day; CO - 2,706 lb/hr or 12,642.2 lb/day; PM_{10} - 828 lb/day; or SO_x (as SO_2) - 132.6 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-10.

AQ-13 During the commissioning period, the project owner shall demonstrate compliance with conditions **AQ-11** and **AQ-12** through the use of properly operated and maintained continuous emissions monitors and recorders as specified in conditions **AQ-25** and **AQ-26**. 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-11 and 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-10.

AQ-14 The continuous monitors specified in conditions **AQ-25** and **AQ-26** shall be installed, calibrated, and operational prior to the first firing of this unit. After first firing, the detection range of the CEMS shall be adjusted as necessary to accurately measure the resulting range of NOx 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-10).

AQ-15 The total number of firing hours of this unit without abatement of emissions by the SCR system and the oxidation catalyst shall not exceed 294 hours during the commissioning period. Such operation of this unit without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system and the oxidation catalyst in place. Upon completion of these activities, the project owner shall provide written notice to the District and the unused balance of the 294 firing hours without abatement shall expire. [District Rule 2201]

Verification: The project owner shall provide to the District and the CPM a reporting of the unused balance of the 294 firing hours without abatement for each turbine in the monthly commissioning status reports (see verification of Condition AQ-10).

AQ-16 The total mass emissions of NO_x, CO, VOC, PM_{10}, and SO_x that are emitted during the commissioning period shall accrue towards the consecutive twelve month emission limits specified in condition **AQ-35**. [District Rule 2201]

Verification: None.

AQ-17 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-18 Selective catalytic reduction (SCR) system and oxidation catalyst shall serve the gas turbine engine. Exhaust ducting shall be equipped with a fresh air inlet and blower to be used to lower the exhaust temperature prior to inlet of the SCR system catalyst. The project owner shall submit SCR and oxidation 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 to the District and the CPM 30 days prior to commencement of construction.

AQ-19 The 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 District and the CPM at least 30 days prior to commencement of construction.

AQ-20 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 NOx control system and emissions data and submit the information to the CPM and the APCO in the Quarterly Operational Reports (**AQ-C11**).

AQ-21 Combustion turbine generator (CTG) 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-22 Heat recovery steam generator design shall provide space for additional selective catalytic reduction catalyst and oxidation catalyst if required to meet NO_x and CO emission limits. [District Rule 2201]

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

AQ-23 Ammonia injection grid shall be equipped with operational ammonia flow meter and injection pressure indicator. [District Rules 2201 and 4703]

Verification: The project owner shall make the site available for inspection of the ammonia flow meter and injection pressure indicator by representatives of the District, CARB and the Commission.

AQ-24 The project owner shall monitor and record exhaust gas temperature at selective catalytic reduction and oxidation catalyst inlets. [District Rules 2201 and 4703]

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

AQ-25 The CTG shall be equipped with a continuous monitoring system to measure and record hours of operation and fuel consumption. [District Rules 2201, 4001, and 4703]

Verification: The project owner shall make the site available for inspection of the hourly operation and fuel consumption measuring equipment and records by representatives of the District, CARB and the Commission.

AQ-26 The CTG shall be equipped with a continuous emission monitor (CEM) for NO_x (before and after SCR system), CO, and O_2. Continuous emissions monitor(s) shall meet the requirements of 40 CFR part 60, Appendices B and F, and 40 CFR part 75, and District-approved protocol, and shall be capable of monitoring emissions during normal operating conditions and during startups and shutdowns, provided the CEM(s) pass the relative accuracy requirement for startups and shutdowns specified herein. If relative accuracy of CEM(s) cannot be demonstrated during startup conditions, CEM results during startup and shutdown events shall be replaced with startup emission rates obtained from source testing to determine compliance with emission limits contained in this document. [District Rules 2201, 4001, and 4703]

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-27 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-28 The CTG shall be fired exclusively on natural gas with a sulfur content of no greater than 0.25 grain of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO the fuel sulfur content data, as required to be compiled in Condition **AQ-43**, demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-29 During startup or shutdown, CTG exhaust emissions shall not exceed any of the following: NO_x (as NO_2) - 80 lb/hr, VOC - 16 lb/hr, or CO - 902 lb/hr, based on three hour averages. [California Environmental Quality Act]

Verification: The project owner shall submit to the CPM and APCO the turbine startup and shutdown emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-30 Combined emission rates from units C-3959-1, C-3959-2, and C-3959-3, during startup or shutdown, shall not exceed any of the following: NO_x (as

NO_2) - 127.54 lb/hr, VOC - 29.26 lb/hr, or CO - 948.28 lb/hr, based on three hour averages. [California Environmental Quality Act]

Verification: The project owner shall submit to the CPM and APCO the turbine startup and shutdown emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-31 Startup is defined as the period beginning with turbine initial firing until the unit meets the lb/hr and ppmvd emission limits in condition **AQ-32**. Shutdown is defined as the period beginning with initiation of turbine shutdown sequence and ending with cessation of firing of the gas turbine. Startup and shutdown durations shall not exceed three hours and one hour, respectively, per occurrence. Startup and shutdown events shall not exceed 416 hours per calendar year. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO the turbine startup and shutdown event duration data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-32 Emission rates from this unit, except during startup and shutdown periods, shall not exceed any of the following: NO_x (as NO_2) - 23.77 lb/hr and 2.5 ppmvd @ 15% O_2; VOC (as methane) - 6.63 lb/hr and 2.0 ppmvd @ 15% O_2; CO - 23.14 lb/hr and 4.0 ppmvd @ 15% O_2; PM10 - 11.5 lb/hr; or SO_x (as SO_2) - 1.84 lb/hr. NO_x (as NO_2) emission limits are one hour rolling averages. 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 turbine emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-33 Emissions from this unit, on days when a startup and/or shutdown occurs, shall not exceed the following: NO_x (as NO_2) - 771.6 lb/day; VOC - 184.0 lb/day; CO - 4,044.1 lb/day; PM_{10} - 276.0 lb/day; or SO_x (as SO_2) - 44.2 lb/day. [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-C11**).

AQ-34 The ammonia (NH_3) emissions shall not exceed 10 ppmvd @ 15% O_2 over a 24 hour rolling average. [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-C11**).

AQ-35 Annual emissions from the CTG, calculated on a 12 consecutive month rolling basis, shall not exceed any of the following: NO_x (as NO_2) - 170,552 lb/year; CO - 546,676 lb/year; VOC - 51,760 lb/year; PM_{10} - 91,592 lb/year; or SO_x (as SO_2) - 14,436 lb/year. [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-C11**).

AQ-36 NO_x emissions (as NO_2), except during startup and shutdown periods, shall not exceed 2.0 ppmvd @ 15% O_2 (twelve month rolling average). [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-C11**).

AQ-37 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: None.

AQ-38 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: None.

AQ-39 Compliance with ammonia slip limit shall be demonstrated utilizing the following calculation procedure: ammonia slip ppmvd @ 15% O_2 = ((a - (b x c/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 ppmvd @ 15% O_2 across the 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: If an ammonia in-stack monitor is proposed the project owner shall include the ammonia monitor in the Continuous Emission Monitoring System (CEMS) protocol that is required to be approved by the APCO and CPM under Condition **AQ-26**.

AQ-40 Source testing to measure startup NO_x, CO, and VOC mass emission rates shall be conducted for one of the gas turbines (C-3959-1, C-3959-2, or C-3959-3) prior to the end of the commissioning period and at least once every seven years thereafter. CEM relative accuracy shall be determined during startup source testing in accordance with 40 CFR 60, Appendix B. [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.

AQ-41 Source testing to measure the NO_x, CO, and VOC emission rates (lb/hr and ppmvd @ 15%at 15 O_2) shall be conducted within 60 days after the end of the commissioning period and at least once every twelve months thereafter. [District Rules 1081 and 4703]

Verification: The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing.

AQ-42 Source testing to measure the PM_{10} emission rate (lb/hr) and the ammonia emission rate shall be conducted within 60 days after the end of the commissioning period and at least once every twelve months thereafter. [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.

AQ-43 Compliance with natural gas sulfur content limit shall be demonstrated within 60 days after the end of the commissioning period and periodically as required by 40 CFR 60 Subpart GG and 40 CFR 75. [District Rules, 1081, 2540, and 4001]

Verification: The project owner shall compile continuous fuel sulfur content monitoring data from the gas supplier, or if such data is not available, the project owner shall test the sulfur content of the natural gas fuel monthly using recognized ASTM method(s). The fuel sulfur content data shall be submitted to the CPM and the APCO in the Quarterly Operation Reports (AQ-11).

AQ-44 Source testing to determine the percent efficiency of the turbine shall be conducted within 60 days after the end of the commissioning period and at least once every twelve months thereafter. [District Rule 4703]

Verification: The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing.

AQ-45 Compliance demonstration (source testing) shall be District witnessed, or authorized and samples shall be collected by a California Air Resources Board certified testing laboratory. Source testing shall be conducted using the methods and procedures approved by the District. 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. The results of each source test shall be submitted to the District within 60 days thereafter. [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 fifteen (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-46 The following test methods shall be used: PM_{10} - 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. 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 provide a source test plan demonstrating compliance with this condition to the CPM and APCO for approval fifteen (15) days prior to testing.

AQ-47 Source testing to determine the percent efficiency of the turbine shall be conducted utilizing the procedures in District Rule 4703 (Stationary Gas Turbines). [District Rule 4703]

Verification: The project owner shall provide a source test plan demonstrating compliance with this condition to the CPM and District for approval fifteen (15) days prior to testing.

AQ-48 The project owner shall maintain the following records: date and time, duration, and type of any startup, shutdown, or malfunction; performance testing, evaluations, calibrations, checks, adjustments, any period during which a continuous monitoring system or monitoring device was inoperative, and maintenance of any continuous emission monitor. [District Rules 2201 and 4703]

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

AQ-49 The project owner shall maintain the following records: hours of operation, fuel consumption (scf/hr and scf/rolling twelve month period), continuous emission monitor measurements, calculated ammonia slip, and calculated NOx mass emission rates (lb/hr and lb/twelve month rolling period). [District Rules 2201 and 4703]

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

AQ-50 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: None.

AQ-51 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-C11**).

AQ-52 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-C11**).

AQ-53 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-C11**).

AQ-54 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 as part of the Quarterly Operational Report (**AQ-C11**).

AQ-55 The project owner shall submit a written report to the 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 excess emissions and other data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-56 The 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-57 All records required to be maintained by this permit shall be maintained for a period of at least 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-58 The project owner shall submit an application to comply with Rule 2540 - Acid Rain Program. [District Rule 2540]

Verification: The project owner shall submit to the CPM copies of the Title IV permit and proof that necessary Title IV SO_2 emission allotments have been acquired at least fifteen (15) days prior to the initial firing of the turbine(s).

SJVACPD Permit No. UNIT C-3959-4-0: 227,163 GPM MECHANICAL/INDUCED DRAFT COOLING TOWER WITH 16 CELLS SERVED BY HIGH EFFICIENCY DRIFT ELIMINATOR.

Conditions of Certification AQ-59 through AQ-65 apply to the cooling tower.

AQ-59 The project owner shall submit to the District at least 30 days prior to commencement of construction, the drift eliminator design details and vendor supplied justification for the correction factor used to correlate blowdown Total Dissolved Solids (TDS) to drift TDS and correct for the amount of drift that stays suspended in the atmosphere. Correction factor is used in the equation below to calculate cooling tower PM_{10} emissions rate. [District Rule 2201]

Verification: The project owner shall provide copies of cooling tower and drift eliminator design details to the CPM and the District for approval at least 30 days prior to construction of permanent foundations for the cooling tower.

AQ-60 The project owner shall submit cooling tower design details, including the cooling tower type and materials of construction to the District at least 90 days before the tower is operated. [District Rule 7012]

Verification: The project owner shall provide copies of cooling tower and drift eliminator design details to the CPM and the District for approval at least 30 days prior to construction of permanent foundations for the cooling tower.

AQ-61 No hexavalent chromium containing compounds shall be added to cooling tower circulating water. [District Rule 7012]

Verification: The project owner shall provide the list of cooling tower water additives (i.e. biocides, fungicides, anti-scaling compounds, etc.) demonstrating compliance with this condition to the CPM for approval at least 30 days prior to operation of the cooling tower and shall provide any revisions to the cooling tower water additives list to the CPM for approval prior using the new water additive.

AQ-62 Drift eliminator drift rate shall not exceed 0.0005%. [District Rule 2201]

Verification: The project owner shall provide copies of cooling tower and drift eliminator design details to the CPM and the District for approval at least 30 days prior to construction of permanent foundations for the cooling tower.

AQ-63 PM_{10} emission rate shall not exceed 25.9 lb/day. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO the cooling tower emission data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-64 Compliance with the PM_{10} daily emission limit shall demonstrated as follows: PM_{10} lb/day = circulating water recirculation rate * total dissolved solids concentration in the blowdown water * design drift rate * correction factor. [District Rule 2201]

Verification: None.

AQ-65 Compliance with PM_{10} emission limit shall be determined by blowdown water sample analysis by independent laboratory within 60 days of initial operation and quarterly thereafter. [District Rule 1081]

Verification: The results and field data collected from cooling tower blowdown water samples analysis shall be submitted to the CPM and the District as part of the Quarterly Operational Report (**AQ-C11**).

SJVACPD Permit No. UNIT C-3959-5-0: 161 MMBTU/HR ABCO D-TYPE NATURAL GAS FIRED BOILER OR EQUIVALENT WITH COEN QUANTUM LOW NOX (QLN) BURNER OR EQUIVALENT WITH A SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM AND AN OXIDATION CATALYST.

Conditions of Certification AQ-66 through AQ-91 apply to the auxiliary boiler.

AQ-66 The project owner shall obtain APCO approval for the use of any equivalent boiler or burner not specifically approved by this Authority to Construct. Approval of an equivalent boiler or burner shall only be made after the APCO's determination that the submitted design and performance data for the proposed boiler/burner is equivalent to the approved boiler/burner. [District Rule 2201]

Verification: The project owner shall submit a request for approval, including specific design and performance data for equivalent boiler or burner not specifically approved by the Authority to Construct to the APCO and the CPM at least 90 days prior to the installation of the auxiliary boiler.

AQ-67 The project owner's request for approval of an equivalent boiler or burner shall include the following information: boiler or burner manufacturer and model number, maximum heat input rating, manufacturer's guaranteed emission concentrations and a description of low-NO_x operation. [District Rule 2201]

Verification: The project owner shall submit a request for approval including specific design and performance data for equivalent boiler or burner not specifically approved by the Authority to Construct to the APCO and the CPM at least 90 days prior to the installation of the auxiliary boiler.

AQ-6 The project owner's request for approval of an equivalent boiler or burner shall be submitted to the District at least 90 days prior to the planned installation date. The project owner shall also notify the District at least 30 days

prior to the actual installation of the District approved equivalent boiler or burner. [District Rule 2201]

Verification: The project owner shall submit a request for approval including specific design and performance data for equivalent boiler or burner not specifically approved by the Authority to Construct to the APCO at least 90 days prior to the planned installation of the auxiliary boiler, and notify the CPM and District at least 30 days prior to the actual installation of the approved equivalent boiler or burner.

AQ-69 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 auxiliary boiler stack the project owner shall provide to the CPM for approval detailed plan drawings of the auxiliary boiler stack 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 auxiliary boiler stack by representatives of the District, CARB and the Commission.

AQ-70 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 of the ammonia flow meter and injection pressure indicator by representatives of the District, CARB and the Commission.

AQ-71 The project owner shall monitor and record exhaust gas temperature at selective catalytic reduction catalyst and oxidation catalyst inlets. [District Rules 2201 and 4351]

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

AQ-72 The boiler shall be fired exclusively on natural gas with a sulfur content of no greater than 0.25 grain of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO the fuel sulfur content data, as required to be compiled in Condition **AQ-43**, demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-73 During startup or shutdown, boiler exhaust emissions shall not exceed either of the following: NO_x (as NO_2) - 10.0 lb/hr or CO - 12.5 lb/hr. [California Environmental Quality Act]

Verification: The project owner shall submit to the CPM and APCO the auxiliary boiler startup and shutdown emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-74 Startup is defined as the period beginning with boiler initial firing until the unit meets the ppmvd emission limits in condition **AQ-75**. Shutdown is defined as the period beginning with initiation of boiler shutdown sequence and ending with cessation of firing of the boiler. Startup and shutdown durations shall not exceed one hour, each, per occurrence. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO the auxiliary boiler startup and shutdown event duration data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-75 Emission rates from this unit, except during startup and shutdown periods, shall not exceed any of the following: NO_x (as NO_2) - 9.0 ppmvd @ 3% O_2 or 0.0112 lb/MMBtu; VOC (as methane) - 10.0 ppmvd @ 3% O_2; CO - 50.0 ppmvd @ 3% O_2; PM_{10} - 0.0205 lb/MMBtu; or SO_x (as SO_2) - 0.0007 lb/MMBtu. All emission limits are three hour rolling averages. [District Rules 2201, 4305, and 4351]

Verification: The project owner shall submit to the CPM and APCO the auxiliary boiler emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-76 Ammonia (NH_3) emissions shall not exceed 10 ppmvd @ 3% O_2 over a 24 hour rolling average. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO the auxiliary boiler emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-77 Emissions from this unit, on days when a startup and/or shutdown occurs, shall not exceed the following: NO_x (as NO_2) - 43.3 lb/day; VOC - 16.6 lb/day; CO - 148.8 lb/day; PM_{10} - 79.2 lb/day; or SO_x (as SO_2) - 2.7 lb/day. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO the auxiliary boiler emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-78 Annual hours of operation shall not exceed 3,000 hours per calendar year. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO the auxiliary boiler operations data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-79 Source testing to measure startup NO_x and CO mass emission rates shall be conducted upon initial operation and at least once every seven years thereafter. [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.

AQ-80 Source testing to measure the NO_x and CO emissions rates shall be conducted within 60 days of initial operation and not less than once every 12 months thereafter. After demonstrating compliance on two consecutive annual source tests, the unit shall be tested not less than once every thirty-six months. [District Rules 1081, 4305, and 4351]

Verification: The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing.

AQ-81 If the project owner fails any compliance demonstration for the NO_x and/or CO emission limits of this permit when testing not less than every 36 months, compliance with the NO_x and CO emission limits shall be demonstrated not less than once every 12 months. [District Rules 1081, 4305, and 4351]

Verification: The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing.

AQ-82 Source testing to measure the ammonia emission rate shall be conducted within 60 days of initial operation and at least once every twelve months thereafter. [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.

AQ-83 The following test methods shall be used: NO_x (ppmv) - EPA Method 7E or ARB Method 100, NO_x (lb/MMBtu) - EPA Method 19, CO (ppmv) - EPA Method 10 or ARB Method 100, stack gas oxygen - EPA Method 3 or 3A or ARB Method 100, ammonia - BAAQMD ST-1B, and fuel hhv - ASTM D 1826-88 or D 1945-81 in conjunction with ASTM D 3588-89 for gaseous fuels. Alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081, 4305, and 4351]

Verification: The project owner shall provide a source test plan demonstrating compliance with this condition to the CPM and APCO for approval fifteen (15) days prior to testing.

AQ-84 The stack concentration of NO_x (as NO_2), CO, and O_2 shall be measured at least on a monthly basis using District approved portable analyzer. [District Rule 4305]

Verification: The project owner shall submit to the CPM and APCO the auxiliary boiler portable analyzer concentration data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-85 The project owner shall maintain records of the date and time of NO_x, CO, and O_2 measurements, the measured NO_2 and CO concentrations corrected to 3% O_2, and the O_2 concentration. The records must also include a description of any corrective action taken to maintain the emissions within the acceptable range. These records shall be retained at the facility for a period of no less than 2 years and shall be made available for District inspection upon request. [District Rule 4305]

Verification: The project owner shall make the auxiliary portable analyzer concentration and corrective action records available for inspection by representatives of the District, CARB and the Commission upon request.

AQ-86 If the NO_x or CO concentrations, as measured by the portable analyzer, exceed the allowable emissions rate, the project owner shall notify the District and take corrective action within one (1) hour after detection. If the portable analyzer readings continue to exceed the allowable emissions rate, the project owner shall conduct an emissions test within 60 days, utilizing District-approved test methods, to demonstrate compliance with the applicable emissions limits. [District Rule 4305]

Verification: The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing.

AQ-87 The portable analyzer shall be calibrated as recommended by the manufacturer. All instrument calibration data shall be kept on file including the date of calibration. The calibration date shall not exceed 6 months prior to the date the stack concentrations are measured and recorded. [District Rule 4305]

Verification: The project owner shall make portable analyzer manufacturer operating manuals and calibration records available for inspection by representatives of the District, CARB and the Commission upon request.

AQ-88 Concentration measurements shall not be taken until the sample acquisition probe has been exposed to the stack gas for at least 150% of the response time. Measurements shall be taken in triplicate. [District Rule 4305]

Verification: The project owner shall submit to the CPM and APCO the auxiliary boiler portable analyzer concentration data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-89 If water vapor is not removed prior to measurement, the absolute humidity in the gas stream must be determined so that the gas concentrations may be reported on a dry basis. [District Rule 4305]

Verification: None.

AQ-90 If water vapor creates an interference with the measurement of any component, then the water vapor must be removed from the gas stream prior to concentration measurements. [District Rule 4305]

Verification: None.

AQ-91 Records of monthly natural gas hhv, natural gas consumption, and hours of operation shall be maintained and retained on site for a period at least two years and made available for District inspection upon request. [District Rules 2201 and 4351]

Verification: The project owner shall make the records that demonstrate compliance with this condition available for inspection by representatives of the District, CARB and the Commission upon request.

SJVACPD Permit No. UNIT C-3959-6-0: 300 HP CUMMINS MODEL 6CTA8.3-FA DIESEL FIRED EMERGENCY IC ENGINE POWERING A FIRE PUMP.

Conditions of Certification AQ-92 through AQ-97 apply to the emergency fire pump engine.

AQ-92 The exhaust stack shall not be fitted with a rain cap, or any other similar device which would impede vertical exhaust flow. [District Rule 4102]

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

AQ-93 The sulfur content of the diesel fuel used shall not exceed 0.05% by weight. [District Rule 2201]

Verification: The project owner shall make fuel purchase, MSDS or other fuel supplier records containing diesel fuel sulfur content available for inspection by representatives of the District, CARB and the Commission upon request.

AQ-94 NO_x emissions shall not exceed 5.89 g/hp-hr. [District Rule 2201]

Verification: The project owner shall provide to the CPM and APCO, 30 days prior to installation of the fire pump engine, manufacturer emissions guarantee data demonstrating compliance with this condition.

AQ-95 PM_{10} emissions shall not exceed 0.25 g/hp-hr. [District Rule 2201]

Verification: The project owner shall provide to the CPM and APCO, 30 days prior to installation of the fire pump engine, manufacturer emissions guarantee data demonstrating compliance with this condition.

AQ-96 The engine shall be operated only for maintenance, testing, and required regulatory purposes, and during emergency situations. Operation of the engine for maintenance, testing, and required regulatory purposes shall not exceed 100 hours per year. [District Rules 2201 and 4701]

Verification: The project owner shall submit to the CPM and APCO the fire pump engine operations data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-97 The project owner shall maintain records of hours of emergency and non-emergency operation. Records shall include the date, the number of hours of operation, the purpose of the operation (e.g., load testing, weekly testing, rolling blackout, general area power outage, etc.), and the sulfur content of the diesel fuel used. Such records shall be retained on site for a period of at least two years and made available for District inspection upon request. [District Rule 4701]

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

SJVACPD Permit No. UNIT C-3959-7-0: 1,529 HP CUMMINS MODEL QSV81G OR EQUIVALENT LEAN BURN NATURAL GAS FIRED EMERGENCY IC ENGINE POWERING A 1,100 KW ELECTRICAL GENERATOR.

Conditions of Certification AQ-98 through AQ-104 apply to the emergency generator engine.

AQ-98 The project owner shall obtain APCO approval for the use of any equivalent IC engine not specifically approved by this Authority to Construct. Approval of an equivalent IC engine shall only be made after the APCO's determination that the submitted design and performance data for the proposed IC engine is equivalent to the approved IC engine. [District Rule 2201]

Verification: The project owner shall submit a request for approval including specific design and performance data for an equivalent emergency generator IC engine not specifically approved by the Authority to Construct to the APCO and the CPM at least 90 days prior to the installation of the emergency generator IC engine.

AQ-99 The project owner's request for approval of an equivalent IC engine shall include the following information: IC engine manufacturer and model number, horsepower (hp) rating, exhaust stack information, and manufacturer's guaranteed emission concentrations. [District Rule 2201]

Verification: The project owner shall submit a request for approval including specific design and performance data for an equivalent emergency generator IC engine not specifically approved by the Authority to Construct to the APCO and the CPM at least 90 days prior to the installation of the emergency generator IC engine.

AQ-100 The project owner's request for approval of an equivalent IC engine shall be submitted to the District at least 90 days prior to the planned installation date. The project owner shall also notify the District at least 30 days prior to the actual installation of the District approved equivalent IC engine. [District Rule 2201]

Verification: The project owner shall submit a request for approval including specific design and performance data for an equivalent emergency generator IC engine not specifically approved by the Authority to Construct to the APCO and CPM at least 90 days prior to the installation of the emergency generator IC engine, and notify the District and CPM at least 30 days prior to the actual installation of the approved equivalent IC engine.

AQ-101 The exhaust stack shall not be fitted with a rain cap, or any other similar device which would impede vertical exhaust flow. [District Rule 4102]

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

AQ-102 Emission rates from this unit shall not exceed any of the following: NO_x (as NO_2) - 0.78 g/hp-hr; VOC (as methane) - 0.42 g/hp-hr; CO - 2.50 g/hp-hr; PM_{10} - 0.01 lb/MMBtu; or SO_x (as SO_2) - 0.0007 lb/MMBtu. [District Rule 2201]

Verification: The project owner shall provide to the CPM and APCO, 30 days prior to installation of the emergency generator IC engine, manufacturer emissions guarantee data or other information demonstrating compliance with this condition.

AQ-103 The engine shall be operated only for maintenance, testing, and required regulatory purposes, and during emergency situations. Operation of the engine for maintenance, testing, and required regulatory purposes shall not exceed 200 hours per year. [District Rules 2201 and 4701]

Verification: The project owner shall submit to the CPM and APCO the emergency generator IC engine operations data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-C11**).

AQ-104 The project owner shall maintain records of hours of emergency and non-emergency operation. Records shall include the date, the number of hours of operation, the purpose of the operation (e.g., load testing, weekly testing, rolling blackout, general area power outage, etc.), and the sulfur content of the diesel fuel used. Such records shall be retained on site for a period of at least two years and made available for District inspection upon request. [District Rule 4701]

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

Conditions of Certification AQ-105 through AQ-117 are SJVACPD General Facility Permit Conditions

AQ-105 The project owner shall not begin actual onsite construction of the equipment authorized by this Authority to Construct 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-106 Upon implementation of C-3959-1-0, C-3959-2-0, C-3959-3-0, C-3959-4-0, and C-3959-5-0, emission offsets shall be provided to offset the following increases in: PM_{10} - Q1: 66,234 lb, Q2: 66,234 lb, Q3: 66,234 lb, and Q4: 66,234 lb; NO_x (as NO_2) - Q1: 124,267 lb, Q2: 124,267 lb, Q3: 124,267 lb, and Q4: 124,267 lb; VOC - Q1: 34,378 lb, Q2: 34,378 lb, Q3: 34,378 lb, and Q4: 34,378 lb. Offsets shall be provided at the appropriate distance ratio specified in Rule 2201. SO_x offsets provided to offset PM_{10} increases shall be at an interpollutant ratio of 2.2:1 and applicable distance ratio. [District Rule 2201]

Verification: The project owner shall submit copies of the surrendered ERC certificates to the CPM at least 30 days prior to first fire of the any combustion turbine at the SJVEC site.

AQ-107 All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District NSR Rule]

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

AQ-108 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-C11**). The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission.

AQ-109 Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

Verification: The project owner shall submit the results of the initial and annual source tests per Condition **AQ-42**.

AQ-110 No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

Verification: The project owner shall document any known opacity violations in the Quarterly Operational Report (**AQ-C11**). The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission.

AQ-111 The project owner shall submit an application to comply with Rule 2520 - Federally Mandated Operating Permits within twelve months of commencing operation. [District Rule 2520]

Verification: The project owner shall submit a copy of their Title V – Federal Mandated Operating Permit Application to the CPM within 12 months of commencing operation.

AQ-112 On or after May 15, 2002, disturbances of soil related to any construction, demolition, excavation, extraction, and other earthmoving activities shall comply with the requirements for fugitive dust control in SJVUAPCD District Rule 8021 (11/15/01) unless specifically exempted under section 4.0 of Rule 8021. [District Rule 8021]

Verification: The project owner shall document compliance with Rule 8021 in the Monthly Construction Compliance Report required in condition **AQ-C2**, and as necessary after construction is complete in the Quarterly Operational Report (**AQ-C11**).

AQ-113 On or after May 15, 2002, outdoor handling, storage, and transport of any bulk material shall comply with the requirements of SJVUAPCD District Rule 8031 (11/15/01), unless specifically exempted under section 4.0 of Rule 8031. [District Rule 8031]

Verification: The project owner shall document compliance with Rule 8031 in the Monthly Construction Compliance Report required in condition **AQ-C2**, and as necessary after construction is complete in the Quarterly Operational Report (**AQ-C11**).

AQ-114 On or after May 15, 2002, all sites that are subject to SJVUAPCD District Rule 8021, SJVUAPCD District Rule 8031, and SJVUAPCD District Rule 8071 shall comply with the requirements of SJVUAPCD District Rule 8041 (11/15/01), unless specifically exempted under section 4.0 of Rule 8041. [District Rule 8041]

Verification: The project owner shall document compliance with Rule 8041 in the Monthly Construction Compliance Report required in condition **AQ-C2**, and as necessary after construction is complete in the Quarterly Operational Report (**AQ-C11**).

AQ-115 On or after May 15, 2002, any open area having 3.0 acres or more of disturbed surface area, that has remained undeveloped, unoccupied, unused or vacant for more than seven days shall comply with the requirements of SJVUAPCD District Rule 8051 (11/15/01), unless specifically exempted under section 4.0 of Rule 8051. [District Rule 8051]

Verification: The project owner shall document compliance with Rule 8051 in the Monthly Construction Compliance Report required in condition **AQ-C2**, and as necessary after construction is complete in the Quarterly Operational Report (**AQ-C11**).

AQ-116 On or after May 15, 2002, any new or existing public or private paved or unpaved road, road construction project, or road modification project shall implement the control measures and design criteria of, and comply with the requirements of SJVUAPCD District Rule 8061 (11/15/01) unless specifically exempted under section 4.0 of Rule 8061. [District Rule 8061]

Verification: The project owner shall document compliance with Rule 8061 in the Monthly Construction Compliance Report required in condition **AQ-C2**, and as necessary after construction is complete in the Quarterly Operational Report (**AQ-C11**).

AQ-117 On or after May 15, 2002, any unpaved vehicle/equipment traffic area of 1.0 acre or larger shall comply with the requirements of SJVUAPCD District Rule 8071 (11/15/01), unless specifically exempted under section 4.0 of Rule 8071. [District Rule 8071]

Verification: The project owner shall document compliance with Rule 8071 in the Monthly Construction Compliance Report required in condition **AQ-C2**, and as necessary after construction is complete in the Quarterly Operational Report (**AQ-C11**).

REFERENCES

CARB (California Air Resources Board). 1999. Guidance for Power Plant Siting and Best Available Control Technology. Issued September 1999.

CARB (California Air Resources Board). 2000. California Ambient Air Quality Data CD ROM.

CARB (California Air Resources Board). 2001. California Ambient Air Quality Data available on CARB Website. http://www.arb.ca.gov/adam/.

Duke Energy North America. Duke 2002. Correspondence from James R. Vigor of Duke Energy to Donna Stone of CEC. Submitted to the California Energy Commission, February 20, 2002.

San Joaquin Valley Energy, LLC. SJVEC 2001a. Application for Certification, Central Valley Energy Center LLC (01-AFC-22). Submitted to the California Energy Commission, October 31, 2001.

San Joaquin Valley Energy, LLC. SJVEC 2001b. Application for Certification Supplement in Response to CEC Data Adequacy recommendation, Application for Certification, Central Valley Energy Center LLC (01-AFC-22). Submitted to the California Energy Commission, December 20, 2001.

San Joaquin Valley Energy, LLC. SJVEC 2002a. Application for Certification Data Response, Set 1A, Central Valley Energy Center LLC (01-AFC-22). Submitted to the California Energy Commission, February 26, 2002.

San Joaquin Valley Energy, LLC. SJVEC 2002b. Application for Certification Data Response, Set 2A, Central Valley Energy Center LLC (01-AFC-22). Submitted to the California Energy Commission, March 29, 2002.

SCAQMD (South Coast Air Quality Management District). 1993. CEQA Air Quality Handbook. November, 1993 Update.

SR (Sierra Research) SR 2002a. Letter to Dave Warner of the SJVUAPCD from Nancy Matthews regarding “Carbon Monoxide Emission Limits: Project No. C-1011446, San Joaquin Valley Energy Center.” Submitted to the California Energy Commission, March 22, 2002.

SJVAPCD (San Joaquin Valley Air Pollution Control District) SJVAPCD 2002a. Determination of Compliance Evaluation for Central Valley Energy LLC – San Joaquin Valley Energy Center. Submitted to the California Energy Commission on March 25, 2002.

USEPA (United States Environmental Protection Agency) USEPA 2002. Comment letter on the Preliminary Determination of Compliance for San Joaquin Valley Energy Center. May 6, 2002.

BIOLOGICAL RESOURCES

Testimony of Tom Scofield

INTRODUCTION

This section provides the California Energy Commission (Energy Commission) staff's analysis of potential impacts to biological resources from Calpine's (Applicant) proposal for the construction and operation of the San Joaquin Valley Energy Center (SJVEC). This analysis evaluates impacts to state and federally listed species, state and federal species of special concern, and other areas of critical biological concern. This section presents information regarding the affected biotic community, the potential environmental impacts associated with the construction and operation of the proposed project and, where necessary, specifies mitigation planning and compensation measures to reduce potential impacts to non-significant levels. Additionally, this analysis determines compliance with applicable laws, ordinances, regulations and standards (LORS), and specifies conditions of certification.

Staff's analysis is based, in part, on information provided as of October 31, 2001 from Calpine's Application For Certification (Calpine 2001a); Calpine's AFC Supplement provided December 13, 2001 (Calpine 2002a); Applicant's March 12, 2002 Data Responses (Calpine 2002b) ; Calpine's Preliminary Draft Biological Resource Mitigation and Monitoring Plan provided March 12, 2002; staff's February 7, 2002 site visit; and discussions with the United States Fish and Wildlife Service (USFWS 2001 & 2002) and the California Department of Fish and Game (CDFG 2001 & 2002).

LAWS, ORDINANCES, REGULATION AND STANDARDS

The Applicant shall abide by the following laws, ordinances, regulations, and standards during project construction and operation.

FEDERAL

Clean Water Act of 1977
Title 33, United States Code, Sections 1251-1376 and Section 330.5(a)(26), prohibits the discharge of dredged or fill material into the waters of the United States without a permit.

Endangered Species Act of 1973
Title 16, United States Code, Section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq., designates and provides for protection of threatened and endangered plant and animal species, and their critical habitat.

Migratory Bird Treaty Act
Title 16, United States Code, sections 703-712, prohibits the take of migratory birds.

STATE

California Endangered Species Act of 1984
Fish and Game Code Sections 2050 et seq. protects California's rare, threatened, andendangered species.

Nest or Eggs-Take, Possess, or Destroy
Fish and Game Code Section 3503 protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird without prior authorization.

Birds of Prey or Eggs-Take, Possess, or Destroy
Fish and Game Code Section 3503.5 protects California's birds of prey and their eggs by making it unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird.

Migratory Birds-Take or Possession
Fish and Game Code Section 3513 protects California's migratory birds by making it unlawful to take or possess any migratory non-game bird, or any part thereof, as designated in the Migratory Bird Treaty Act.

Fully Protected Species
Fish and Game Code Sections 3511, 4700, 5050, 5515 prohibit take of animals that are classified as Fully Protected in California.

Significant Natural Areas
Fish and Game Code Section 1930 et seq. designates certain areas such as refuges, natural sloughs, riparian areas and vernal pools as significant wildlife habitat.

Native Plant Protection Act of 1977
Fish and Game Code section 1900 et seq. designates state rare, threatened, and endangered plants.

California Code of Regulations
Title 14, sections 670.2 and 670.5 list animals of California designated as threatened or endangered.

LOCAL

No local biological-related LORS have been identified for the SJVEC.

SETTING

REGIONAL

The proposed SJVEC site (site) and linear facilities (transmission line, natural gas line, and reclaimed water line) are located centrally in the western half of Fresno County, California, in the central portion of the San Joaquin Valley (Valley). Historically, the Valley contained many natural habitats that supported a variety of plant and animal species. These natural environments, however, have been largely converted to agricultural and urbanized land uses, and very few natural areas remain. The nearest

remaining natural area is the Mendota Wildlife Area, located approximately eight miles northwest of the project.

In the vicinity of the project, the Valley contains predominantly agricultural production lands, with other mixed uses including residential areas and commercial and industrial facilities. The loss and fragmentation of habitat in the Valley has resulted in the elimination of many species of wildlife and the reduction of populations of many other species of wildlife. Although these areas have been highly modified from their natural state, several special status plant and animal species may occur in the project vicinity. A list of these species and their status is presented in Table 1, below.

BIOLOGICAL RESOURCES - Table 1
Sensitive Species Known to Occur in the Project Vicinity
(Calpine 2001a, Staff 2001-2)

Sensitive Plants	Status*
Heartscale (*Atriplex cordulata*)	CNPS 1B
Brittlescale (*Atriplex depressa*)	CNPS 1B
Lesser saltscale *(Atriplex miniscula*)	CNPS 1B
Palmate-bracted bird's-beak (*Cordylanthus palmatus*)	FE, CE
Recurved larkspur (*Delphinium recurvatum*)	CNPS 1B
Munz's tidytips (*Layia munzii*)	CNPS 1B
San Joaquin woolythreads (*Monolopia congdonii*)	FE, CNPS 1B

Sensitive Wildlife	Status*
Ciervo Aegilian scarab beetle (*Aegialia concinna*)	
San Joaquin dune beetle (*Coelus gracilis*)	
Giant garter snake (*Thamnophis gigas*)	
Blunt-nosed leopard lizard (*Gambelia sila*)	
California horned lizard (*Phrynosoma coronatum frontale*)	
Northern harrier (*Circus cyaneus*)	
Cooper's hawk (*Accipiter gentilis*)	
Swainson's hawk (*Buteo swainsonii*)	
Burrowing owl (*Athene cunicularia*)	
California horned lark (*Eremophilia alpestris actia*)	
Mountain plover (*Charadrius montanus*)	
Fresno kangaroo rat (*Dipodomys nitratoides exilis*)	
Giant kangaroo rat (*Dipodomys ingens*)	
San Joaquin antelope squirrel (*Ammospermophilus nelsoni*)	
San Joaquin kit fox (*Vulpes macrotis mutica*)	

***STATUS LEGEND:** FE = Federally listed Endangered; FT = Federally listed Threatened; FPT = Federal proposed Threatened; California Native Plant Society (CNPS 2001) List 1B = Rare and endangered plants of California and elsewhere; CE = State listed Endangered, CT = State listed Threatened; and CSC = State Species of Special Concern.

LOCAL

Several plant and animal species listed under state and/or federal Endangered Species Acts potentially occur in the project region (Biological Resources Table 1). Of these species, six are expected to potentially occur in the project vicinity, including the federally and state threatened giant garter snake (*Thamnophis gigas*), the federally and state endangered blunt-nosed leopard lizard (*Phrynosoma coronatum frontale*), the state threatened Swainson's hawk (*Buteo swainsonii*), the federal and state species of

special concern burrowing owl (*Athene cunicularia*), the federal and state species of special concern mountain plover (*Charadrius montanus*), and the federally endangered and state threatened San Joaquin kit fox (*Vulpes macrotis mutica*). In addition, two state bird species of special concern [northern harrier (*Circus cyaneus)* and Cooper's hawk (*Accipiter gentilis*)], were observed by staff in the project vicinity and may nest within or near the project area.

The proposed natural gas line crosses Fresno Slough near an historic giant garter snake observation location. Although this record is over 26 years ago (CDFG 2002), Fresno Slough and other aquatic features in the project area (e.g., James Bypass, California Aqueduct, and several irrigation ditches) are considered potential habitat for this species.

Due to intensive agricultural practices in the vicinity of the project, little natural vegetation still exists that could support blunt-nosed leopard lizard. Remaining vestiges of potential habitat for this species, however, occur at Fresno Slough and the California Aqueduct (crossed by the proposed natural gas line), and at James Bypass (crossed by the proposed reclaimed water line).

Swainson's hawks have been observed foraging within the project area (Calpine 2001a) and may nest in the vicinity. Staff observed potentially suitable Swainson's hawk nesting trees in several locations along the project linears that are within ½ mile of the proposed project(s). Active Swainson's hawk nests located within ½ mile of the project would require mitigation that disallows construction activities during the nesting period.

Additionally, staff observed northern harriers in several locations along the natural gas and water lines, and also observed a Cooper's hawk at James Bypass. James Bypass and other areas that support trees (e.g., Fresno Slough) could be used by nesting raptors. Other potentially suitable raptor nesting locations include a multitude of individual trees observed within ½ mile of the project linears, and a grove of medium-size eucalyptus trees observed along Manning Avenue west of the City of San Joaquin.

Several locations along the natural gas and reclaimed water lines may provide potential nesting and foraging habitat for burrowing owls. Nesting burrowing owls have been recorded in the project vicinity (CDFG 2002), and one dead burrowing owl was observed during recent field surveys of the project area near the California Aqueduct (Calpine 2001a). Mountain plovers were not observed during field surveys, but may occasionally use the project vicinity as winter resting and foraging range. San Joaquin kit fox (SJKF) may utilize the project area and surrounding agricultural areas as a migration corridor and perhaps as an occasional foraging location.

Other listed wildlife species that are known to occur in the vicinity of the proposed SJVEC site and related linear facilities (Table 1) are not expected to occur on site due to the highly modified agricultural environment that exists.

No sensitive plant species were identified within the project area and none are expected to occur due to the lack of suitable habitat and the existing land uses. The areas that would be permanently and temporarily disturbed by the proposed project do not support

natural habitat, and occur on highly disturbed agricultural lands that are regularly subjected to farming practices such as heavy disking and herbicide treatments.

Wildlife species that are not state or federally listed, but are considered to have recreational and/or commercial value, may occur in the project area. Bird species that provide hunting opportunities for hunters, such as mourning dove (*Zenaida macroura*), ring-necked pheasant (*Phasianus colchicus*), and common mallard (*Anas platyrhynchos*) are known to occur in the vicinity of the project and may occasionally occur on the SJVEC site.

A detailed description of the existing conditions at the power plant site and related linear facilities is presented below.

Power Plant Site

The proposed power plant site is located in an industrial-zoned area in the southern end of the town of San Joaquin, and is currently active agricultural land under cotton production. The 85-acre site is bordered by commercial and industrial areas within the town of San Joaquin to the north, West Springfield Avenue to the south, Colorado Avenue to the east, and a combination of agricultural and commercial lands to the west.

The proposed power plant would be permanently placed on approximately 25 acres of the 85-acre site. The remaining acreage would be leased for agricultural practices. An additional 25 acres of the site would be used during project construction as a temporary laydown area for construction-related activities, such as parking and staging of equipment.

Linear Facilities

Transmission Lines

The proposed transmission lines would include two adjacently-placed 230 kV lines that share the same 100 foot-wide right of way, and travel approximately 1,500 feet from the SJVEC site south towards the PG&E Helm Substation. One line would connect directly into the substation and the second would be diverted west and connected with the existing Panoche-Helm transmission line. The proposed transmission line right of way is currently active agricultural land (cotton production) with one intersecting roadway (West Springfield Avenue).

Natural Gas Line

The proposed 20 mile-long natural gas pipeline would exit the SJVEC at the southwestern corner of the site and travel westward along West Springfield Avenue for approximately 1.5 miles. The pipeline would then turn north along El Dorado Avenue for approximately 0.5 miles to its intersection with Manning Avenue. The pipeline would then travel westward along Manning Avenue for approximately 19 miles to its connection with PG&E's system.

The 70-foot temporary construction right of way would incorporate a 20 foot–wide spoil pile and a 50 foot-wide working area. In addition a 150 feet by 100 feet metering station and a 30 feet by 100 feet mainline valve station would be permanently placed along the pipeline route.

Approximately two miles of the pipeline right of way would be constructed along roadways that traverse a combination of farmland and sparsely distributed residents. The remaining 19 miles of pipeline would be placed on previously disturbed areas along an existing roadway (Manning Avenue) and within active agricultural lands. Pipeline construction would not result in the removal of native vegetation, but would temporarily disturb approximately 170 acres of agricultural land, and permanently disturb approximately 0.4 acres of agricultural land (metering and mainline valve stations).

Fresno Slough and the California Aqueduct are the only ecologically sensitive area that the natural gas supply line would cross. Although degraded, Fresno Slough supports mature riparian woodland vegetation, and may provide habitat for a variety of wildlife species. The lands adjacent to the California Aqueduct support some remnant vegetation, and may provide habitat for a variety of wildlife species.

Power Plant Access Road

The approximately 800 feet-long primary access road would connect the SJVEC directly to two existing roadways: Springfield Avenue (immediately south of the site) and Cherry Lane (immediately west of the site). The proposed road would be placed on existing agricultural land within the 85-acre power plant site (described above).

Water Supply Pipeline

The applicant proposes to use sub-surface reclaimed water, extracted from under the filtration ponds of the Fresno-Clovis Wastewater Treatment Facility, for cooling. The water would be conveyed to the site via a 21 mile-long pipeline that would start at North Avenue and an extension of Grantland Avenue, go west along North Avenue, south along Chateau Fresno Avenue, west along Lincoln Avenue, south along Jameson Avenue, west along Manning Avenue, and south along Placer Avenue to the project. The water supply line route is located within or directly adjacent to paved roadways, and the predominant land use is intensively managed agricultural land. James Bypass is the only ecologically sensitive area that the planned water supply line route crosses. Although highly degraded, James Bypass supports mature riparian woodland vegetation thatprovides wildlife habitat.

The installation of the water supply line would result in the temporary disturbance of 178 acres of agricultural lands.

ANALYSIS AND IMPACTS

ENVIRONMENTAL CHECKLIST

	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
BIOLOGICAL RESOURCES -- Would the project or related facilities:				
a) Have an adverse effect, either directly, indirectly, or cumulatively, on any species identified as a candidate, sensitive, or special status species in federal, state, local or regional plans, policies, or regulations (including those by the California Department of Fish and Game, National Marine Fisheries Service, U.S. Bureau of Land Management, U.S. Forest Service, or U.S. Fish and Wildlife Service) or habitat for these species.		X		
b) Have an indirect or direct adverse effect on any riparian habitat or other sensitive natural community identified in federal, state, local or regional plans, policies, and regulations (including those by the California Department of Fish and Game or U. S. Fish and Wildlife Service)?				X
c) Have an adverse effect on surface or ocean waters (including those considered by National Marine Fisheries Service as essential fish habitat), or on local aquatic resources, or on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, tidal and freshwater marshes, vernal pools, etc.) either through direct removal, filling, hydrological interruption, pollution (thermal, particulate, or chemical) or other means?				X
d) Interfere with the movement of any native fish or wildlife species (resident or migratory) or with established native (resident or migratory) wildlife corridors, or limit or impede the use of native wildlife nursery sites?		X		

	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
BIOLOGICAL RESOURCES -- Would the project or related facilities:				
e) Conflict with any local policies or ordinances protecting biological resources, such as 1) a tree preservation policy or ordinance, or 2) a native landscape requirement?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan?				X
g) Create an adverse change in commercial or recreational species' distribution or population size, or harvesting opportunities for these species?				X
h) Facilitate the introduction, population growth, or spread of weedy plant species that are difficult to control (such as those classified by the California Department of Agriculture as List A, List B, or Red Alert species) or other invasive or non-native aquatic or terrestrial wildlife species (such as nest parasites)?		X		

ANALYSIS AND DISCUSSION OF IMPACTS

The environmental checklist items that address potential impacts to biological resources are discussed below.

a) Effect on Sensitive Species

Power Plant and Laydown Areas

The proposed power plant site and laydown areas would be located on active farmland. These areas do not contain any native or sensitive plant species, and no sensitive animal species or sensitive habitats occur at these locations. In the San Joaquin Valley, however, agricultural lands are considered potential habitat for the state and federally listed San Joaquin kit fox (SJKF). Loss of this habitat requires consultation with the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG) to develop mitigation measures and provisions for incidental take.

Calpine and the USFWS have informally consulted on the incidental take of SJKF habitat, and the USFWS has determined that construction and operation of the SJVEC (including the power plant, laydown areas, transmission lines, and natural gas and water supply pipelines) is not expected to adversely affect SJKF or any other federally

listed species (Pau 2002). In addition, CDFG has stated that they do not intend to require the applicant to acquire an incidental take permit for any state-listed species for the SJVEC project (Daniels 2001).

To provide protection for sensitive biological resources potentially affected by the SJVEC, staff will require the development and implementation of a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP). Among other requirements, the BRMIMP will present the mitigation measures recommended by the Applicant (provided in the Applicant's Preliminary Draft BRMIMP), and discuss the biological resource permits the Applicant expects to obtain, the responsibilities of the parties involved, and the lines of communication (See Condition of Certification BIO-5). Mitigation will include measures such as pre-construction surveys for sensitive resources by the project's Designated Biologist (or a qualified replacement) (See Conditions of Certification BIO-1, 2, and 3), exclusion barriers for potential kit fox dens (e.g., capping pipe ends), and implementation of a Compliance Project Manager (CPM) approved Worker Environmental Awareness Program (See Condition of Certification BIO- 4). Staff also will require the development of a Site Closure Plan (See Condition of Certification BIO-6). The Closure Plan will include provisions to protect biological resources when the power plant is closed and the site restored, if appropriate.

With the implementation of mitigation measures to protect sensitive biological resources identified in the Biological Resources Conditions of Certification, staff concludes that the construction and operation of the power plant and laydown areas would not have a significant impact on sensitive species or their habitat.

Power Plant Exhaust Stacks

The proposed power plant project includes three 145 foot exhaust stacks. Tall structures such as radio and television antennas, power plant and refinery exhaust stacks, large buildings, and power lines can pose a threat to birds that might collide with them. These structures pose more of a collision threat during periods of inclement weather and when they are located within or adjacent to areas supporting habitats that attract large flocks of birds (e.g., wetlands, open water areas, areas planted in grain crops).

The project site and the adjacent areas do not support habitat that would be attractive to large flocks of birds. Therefore, staff concludes that the proposed facilities will not pose a significant bird collision threat to local and/or migratory bird populations.

Linear Facilities

Natural Gas Pipeline and Water Supply Lines

Natural vegetation would not be affected by construction or operation of the natural gas and water supply pipelines (Calpine 2001a, 2001b, and 2002a). Directional drilling would reduce direct impacts to the aquatic habitats to a less-than-significant level and would require the Applicant to submit a CDFG Streambed Alteration Agreement (SAA) notification package. The Applicant is currently working to obtain an SAA and will be required to submit a finalized agreement 30 days prior to any on-site activities

(Condition of Certification BIO-7). The SAA would provide provisions for avoiding impacts related to the water crossing (e.g., inadvertent release of drilling fluids).

The temporary disturbances related to the installation of the pipelines (e.g., noise and dust) could adversely affect special status wildlife species that may occur in the vicinity. Special status raptor species such as Swainson's hawks, Cooper's hawks, and northern harriers may nest and forage near the project, and project-related activities could disrupt nesting and foraging behavior. Implementation of mitigation measures identified in the BRMIMP to protect sensitive species (e.g., pre-construction nesting surveys and construction timing restrictions) would lessen the likelihood of significant impacts to nesting raptors.

Wildlife species could become trapped and buried in open trenches during construction of the natural gas and water supply pipelines and other facilities. Therefore, the BRMIMP would need to include construction management practices (See Condition of Certification BIO-9) that would be implemented to prevent entrapment or provide escape structures for wildlife. In addition, the Designated Biologist (See Condition of Certification BIO-1) would be required to inspect trenches and other construction areas prior to construction activities each day.

Staff, therefore concludes that, with the implementation of measures outlined in Conditions of Certification BIO-1, 2, 3, 5, and 7, no significant impacts on special status species or their habitat would result from installation and operation of the natural gas and water supply pipelines.

Transmission Lines

The installation and operation of the proposed transmission lines would occur in existing agricultural lands and would not require the removal of native plants or habitat for sensitive animal species. Additional impacts resulting from the transmission lines include the potential for birds to be electrocuted, harmed, or killed by a collision with the new transmission lines.

To reduce the potential for bird electrocutions at the SJVEC transmission lines, the Applicant would be required to incorporate measures developed by the Avian Powerline Interaction Committee in Suggested Practices for Raptor Protection on Powerlines (APLIC 1996). These measures include implementing the prescribed spacing of phases to avoid phase-to-phase contact electrocution of birds with large wingspans, and must be included in the project's BRMIMP (See Condition of Certification BIO-5). With incorporation of these and other measures that stress impact avoidance, staff concludes that the transmission lines would not pose a significant electrocution threat to bird species.

Staff does not anticipate any significant collision-related impacts to birds due to the short distance of the transmission lines, the proximity to existing PG&E lines associated with the nearby Helm Substation, and the placement of the transmission line within an area that does not support habitat that is attractive to large flocks of birds (e.g., wetlands, grain crops, woodlands). In areas adjacent to large wetlands, birds are known to collide with the overhead ground wire(s), not the conductor, because the

ground wire is usually located above the conductor and is harder to see, as it is much smaller in diameter than the conductor. Since the project is not located near such an area, the project's short transmission line and associated overhead ground wire(s) are not expected to pose a threat to local birds.

Access Road

The proposed access road would be placed on existing agricultural lands within the 85-acre power plant site, and would connect two existing paved roadways that occur directly south and west of the site. Roadway collisions are known to increase wildlife mortality, and the proposed access road may contribute to local loss of wildlife. The proposed road, however, would be located in farmland that is used for intensive cotton production, and is, therefore, considered poor habitat for wildlife.

To minimize the likelihood of access road-related wildlife mortalities, staff recommends that the BRMIMP (See Condition of Certification BIO-5) include a measure to limit vehicular speed along the access road. Staff concludes that because the road would be placed within and adjacent to poor wildlife habitat, and because the project owner would be required to implement a vehicular speed control measure, the project's access road will not pose a significant threat to wildlife,

b) Effect on Sensitive Habitat

The proposed SJVEC power plant site, access road, and transmission lines would be placed in existing farmland and would not be adjacent to any riparian habitat or sensitive natural communities. The natural gas and water supply pipelines would intersect areas that support riparian and wetland resources, but would not affect these sensitive habitats because of directional drilling techniques. A discussion of "less than significant" air quality and wastewater impacts to biological resources is presented below.

Air Quality Impacts to Biological Resources

Some terrestrial ecosystems that are nitrogen limited (e.g. serpentine grasslands) respond strongly to incremental additions of nitrogen, and exhibit changes in productivity, species composition, and nutrient retention (Weiss 1998).

No sensitive habitats that would be sensitive to high levels of nitrogen emissions have been identified in the project region. Therefore, staff concludes that power plant-related emissions should not result in any terrestrial ecosystem impacts to sensitive species and their habitat at or near the proposed SJVEC site.

Wastewater and Storm Water Impacts to Biological Resources

The SJVEC is designed to generate no wastewater discharge. Thus, staff has determined that potential adverse impacts to biological resources, which might result from wastewater generation and discharge, are not expected.

Storm water from the 25-acre developed portion of the SJVEC would be collected by pipes, channels, and drains, and sent through oil-water separators prior to collection in a 250 X 300 foot percolation/evaporation detention basin (located on site).

Due to the temporary ponding of water, the proposed detention basin may periodically attract bird species (e.g., migratory and local waterfowl, shorebirds, and wading birds) and expose them to toxic chemicals (e.g., chemicals found in oil and heavy metals). Due to the climate and soil conditions on site, however, percolation and evaporation are expected to rapidly dry-out the basin following storm events.

Staff contacted CDFG to discuss potential biological-related impacts from SJVEC's proposed detention basin (Daniels 2002). Ms. Daniels indicated that the storm water basin is unlikely to significantly attract and affect birds due because of the estimated limited time of ponding and its location within the power plant site. She also suggested that, in the event birds are consistently observed using the basin, CDFG will need to be notified to determine if measures (e.g., hazing, netting) should be implemented to deter birds from using the detention basin. Therefore, staff recommends that the BRMIMP (See Condition of Certification BIO-5) include measures to notify CDFG if birds are consistently observed using the storm water detention basin when ponded.

The Applicant has been asked to develop estimates of percolation/evaporation rates within the basin to estimate the duration of ponding following different storm event scenarios. This information will help staff determine if the detention basin is likely to become an attractive nuisance to birds.

c) Effect on Aquatic Habitats

No surface waters will be affected, and there are no federally protected wetlands, including vernal pools and/or marsh habitat, within the proposed SJVEC site or along the proposed linear facilities that may be affected by construction and operation activities. Aquatic resources that occur along the natural gas and water supply pipeline routes (i.e., Fresno Slough, James Bypass, California Aqueduct, and various irrigation ditches) would not be affected due to directional drilling techniques that reduce direct impacts to these habitats to a less-than-significant level.

d) Effects on Fish and Wildlife

Wildlife Movement

Construction of the proposed SJVEC and linear facilities would result in the permanent loss of 25 acres and the temporary loss of 348 acres of agricultural land. This loss does not pose a significant impact to wildlife movement in the vicinity of the SJVEC since the surrounding agricultural lands provide alternate movement routes around the site.

Wildlife species movement could be impeded and animals could become trapped and buried in open trenches during construction of the natural gas and water supply pipelines and other facilities. Staff concludes, however, that potential effects due to entrapment of wildlife would be less than significant with implementation of mitigation measures that would lessen the likelihood that project construction activities will impact any local wildlife (see Condition of Certification BIO 2).

Additionally, Calpine is seeking land purchase opportunities in the vicinity of the SJVEC to secure habitat that would provide movement corridors and other wildlife habitat values. Calpine has stated that the USFWS would consider their land purchase as

compensatory habitat for potential cumulative impacts to biological resources (Lagerquist 2002).

Noise

The proposed facility would generate additional noise, especially during construction. The potential impact to biological resources from this additional noise is considered to be insignificant because the proposed project is located adjacent to roadways or actively managed agricultural fields, and near existing residential and industrial areas and no sensitive species are known to occur in the immediate vicinity of the project. Thus, the additional noise associated with the construction and operation of the SJVEC would not likely have a negative effect on wildlife species in the vicinity of the project.

e) Conflicts With Local LORS

No local ordinances or policies related to sensitive biological resources have been identified. The City of San Joaquin codes do include provisions that require an Applicant to notify the City prior to any tree removal activities and to follow guidelines established for landscape plantings. The Applicant has indicated that trees will not be removed within the San Joaquin City limits (Lagerquist, 2002) and that a revised on-site landscaping plan that compliments the facility appropriate to the regional context is being developed in consultation with the City of San Joaquin (Calpine 2002b). Staff therefore concludes that the SJVEC does not conflict with local biological resource LORS.

f) Conflicts With Adopted Plans

The proposed SJVEC will not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. The SJVEC is within the area addressed by the Recovery Plan for Upland Species of the San Joaquin Valley (USFWS 1988), which was developed to help protect habitat for 11 special status species known from the San Joaquin Valley. No critical habitat for these species, however, would be affected by the proposed project (Pau, 2002).

g) Effects on Commercial or Recreational Species

The proposed SJVEC would not create an adverse change in commercial or recreational species distribution or population size, or harvesting opportunities for these species; therefore no impact is expected.

h) Effects From Invasive Plant or Wildlife Species

Construction of the SJVEC could facilitate the introduction, population growth, and spread of weedy plant species. Weedy plant species growth can suppress native vegetation growth and infest adjacent agricultural lands. Best Management Practices designed to eliminate or minimize the spread of noxious weeds shall be developed by the Applicant and included in the BRMIMP (See Condition of Certification BIO-5).

CUMULATIVE IMPACTS

Cumulative impacts are those that result from the incremental impacts of an action added to other past, present, and reasonably foreseeable future actions, regardless of

who is responsible for such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The proposed SJVEC power plant exhaust stacks and transmission lines are not expected to be a prominent obstacle for bird species and, therefore, should not cause an increase in bird collisions or represent an impediment to bird movements. As a result, the stacks and transmission lines do not contribute to any potential regional cumulative impact concern. In addition, the anticipated project noise increase, when considered in combination with current noise levels, would not contribute to any cumulative noise/wildlife impacts concern.

No natural habitats are remaining on the power plant site, and natural habitats associated with the linears would be entirely avoided. Thus, all project-related disturbances would be limited to already-disturbed areas. The SJVEC, however, will result in the permanent and temporary loss of agricultural land. The permanent removal of agricultural land at the SJVEC, and at other projects in the vicinity, creates a cumulative effect on habitat and movement for the SJKF. However, due to the relatively small amount of agricultural land that will be permanently converted to the SJVEC, the lack of critical habitat for SJKF (Pau 2002), Calpine's intention to purchase compensatory wildlife habitat, and mitigation measures developed as Conditions of Certification (BIO 1-5, 7, 8, and 9), staff concludes that the permanent and temporary loss of agricultural lands would not result in a significant cumulative impact.

COMPLIANCE WITH LORS

Staff has corresponded with CDFG regarding the project's potential need for a Streambed Alteration Agreement (SAA) for directional drilling activities along the project's natural gas and water supply pipelines (Kinland 2002). CDFG has stated that a SAA will be required for these activities. The Applicant has been notified, and is currently working with CDGF to develop a SAA. Staff has requested a schedule date for issuance of the SAA and has made notification of a final agreement a condition of certification (See Condition of Certification BIO-7).

Following repeated correspondence with the USFWS, CDFG, and the Army Corps of Engineers (ACOE), staff concludes that the proposed SJVEC would comply with all applicable LORS, provided that a SAA has been acquired a minimum of 30 days prior to the onset of construction activities, and all SAA terms and conditions are implemented during project construction.

RESPONSES TO AGENCY AND PUBLIC COMMENTS

Staff discussed the proposed SJVEC with the USFWS on at least three occasions (Pau, January 7, 14, and February 4, 2002) to determine if the SJVEC owner would be required to get a federal take permit (a Section 7 Biological Opinion). Staff received a letter on March 25, 2002 stating that the project is not likely to affect listed species (e.g. SJVKF and giant garter snake) and a federal Section 7 take permit would not be required (Knight 2002).

Staff discussed the proposed SJVEC with the ACOE to determine whether or not the ACOE had jurisdiction (Herkala 2002) over potential impacts to jurisdictional wetlands (creeks, canal, ditches, etc.). Following their review of the project, ACOE did not claim any jurisdiction because of the lack of impacts to jurisdictional areas (Calpine 2002b).

Staff discussed the proposed SJVEC with Donna Daniels of CDFG on several occasions (October 22, 2001, January 16 and 18, 2002, March 6, 2002) and with Craig Kinland (CDFG's Streambed Alteration Agreement coordinator) on March 11, 2002. During these conversations, CDFG indicated that they had no concerns related to impacts to state listed species for the proposed SJVEC; however, staff was informed that a SAA would likely be required for project-related directional drilling activities along the project's linears. CDFG will provide the Applicant and staff with a determination following their review of the SAA notification package.

Staff has not received any public comments regarding biological resources.

CONCLUSIONS AND RECOMMENDATIONS

Staff has concluded that it is unlikely that the proposed project will have an adverse effect on biological resources through bird electrocutions and collisions because the Applicant would be required to implement protective measures that have been developed by the Avian Powerline Interaction Committee (APLIC 1996). Staff also concludes that the local wildlife would not be affected by incremental increases in noise or the removal of wildlife corridors.

Staff recognizes that the construction and operation of the SJVEC would cause permanent, temporary, and possible cumulative impacts to agricultural land that may serve as SJKF habitat. However, because of the highly disturbed conditions of the project area, the fact that the project would not be built within critical habitat for SJKF (Pau 2002), and the anticipated implementation of applicable mitigation measures, staff concludes that potential impacts to SJKF would be mitigated to a less than significant level.

Staff also recognizes that construction of the SJVEC could impact other sensitive species (e.g., nesting raptors) that may occur in the vicinity of the project.

Staff concludes that, with the implementation of the proposed mitigation, the proposed SJVEC project will not result in significant impacts to sensitive species. Staff, therefore, has no further recommendations.

PROPOSED CONDITIONS OF CERTIFICATION

DESIGNATED BIOLOGIST

BIO-1 The project owner shall submit the resume of the Designated Biologist to the California Energy Commission's Compliance Project Manager (CPM) for approval. Site and related facility activities shall not begin until a CPM approved Designated Biologist is available to be on-site.

Protocol: The Designated Biologist must meet the following minimum qualifications:

1. Bachelor's Degree in biological sciences, zoology, botany, ecology, or a closely related field;
2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society;
3. At least one year of field experience with biological resources found in or near the project area; and
4. An ability to demonstrate to the satisfaction of the CPM the appropriate education and experience for the biological resources tasks that must be addressed during project construction and operation.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM the resume and contact information of the proposed Designated Biologist for approval.

If a Designated Biologist is replaced, the resume and contact information of the proposed replacement must be submitted to the CPM at least 10 working days prior to the termination or release of the preceding Designated Biologist.

Designated Biologist Duties

BIO-2 The CPM approved Designated Biologist shall perform the following during any site or related facilities mobilization, construction and operation activities:

1. Advise the project owner's Construction/Operation Manager, and supervising construction and operations engineer on the implementation of the biological resources Conditions of Certification;
2. Be available to supervise or conduct 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;
3. Clearly mark areas with sensitive biological resources and inspect these areas for compliance with regulatory terms and conditions;
4. 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 (parking lots) for animals in harms way;
5. Notify the project owner and the CPM of any non-compliance with any biological resources Condition of Certification; and
6. Respond to direct inquiries of the CPM regarding biological resource issues.

Verification: The Designated Biologist shall maintain written records of the tasks described above, and summaries of these records shall be submitted in the Monthly Compliance Reports.

During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report.

Designated Biologist Authority

BIO-3 The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist to ensure conformance with the Biological Resources Conditions of Certification.

Protocol: The project owner's Construction/Operation Manager shall halt, if necessary, all construction or operation activities in areas specifically identified by the Designated Biologist as sensitive to assure that potential significant biological resource impacts are avoided.

The Designated Biologist shall:

a. Inform the project owner and the Construction/Operation Manager when to resume construction or operation, and

b. Advise the CPM if any corrective actions have been taken or will be instituted.

Verification: Within 24 hours of a Designated Biologist notification of non-compliance or a halt of construction or operation activities, the project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem or the non-compliance with a condition.

For any necessary corrective action taken by the project owner, a determination of success or failure will be made by the CPM within five (5) 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-4 The project owner shall develop and implement a CPM approved Worker Environmental Awareness Program (WEAP) in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, construction, and operation, are informed about sensitive biological resources associated with the project.

Protocol: The WEAP must:

a. 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 is made available to all participants;

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

c. Present the reasons for protecting these resources;

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

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

f. Include an acknowledgment form signed by each worker indicating that they received training and shall abide by the guidelines.

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

Verification: At least 30 days prior to the start of any site or related facilities mobilization, the project owner shall provide to the CPM two (2) copies of the WEAP and all supporting written materials prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall state 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.

During construction, the signed training acknowledgement forms 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-5 The project owner shall submit to the CPM for review and approval a copy of the BRMIMP and shall implement the measures identified in the approved BRMIMP. Any changes to the approved BRMIMP must also be approved by the CPM in consultation with CDFG, the USFWS and appropriate agencies.

Protocol: The final BRMIMP shall identify:

a. All biological resource mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;

b. All Biological Resource Conditions of Certification identified in the Commission's Final Decision;

c. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion;

d. All biological resources mitigation, monitoring and compliance measures required in other state agency terms and conditions, such as those provided in the CDFG Take Permit and Streambed Alteration Agreement and regional water quality control board permits;

e. All biological resources mitigation, monitoring and compliance measures required in local agency permits, such as site grading and landscaping requirements;

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

g. All required mitigation measures for each sensitive biological resource;

h. Required habitat compensation strategy, including provisions for acquisition, enhancement, and management for any temporary and permanent loss of sensitive biological resources;

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

j. 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;

k. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities - one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of mitigation measures. Include planned timing of aerial photography and a description of why times were chosen;

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

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

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

o. A discussion of biological resources related facility closure measures;

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

q. A copy of all biological resources-related permits.

Verification: At least 45 days prior to start of any site or related facility mobilization activities, the project owner shall provide the CPM with two copies of the BRMIMP for this project, and provide copies to the CDFG and the USFWS.

The CPM, in consultation with the CDFG, the USFWS and any other appropriate agencies, will determine the BRMIMP's acceptability within 30 days of receipt.

The project owner shall notify the CPM no less than five working days before implementing any modifications to the approved BRMIMP to obtain CPM approval.

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

Closure Plan Measures

BIO-6 The project owner will incorporate into the planned permanent or unexpected permanent closure plan, and the BRMIMP, measures that address the local biological resources.

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

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

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

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

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

Verification: At least 12 months prior to commencement of planned permanent closure activities, the project owner shall address all biological resources related issues associated with facility closure that is incorporated into the BRMIMP in a Biological Resources Element. The Biological Resources Element will be incorporated into the Facility Closure Plan and include a complete discussion of the local biological resources and proposed facility closure mitigation measures.

Streambed Alteration Agreement

BIO-7 The project owner shall acquire a Streambed Alteration Agreement from the CDFG, incorporate the terms and conditions into the project's BRMIMP, and implement the terms and conditions during project construction.

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

Preventative Design Mitigation Features

BIO-8 The project owner shall modify the project design to incorporate all feasible measures that avoid or minimize impacts to the local biological resources.

Protocol:

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

b. Avoid wetland loss; and

c. Design and construct transmission lines and all electrical components to reduce the likelihood of electrocutions of large birds.

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

Construction Mitigation Management to Avoid Harassment or Harm

BIO-9 The project owner shall manage their construction site, and related facilities, in a manner to avoid or minimizes impacts to the local biological resources.

Protocol:

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

b. Make certain all food-related trash will be disposed of in closed containers and removed at least once a week. Feeding of wildlife shall be prohibited;

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

d. Prohibit pets from being brought to the site; and,

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

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

REFERENCES

Avian Powerline Interaction Committee (APLIC). 1996. Suggested Practices for Raptor Protection on Powerlines: The State of the Art in 1996. Edison Electric Institute/Raptor Research Foundation, Washington D.C.

California Department of Fish and Game. California Natural Diversity Database. 2002. Search of the San Joaquin, Helm, Raisin, Monocline Ridge, Levis, Kearney Park, and Lillis Ranch 7.5 minute United States Geologic Survey topographic maps.

California Native Plant Society. 2001. Inventory of Rare and Endangered Plants of California. 6th Edition, Special Publication #1. Sacramento, California.

Daniels, D. 2001. California Department of Fish and Game. Personal communication with Tom Scofield on October 22, 2001.

Daniels, D. 2002. California Department of Fish and Game. Personal communication with Tom Scofield on January 7, 17 and March 6, 2002.

Calpine (Calpine's Central Valley Energy Center LLC). 2001a. Application for Certification for the Central Valley Energy Center. Submitted to the California Energy Commission on August 27, 2001.

Calpine (Calpine's Central Valley Energy Center LLC). 2002a. Supplement to Application for Certification for the Central Valley Energy Center. Submitted to the California Energy Commission December 2001.

Calpine (Calpine Corporation). 2002b. Data Responses. Submitted to the California Energy Commission on March 12, 2002.

Calpine (Calpine Corporation). March 12, 2002, Preliminary Draft Biological Resource Mitigation and Monitoring Plan for the San Joaquin Valley Energy Center.

Herkala, M. 2002. United States Army Corps of Engineers, Sacramento CA., Personal communication with Tom Scofield on March 5, 2002.

Kinland, C. 2002. California Department of Fish and Game. Streambed Alteration Agreement Program. Personal communication with Tom Scofield on March 11, 2002.

Knight, J. March 25, 2002. United States Fish and Wildlife Service. Letter to Michael Argentine (Calpine Corporation) Regarding Informal Consultation of the San Joaquin Valley Energy Center Project, Fresno County, California.

Lagerquist, T. 2002. Peregrine Environmental. Personal communication with Tom Scofield on February 7, 2002.

Pau, N. 2002. United States Fish and Wildlife Service, Sacramento, CA. Personal communications with Tom Scofield on January 7, 14, and February 4, 2002.

Staff. 2001-2002.Wildlife observations by Tom Scofield during site visits in December 2001 and February 2002.

U.S. Fish and Wildlife Service (USFWS), 1988. Recovery Plan for Upland Species of the San Joaquin Valley. 340 pps.

Weiss, S. 1999. Cars, cows and checkerspot butterflies: nitrogen deposition and management of nutrient-poor grasslands for a threatened species. *Conservation Biology* 13(6): 1476-1486.

CULTURAL RESOURCES

Testimony of Judy McKeehan and Gary Reinoehl

INTRODUCTION

The cultural resources section discusses potential impacts on cultural resources of the proposed San Joaquin Valley Energy Center (SJVEC) located in Fresno County. A brief cultural overview of the project is provided, as is analysis regarding selected CEQA checklist items used to assess potential project-related impacts. If cultural resources are identified, staff determines whether there may be a project-related impact to identified resources and if the resource is eligible for the California Register of Historic Resources (CRHR); staff then recommends mitigation that will reduce the impact to the resource to a less than significant level.

There is also potential that a project may have an impact on a previously unidentified resource or affect a resource in an unanticipated manner. Staff also recommends procedures in the conditions of certification that mitigate these potential impacts.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The San Joaquin Valley Energy Center project must comply with the following laws, ordinances, regulations and standards pertaining to cultural resources:

STATE

California Code of Regulations, Title 14, Chapter 11.5, Section 4852 defines the term "cultural resource" to include buildings, sites, structures, objects, and historic districts.

Public Resources Code, Section 5000 establishes a California Register of Historic Resources; determines significance of and defines eligible properties; makes any unauthorized removal or destruction of historic resources on sites located on public land a misdemeanor; prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn; defines procedures for the notification of discovery of Native American artifacts or remains; and, declares that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated.

The California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et seq.; Title 14, California Code of Regulations, Section 15000 et seq.) requires analysis of potential environmental impacts of proposed projects and requires application of feasible mitigation measures.

Public Resources Code Section 21083.2 states that the lead agency determines whether a project may have a significant adverse effect on “unique” archeological resources; if so, an EIR shall address these resources. If potential for damage to unique archeological resources can be demonstrated, the lead agency may require reasonable steps to preserve the resource in place. Otherwise, mitigation measures shall be required as prescribed in this section. The section discusses excavation as mitigation, limits the Applicant’s cost of mitigation, sets time frames for excavation,

defines “unique and non-unique archaeological resources,” and provides for mitigation of unexpected resources.

Public Resources Code Section 21084.1 states that a project may have a significant effect on the environment if it causes a substantial adverse change in the significance of a historic resource; the section further defines an “historic resource” and describes what constitutes a “significant” historic resource.

CEQA Guidelines, Title 14, California Code of Regulations, Section 15126.4(b) prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction enacted as mitigation of a project’s impact on an historical resource; discusses documentation as a mitigation measure; and discusses mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.

CEQA Guidelines, Section 15064.5 defines the term “historical resources,” explains when a project may have a significant effect on historic resources, describes CEQA’s applicability to archaeological sites, and specifies the relationship between “historical resources” and “unique archaeological resources.”

Penal Code, Section 622 1/2 states that anyone who willfully damages an object or thing of archaeological or historic interest is guilty of a misdemeanor.

California Health and Safety Code, Section 7050.5 states that if human remains are discovered during construction, the project owner is required to contact the county coroner.

LOCAL

The Fresno County policies concerning measures for the preservation and protection of historical and cultural resources are contained in the General Plan Update EIR (Fresno County 2000) OS-J.1 through J.8. In addition, Chapter 6 (Recreation, Historical, and Archaeological Resources) provides background information with respect to the region’s historical and prehistorical development, and Appendix 6-A (Historic Resources) lists all known historic properties in the County.

The City of San Joaquin Comprehensive General Plan and EIR (City of San Joaquin 1996) states that there are no known archaeological sites or State of California Historical Landmarks within the planning area. The document also states that the historic value of older structures will be reviewed on a case by case basis, and that some may qualify for the historic registry. Further, in the City of San Joaquin’s Southeast Area Annexation Initial Study/Negative Declaration (City of San Joaquin 2001), proposed Mitigation Measure 5 seeks to reduce potential impacts to prehistoric and historic resources to a less than significant level by specifying consultations with a qualified archaeologist during various stages of ground-disturbing activities in the project area.

SETTING

The proposed power plant site occupies 25 acres on an 85-acre parcel (includes equipment laydown areas) in the City of San Joaquin, California. The associated project linears are located in unincorporated portions of Fresno County. The proposed project consists of the power plant, a 230-kV switchyard, 1,500 feet of new 230-kV transmission line, rerouting of 2,900 feet of 70-kV subtransmission line, 20 miles of new gas pipeline, 21 miles of new reclaimed water supply pipeline, 1 mile of domestic water supply pipeline, and 2.5 miles of sanitary sewer line (SJVEC 2001a: 1-1, 2-2). The project area is located in an urban industrial/agricultural environment. The right triangle-shaped parcel is bounded by the Union Pacific Railroad (formerly known as the Southern Pacific Railroad and the Hanford and Summit Lake Railway) and S. Colorado Avenue on the northeast, W. Springfield Avenue on the south, and S. Colusa Avenue on the west. PG&E's Helm substation is 1,500 feet south of the project site. The proposed power plant site is located in an area that has been recently used for agriculture.

Central California regional prehistoric cultural change from 4,500 years ago (referred to as 4,500 years before present, or 4,500 B.P.) to historic contact has been divided into three sequences: the Early Horizon (ca. 4,500-3,500/3,000 B.P.), the Middle Horizon (3,500-1,500 B.P.), and the Late Horizon (1,500-250 B.P.). Locally, buried archaeological remains have been exposed in alluvium and are not well understood or analyzed. The Early Horizon is represented by few known or investigated sites and is characterized by milling stones, hunting and fishing implements, and elaborate burials. The Middle Horizon is usually exhibited by deeply stratified deposits; mortars and pestles have replaced millingstones as plant food processors, and burials are utilitarian and often demonstrate evidence of violence. The Late Horizon appears as an extension of the Middle Horizon with the addition of new traits such as the use of the bow and arrow, and burials that include cremation and "killed" grave offerings.

Both Southern Valley and Northern Valley Yokuts lived near the project vicinity. The closest historically known tribal groups are the related Pitkachi, Gashou, and Wechikit. These groups had territories in the areas of the San Joaquin River, Kings River and Dry Creek. Another Yokut group called the Tache, or Tucuyu, occupied the area of the Fish Slough and Fresno Slough, near the project area, between Lemoore and Coalinga. The Yokuts comprised 60 or more hunter/gatherer tribal groups throughout Central California that traded amongst themselves and with other groups to the east and west (SJVEC 2001a: 8.3-8, -11).

In historic times, the southern San Joaquin Valley was isolated by distance and difficult terrain and was thus sparsely occupied by remnant native bands, trappers, and early immigrants. Two stage roads ran through the area in the 1850s-1860s. The huge J.G. James Ranch was acquired during the 1850s-1870s. James was also a pioneer in bringing irrigation to the area. The remaining James lands became the townsite of San Joaquin in 1913. The Hanford and Summit Lake Railroad line (later the Southern Pacific Railway) was extended through the area in 1912. Agriculture boomed in San Joaquin in the 1910s and 1920s, but water prices and minerals in the water caused an end to the boom by 1927. The formation of the Westland Water District in 1951 led to an increase in agricultural acreage by 1953 (SJVEC 2001a: 8.3-12, -14).

ANALYSIS AND IMPACTS

PROJECT SPECIFIC IMPACTS

The Environmental Checklist (see below) is presented in the California Environmental Quality Act (CEQA) guidelines to assist lead agencies in their analysis of project impacts. We provide this checklist as a summary of staff's conclusions regarding the potential for adverse significant project impacts. Following the checklist is a discussion of staff's analysis and rationale for these conclusions.

Environmental Checklist

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
CULTURAL RESOURCES – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?		X		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?			X	
c) Disturb any human remains, including those interred outside of formal cemeteries?			X	

a) Impacts to Historical Resources

The cultural resources record searches of existing survey information provided by the Applicant indicated one above-ground resource of historic age within one mile of the power plant site, water, natural gas, sewer, and transmission line routes. The one previously recorded resource is the Fresno Slough Bypass, in the vicinity of San Joaquin, that has been determined eligible for listing in the National Register of Historic Places (NRHP) as a" contributor" to a historic district by a consensus determination. There are no historically significant structures within ¼ mile of the power plant site, water, natural gas, sewer, and transmission line routes according to the Fresno County Historical Society and the Fresno County Library (SJVEC 2001a 8.314 -16). Commission staff requested a list of local historical societies and archeological societies that the Applicant contacted as part of their background research. The Energy Commission has not yet received the list.

The Applicant performed a pedestrian field survey of the power plant site, water, natural gas, sewer, and transmission line routes. The current survey identified 27 above-ground or non-archaeological resources of historic age within one-half mile of the power plant site and its associated linear facilities (SJVEC 2002a: 16). The resources consist of 15 buildings, nine ditches, and three structures. The structures are: 1) the Helm Substation and associated electrical transmission lines, 2) Tranquillity Irrigation District Reservoir, and 3) the Union Pacific Railroad.

Additionally, two buildings, two ditches, a portion of the California Aqueduct (San Luis Canal), and several detention basins were identified and found to be younger than 45 years and to possess no unique features or qualities. Disturbance of most of the historic ditches would be avoided by use of directional boring techniques.

The buildings will not be impacted by construction. They consist of Craftsman-style (1905-1930), Ranch-style (1935-1975), Folk Victorian (1870-1910), Vernacular (pre-1957), and Minimal Traditional (1935-1950) residences. Additional agricultural and domestic buildings were associated with many of the residential buildings. The construction of the power plant has the potential to alter the setting of these resources. If the setting is important to the eligibility of the resource, then a change in the setting could be a significant impact.

One building that lies within ½ mile of the power plant site (along South Placer Avenue) and the local Union Pacific Railroad section were evaluated for the NRHP and found to be ineligible. The Applicant states that the building consists of a scale house and wagon bed scale constructed around 1944 by the Producers' Cotton Oil Company to weigh cotton wagons. The Applicant indicated that although both resources are associated with an important individual in the cotton industry, neither resource was found to meet "additional criteria necessary for eligibility." The original Fairbanks scale was replaced in 1954, and the scale house was determined to have "lost its integrity of setting, materials and workmanship through the introduction of aluminum slider windows." Further, the Applicant states that the scale house has no notable design characteristics, and was constructed with common materials and workmanship.

The Applicant has made a case for the significance of the scale house and wagon bed scale because of its association with Stanley Pratt, founder of the Producers' Cotton Oil Company in San Joaquin in 1939, and an important individual in the cotton industry at the state and local level. The resource retains its integrity of location. The integrity of design is altered by the change in the windows, the addition of the bars over the windows, and the changes in the scale. The integrity of setting of this resource is important because of its relationship with the agricultural use of the surrounding area, the cultivation of cotton, and the gin that used to be to the west. The integrity of setting has been altered by the construction of large buildings less than a half mile to the west, residential buildings approximately a half-mile to the north, and the loss of the gin to the west. The setting to the east and south is still dominated by expanses of agricultural fields. The replacement of the windows, the additions of the bars and the changes to the wagon bed have diminished the integrity of materials. Workmanship has likewise been diminished by the same alterations. The alterations and the changes in the setting have likewise diminished the integrity of feeling and association. The loss of association with the cotton gin to the west is particularly important in conveying the significance of this resource. Commission staff has determined that the integrity of the resource has been diminished to the extent that it no longer meets the minimum requirements for eligibility to the California Register of Historical Resources (CRHR) under any criteria.

The Hanford and Summit Lake Railway was constructed between Hardwick and Ingle, a distance of 43 miles. It extended from Riverdale to Tranquility by 1912. The rail line

was of local importance to the town of San Joaquin as the town did not exist until after the railroad was built and was important to the agricultural development of this part of the Central Valley. The company abandoned the Hardwich to Riverdale portion in 1952, and removed the rail between Hanford and Burrel in the early 1980s. During the field inspection of the railroad, the Applicant noted that the rails were marked with 1970, indicating the rails had been replaced since 1970. The Applicant notes that the line is associated with the transportation history of Fresno County. However, they stated that the portion of the Hanford and Summit Railway grade in the project area does not qualify under NRHP criteria A or D because it does not retain integrity of association, materials, design, workmanship, or feeling (SJVEC 2002a: 14, 15).

The Hanford and Summit Railway appears to be of local importance in the development of this part of the Central Valley. The character defining elements of a railway are the grade, ballast, ties and rails. The period of significance would be from 1912 until the early 1950s. The removal of approximately 20 miles (approximately half of the original length) of rail and ties between Hanford and Burrel has affected the integrity of materials, workmanship, design, and feeling. The grade and ballast may still exist and would retain integrity of location, materials, workmanship, design, and feeling. The portion of the railway with replaced rails would have diminished integrity of materials, workmanship, design, and feeling. However, the diminishment of these aspects of integrity would not be as significant where rails and ties still exist as those areas where the ties and rails have been removed. The introduction of new buildings along the rail line, and the alteration and additions of mechanical crossings have altered the setting of the railway to some extent. The integrity of the Hanford and Summit Railway has been diminished to such a degree that it would not meet the requirements for eligibility to the CRHR. The Energy Commission agrees that the Hanford and Summit Railway would not qualify for eligibility to the CRHR.

The Tranquillity Irrigation District Reservoir and Dry Creek Canal have not been evaluated for eligibility to the NRHP and the CRHR. The Tranquillity Irrigation District Reservoir would be trenched by the project for the installation of the 24-inch diameter gas pipeline. The reservoir covers approximately 500 acres. The reservoir is depicted on maps produced in 1911 and 1914, although it is not delineated on the 1923 USGS quadrangle map. The Applicant indicates that it was used from 1923 until 1937, when water from the Kings River was diverted. The site of the reservoir is currently used for agricultural purposes.

The Applicant recommended that impacts to historic resources be avoided during project development. If it is determined that impacts cannot be avoided, then resource evaluations and mitigation measures should be implemented (SJVEC 2002a: 16).

Since the evaluation of the Tranquility Irrigation District Reservoir was not completed during the application process, it will be treated as eligible for the CRHR for the purposes of this analysis until and unless an evaluation of the reservoir reveals it is not eligible for the CRHR. Without that analysis, or if the analysis determines that the reservoir is eligible for the CRHR, photographs of the reservoir would be taken prior to construction and the land returned to the same configuration at the end of construction. If the land cannot be returned to the original contour and configuration, then the

reservoir would have to be evaluated and mitigation measures implemented to minimize the impacts to less than significant.

The Dry Creek Canal was built prior to 1912. This earthen ditch still is used as a water conveyance. The Dry Creek Canal (if trenched south of West North Avenue) may be impacted by installation of the water supply line. The Dry Creek Canal has not been evaluated for eligibility to the CRHR.

Since the evaluation of the Dry Creek Canal was not completed during the application process, it will be assumed to be eligible for the CRHR for the purposes of this analysis. If the canal (embankments or other parts) cannot be avoided, then photographs of the canal would be taken prior to construction and the land returned to the same configuration at the end of construction. If the land cannot be returned to the original contour and configuration, then the canal would have to be evaluated and mitigation measures implemented to minimize the impacts to less than significant.

The Commission staff recommends that the Dry Creek Canal and the Tranquillity Irrigation District Reservoir be photographed prior to construction and then returned to the same configuration (contour and appearance) to mitigate potential significant impacts if they cannot be avoided. If the land cannot be returned to the original contour and configuration, then the resources would have to be evaluated and mitigation measures implemented to minimize the impacts to less than significant. Proposed conditions of certification would require mitigation of the Dry Creek Canal and evaluation of the Tranquillity Irrigation District Reservoir if they cannot be avoided. Mitigation would consist of contouring the land to the original appearance. If this is not possible, then the resources would have to be evaluated for the CRHR. If either of the resources is eligible, implementation of the proposed Condition of Certification will reduce impacts to the reservoir to a level of insignificance. Implementation of the proposed Conditions of Certification **CUL-1** through **CUL-8** would reduce impacts to any potential historical resource to a level of insignificance.

b) Impacts to Archaeological Resources

A cultural resources records search of archaeological resources within one mile of the project site and linear features indicated one historical archaeological site (CA-FRE-3064H), a scatter of glass, brick, ceramic, and concrete debris dating from the 1930s or 1940s within the wastewater treatment facility (SJVEC 2001, 8.3-16). Eighteen prehistoric archaeological sites were recorded. Of these prehistoric sites, three sites contain reported human burials or remains, and two others contain multiple house pits. The Applicant has not yet submitted the requested list of local archaeological societies contacted (CEC 2002).

The Applicant performed pedestrian field surveys of the power plant site, water lines, sanitary sewer line, the transmission line and the previously unsurveyed portions of the gas line (SJVEC 2001: 8.3-17; SJVEC 2002b: 1; SJVEC 2001c: 1). Most of the linear surveys were restricted to a 30 to 60 foot width due to lack of property access. Most surveys were within agricultural fields or along roads with good visibility.

One archaeological isolate, a cobble tool, was identified as a result of the surveys (SJVEC 2001a, 8.3-16, SJVEC 2001b). Additionally, an interview with a local resident

at the time of the surveys indicated that Native American burials and artifacts have been previously removed from an area between Yolo and Sonoma Avenues (SJVEC 2001c: 1).

A local homestead well that may lie within the project site was not located during field surveys (SJVEC 2001a: 18; SJVEC 2002b, Figure 1). If the well or other features are located on the project site, impacts to it or to associated remains may occur during construction activities.

Buried archaeological resources could be encountered during project construction. The project site is located in an alluvial plain and has been subject to unspecified years of agricultural activity. An alluvial deposit may contain buried prehistoric cultural resources. Three sites containing human burials or remains were previously recorded within one mile of the project.

The Applicant recommends: 1) demarcation of resources as an Environmentally Sensitive Area when construction activities are within 100 feet of any known archaeological sites to facilitate avoidance, 2) informing the construction crew of the resource values and regulatory protections through an employee training program, and 3) monitoring during construction in sensitive areas (James Bypass and between Yolo Avenue and Sonoma Avenue) (SJVEC 2001a: 8.3-20; SJVEC 2001c: 1). The Applicant presents a proposed monitoring program and protocol to be followed (SJVEC 2001a: 8.3-20, -23).

Commission staff recommends survey of all areas not previously surveyed, evaluation of any resources identified that cannot be avoided, and monitoring of initial groundbreaking activities at the plant site and at the trenching for underground water and gas lines. Staff also recommends that following the initial groundbreaking, the project owner's Cultural Resources Specialist (CRS) would evaluate the potential for encountering buried archaeological deposits and provide recommendations for additional monitoring. Any additional monitoring would continue until the CRS determines that no archaeological resources would be impacted.

Staff has adapted the Applicant's proposed mitigation measures into a series of conditions of certification, sometimes rewording for clarification, adding time frames, and/or adding other requirements.

The proposed mitigation measures would apply to any potential impacts to sensitive archaeological resources in all areas affected by the project. Mitigation measures are derived from good professional practice and are based on the U.S. Secretary of the Interior's guidelines. The mitigation measures set forth in conditions of certification have been applied to previous projects before the Energy Commission and have proven successful in protecting sensitive cultural resources from construction-related impacts while allowing the timely completion of projects throughout California. Adoption of staff's proposed conditions of certification is expected to reduce the potential for adverse project impacts on archaeological resources to a less than significant level.

In the event of an unanticipated discovery, the proposed conditions of certification **CUL-1** through **CUL-8** shall apply. Implementation of the proposed conditions of certification

CUL-1 through **CUL-8** would reduce impacts to any archaeological resource identified during construction to a level of insignificance. Development of a Cultural Resource Monitoring and Mitigation Plan prior to the start of construction that could be applied to discoveries may reduce construction delays.

c) *POTENTIAL FOR DISTURBANCE OF HUMAN REMAINS*

There is a verbal record of human remains that could be disturbed by the proposed project (SJVEC 2001c: 1). Three sites containing human burials or remains were previously recorded within one mile of the project. In the event that human remains are encountered during project construction, the proposed conditions of certification **CUL-1** through **CUL-8** and state law shall apply, and would reduce the potential to disturb human remains to a level of insignificance.

CUMULATIVE IMPACTS

Staff concludes there are no known cumulative impacts because the project would not affect any known cultural or historical resources. Should any cultural resources be identified during construction, implementation of the proposed conditions of certification **CUL-1** through **CUL-8** would reduce cumulative impacts to a level of insignificance.

CONCLUSIONS AND RECOMMENDATIONS

Based on the discussion above, staff believes that the project would not cause significant impacts to cultural resources provided the following conditions of certification are implemented. Staff recommends adapting the following conditions of certification should the Commission approve the San Joaquin Valley Energy Center.

PROPOSED CONDITIONS OF CERTIFICATION

Cultural Resource Specialist

CUL-1 Prior to the start of ground disturbance, the project owner shall provide the California Energy Commission Compliance Project Manager (CPM) with the name and resume of its Cultural Resources Specialist (CRS), and one alternate CRS, if an alternate is proposed, for approval. The CRS shall be responsible for implementation of all cultural resources conditions of certification.

Protocol: 1. The resume for the CRS and alternate, shall include information that demonstrates that the minimum qualifications specified in the U.S. Secretary of Interior Guidelines, as published in the Code of Federal Regulations, 36 CFR Part 61 are met. In addition, the CRS shall have the following qualifications.

a. The technical specialty of the CRS shall be appropriate to the needs of this project and shall include a background in anthropology, archaeology, history, architectural history or a related field;

b. The background of the CRS shall include at least three years of archaeological or historic, as appropriate, resource mitigation and field experience in California;

c. The resume shall include the names and phone numbers of contacts familiar with the CRS's work on referenced projects.

2. The CRS may obtain qualified cultural resource monitors (CRM) to monitor as necessary on the project. CRM shall meet the following qualifications.

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

   b. An AS or AA in anthropology, archaeology, historic archaeology or a related field and four years experience monitoring in California; or

   c. Enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historic archaeology or a related field and two years of monitoring experience in California.

3. The project owner shall ensure that the CRS completes any monitoring, mitigation and curation activities necessary to this project and fulfills all the requirements of these conditions of certification. The project owner shall also ensure that the CRS obtains additional technical specialists, or additional CRM, if needed. The project owner shall also ensure that the CRS evaluates any cultural resources that are newly discovered or that may be effected in an unanticipated manner for eligibility to the California Register of Historic Resources (CRHR).

   a. At least 30 days prior to the start of ground disturbance, the project owner shall submit the name and statement of qualifications of CRS and alternate CRS, if an alternate (1) is proposed, to the CPM for review and approval.

   b. If the CPM determines the proposed CRS to be unacceptable, the project owner shall submit another individual's name and resume for consideration. If the CPM determines the proposed alternate to be unacceptable, the project owner may submit another individual's name and resume for consideration. At least 10 days prior to the termination or release of the CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval.

4. At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resource monitoring required by this condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM, identifying the CRMs and attesting to the qualifications. The letter shall be provided one week prior to the CRM beginning on-site duties.

5. At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources conditions of certification.

MAPS AND SCHEDULES

CUL-2 1. Prior to the start of ground disturbance, the project owner shall provide the CRS and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps will include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting individual artifacts. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall approve all submittals.

2. If the footprint of the power plant or linear facilities changes, the project owner shall provide maps and drawings reflecting these changes to the CRS and the CPM. Maps shall identify all areas of the project where ground disturbance is anticipated.

3. 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 CPM.

4. At a minimum, the CRS shall consult 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.

5. The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

6. At least 30 days prior to the start of ground disturbance, the project owner shall provide the CRS and the CPM with the maps and drawings.

7. If this is to be a phased project, the project owner shall also provide to the CRS and CPM a letter identifying the proposed schedule of the ground disturbance or construction phases, and the associated dates for submittal of maps and drawings, along with the initial maps and drawings.

8. If there are changes to the footprint for a project phase, revised maps and drawings shall be provided to the CRS and CPM at least 15 days prior to start of ground disturbance for that phase. 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.

Worker Environmental Awareness Program

CUL-3 Worker Environmental Awareness Program (WEAP) shall be provided, on a weekly basis, to all new employees starting prior to the beginning and for

the duration of ground disturbance. The training may be presented in the form of a video. The training shall include:

(a) a discussion of applicable laws and penalties under the law;
(b) samples or visuals of artifacts that might be found in the project vicinity;
(c) information that the CRS, alternate CRS or CRM has the authority to halt construction in the event of a discovery or unanticipated impact to a cultural resource;
(d) instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the CRS or CRM;
(e) an informational brochure that identifies reporting procedures in the event of a discovery;
(f) 6. an acknowledgement form signed by each worker indicating that they have received the training;
(g) 7. and a sticker that shall be placed on hard hats indicating that environmental training has been completed.

The project owner shall provide in the Monthly Compliance Report the WEAP Certification of Completion form of persons who have completed the training in the prior month and a running total of all persons who have completed training to date.

Cultural Resource Monitoring and Mitigation Plan

CUL-4 Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by the CRS, to the CPM for review and approval. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources.

Protocol: The CRMMP shall include, but not be limited to, the following elements and measures:

1. The following statement shall be placed in the Introduction: Any discussion, summary, or paraphrasing of the conditions in this CRMMP is intended as general guidance and as an aid to the user in understanding the conditions and their implementation. If there appears to be a discrepancy between the conditions and the way in which they have been summarized, described, or interpreted in the CRMMP, the conditions, as written in the Final Decision, supercede any interpretation of the Conditions in the CRMMP. The Cultural Resources conditions of Certification are attached as an appendix to this CRMMP.

2. A proposed general research design that includes a discussion of research questions and testable hypotheses applicable to the project area. A refined research design will be prepared for any resource where data recovery is required.

3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during ground

disturbance, construction, and post-construction analysis phases of the project.

4. Identification of the person(s) expected to perform each of the tasks; a description of each team member's qualifications and their responsibilities; and the reporting relationships between project construction management and the mitigation and monitoring team.

5. A discussion of the inclusion of Native American observers or monitors, the procedures to be used to select them, and their role and responsibilities.

6. A discussion of all avoidance measures such as flagging or fencing, to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during construction and/or operation, and identification of areas where these measures are to be implemented. The discussion shall address how these measures will be implemented prior to the start of construction and how long they will be needed to protect the resources from project-related effects.

7. A discussion of the requirement that all cultural resources encountered will be recorded on a DPR form 523 and mapped (may include photos). In addition, all archaeological materials collected as a result of the archaeological investigations shall be curated in accordance with the State Historical Resources Commission's "Guidelines for the Curation of Archaeological Collections" into a retrievable storage collection in a public repository or museum. The public repository or museum must meet the standards and requirements for the curation of cultural resources set forth at Title 36 of the Federal Code of Regulations, Part 79.

8. A discussion of any requirements, specifications, or funding needed for curation of the materials to be delivered for curation and how requirements, specifications and funding will be met. Also the name and phone number of the contact person at the institution shall be included. In addition, include information indicating that the project owner will pay all curation fees and that any agreements concerning curation will be retained and available for audit for the life of the project.

9. A discussion of the availability and the CRS's access to equipment and supplies necessary for site mapping, photographing, and recovering any cultural resource materials encountered during construction.

10. A discussion of the proposed Cultural Resource Report, which shall be prepared according to Archaeological Resource Management Report (ARMR) Guidelines.

At least 30 days prior to the start of ground disturbance, the project owner shall provide the CRMMP to the CPM for review and approval. A letter shall be provided to the CPM indicating that the project owner will pay curation fees for any materials collected as a result of the archaeological studies. Ground disturbing activities may not commence until the CRMMP is approved.

SURVEYS, AVOIDANCE AND EVALUATION

CUL-5 (1) Prior to the start of ground disturbance within all right of ways, construction laydown area, access roads, or other areas not previously surveyed for the project, cultural resource surveys shall be conducted.

(2) If cultural resources are identified in the right of ways, construction laydown area, access roads, or other areas, then avoidance measures shall be provided. If the resources cannot be avoided, then the cultural resource shall be evaluated for eligibility for the CRHR prior to ground disturbance within 100 feet of the identified resource.

(2) If a cultural resource cannot be avoided and the resource is determined by the Energy Commission to be eligible for the CRHR, then mitigation measures must be implemented to reduce the impacts to less than significant prior to any ground disturbing activities within 100 feet of the identified resource.

At least 30 days prior to start of ground disturbance in the areas described in (1) above, reports (in ARMR format) on the surveys conducted shall be submitted to the CPM for review and approval.

The survey report shall include proposed avoidance measures. If the resource cannot be avoided, the survey report(s) shall include an evaluation of the cultural resource(s) for eligibility to the CRHR.

Preliminary report(s) (ARMR format) documenting the implementation of mitigation measures shall be provided to the CPM for review and approval prior to ground disturbing activities within 100 feet of the resource. The final report on implementation of mitigation measures shall be incorporated in the Cultural Resources Report (CRR) or appended to the CRR.

MONITORING ACTIVITIES

CUL-6 (1) The CRS, alternate CRS, or CRM(s) shall monitor ground disturbance activities full time in the vicinity of the project site, linears and laydown areas, access roads or other ancillary areas to ensure there are no impacts to undiscovered resources or known resources affected in an unanticipated manner. In the event that the CRS determines that full-time monitoring is not necessary in certain locations, a letter providing a detailed justification for the decision to reduce the level of monitoring shall be provided to the CPM for review and approval.

(2) CRM(s) shall keep a daily log of any monitoring or cultural resource activities and the CRS shall prepare a weekly summary report on the progress or status of cultural resources-related activities. The CRS may informally discuss cultural resource monitoring and mitigation activities with Energy Commission technical staff.

(3) The CRS shall notify the project owner and the CPM within 24hrs., by telephone or e-mail, of any incidents of non-compliance with any cultural resources conditions of certification. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the conditions of certification.

Cultural resource monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a CRM from duties assigned by the CRS or direction to a CRM to relocate monitoring activities by anyone other that the CRS shall be considered non-compliance with these conditions of certification.

(4) 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 will be monitored.

During the ground disturbance phases of the project, if the CRS wishes to reduce the level of monitoring occurring at the project, a letter identifying the area(s) where the CRS recommends the reduction and justifying the reductions in monitoring shall be submitted to the CPM for review and approval.

During ground disturbance, the project owner shall include in the MCRs copies of the weekly summary reports prepared by the CRS regarding project-related cultural resources monitoring. Copies of daily logs shall be retained on-site and made available for audit by the CPM.

Within 24 hours of recognition of a non-compliance issue, the CRS shall notify the CPM by telephone of the problem and of steps being taken to resolve the problem. A report that describes the issue, resolution of the issue, and the effectiveness of the resolution measures shall be provided in the next MCR.

One week prior to ground disturbance, in areas where there is a potential to discover Native American cultural resources, the project owner shall send notification to the CPM identifying the person(s) retained to conduct Native American monitoring. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM who will initiate a resolution process.

DRY CREEK CANAL AND TRANQUILLITY IRRIGATION DISTRICT RESERVOIR

CUL-7 If the Dry Creek Canal or the Tranquillity Irrigation District Reservoir cannot be returned to their original contour and appearance, then the Dry Creek Canal and/or the Tranquillity Irrigation District Reservoir shall be evaluated for the CRHR prior to ground disturbance. If Dry Creek Canal or the Tranquillity Irrigation District Reservoir is eligible for the CRHR, then the project owner shall propose and submit mitigation measures to the CPM for approval. The mitigation measures shall be completed prior to alteration of the Dry Creek Canal and/or the Tranquillity Irrigation District Reservoir.

If the Dry Creek Canal or the Tranquillity Irrigation District Reservoir cannot be returned to the original contour and appearance, at least 30 days prior to project-related ground disturbance associated with the Dry Creek Canal and/or the Tranquillity Irrigation District Reservoir the project owner shall provide to the CPM for review and approval a determination of eligibility for the resource that cannot be restored to its original

appearance and the mitigation measures that would reduce this impact to less than significant.

Cultural Resources Report

CUL-8 The project owner shall submit the Cultural Resources Report (CRR) to the CPM for approval. The CRR shall report on all field activities including dates, times and locations, findings, samplings and analysis. All survey reports, DPR 523 forms and additional research reports not previously submitted to the California Historic Resource Information System (CHRIS) shall be included as an appendix to the CRR.

The project owner shall submit the subject CRR within 90 days after completion of ground disturbance (including landscaping). Within 10 days after CPM approval, the project owner shall provide documentation to the CPM that copies of the CRR have been provided to the curating institution (if archaeological materials were collected), the State Historic Preservation Office and the CHRIS.

REFERENCES

SJVEC (San Joaquin Valley Energy Center, LLC) 2001a. Application for Certification, No. 01-AFC-22. Dated October 16 and submitted to the California Energy Commission, October 31, 2001.

SJVEC (San Joaquin Valley Energy Center, LLC) 2001b. Confidential filing for Cultural Resources Technical Report (Appendix 8.3D). Submitted to the California Energy Commission, October 31, 2001.

SJVEC (San Joaquin Valley Energy Center, LLC) 2001c. Confidential filing for Cultural Resources Survey (Appendix 8.3E). Dated October 25, 2001 and submitted to the California Energy Commission, October 31, 2001.

CEC (California Energy Commission / Lagerquist) 2002. Record of Conversation of T. Lagerquist. Dated April 25, 2002.

Fresno County Draft General Plan *in* Fresno County General Plan Update EIR, Chapter 4.7 (Cultural Resources), January 2000.

City of San Joaquin Comprehensive General Plan and EIR – Final Document. City of San Joaquin, California.

Southeast Area Annexation Initial Study/Negative Declaration (draft, 2001.

SJVEC (San Joaquin Valley Energy Center, LLC) 2002a. Confidential filing for Cultural Resources Technical Report (CR-37) in Data Response Set 1B. Dated March 12, 2002 and docketed April 4, 2002

SJVEC (San Joaquin Valley Energy Center, LLC) 2002b. Confidential filing for Cultural Resources Technical Report (CR-41) in Data Response Set 1 D. Dated March 29, 2002 and docketed March 29, 2002

HAZARDOUS MATERIALS MANAGEMENT

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

INTRODUCTION

The purpose of this analysis is to determine if the proposed San Joaquin Valley Energy Center (SJVEC) has the potential to cause significant impacts on the public as a result of the use, handling or storage of hazardous materials at the proposed facility. 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 thus employees frequently accept a higher level of risk than the general public as a condition of employment. Workers are thus not afforded the same level of protection normally provided to the public. Further, workers can be provided with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials. Staff's **Worker Safety and Fire Protection** analysis describes the requirements applicable to the protection of workers from such risks.

Two acutely hazardous materials would be stored at the SJVEC in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j), aqueous ammonia (28 percent solution) and sulfuric acid. (See Table 8.12-4 of the Application for Certification, Calpine 2001a and Informal DR-5, Calpine 2002a). It is staff's opinion that aqueous ammonia presents the greatest potential for off-site consequences. The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with use of the more economical anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the more hazardous anhydrous form, which is stored as a liquefied gas at elevated pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air and result in high down-wind concentrations. Spills associated with the aqueous form are much easier to contain, and emissions are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials that would be stored at the SJVEC in smaller quantities include mineral and lubricating oils, corrosion inhibitors and water conditioners. Hazardous materials that would be used during the construction phase include gasoline, diesel fuel, and oil, welding gases, lubricants, solvents and paint. No acutely toxic hazardous materials would be used onsite during construction. None of these materials pose significant potential for off-site impacts as a result of the quantities on-site, their relative toxicity, and/or their environmental mobility. Although no natural gas is stored, the project would also involve the construction and operation of a natural gas pipeline and handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. This pipeline would be approximately 20 miles in length including on and off-site segments.

The SJVEC would also require the transportation of aqueous ammonia to the facility. Analysis of the potential for impact associated with such deliveries is addressed below.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

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 CCA section on Risk Management Plans - codified in 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. Due to the petroleum-containing hazardous materials that will be used on this site, a Spill Prevention Control and Countermeasure Plan (SPCC) is required by Federal Regulations (Hazardous Waste Contingency Plan Title 40, Part 112.7).

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 ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

Title 8, California Code of Regulations, Section 458 and Sections 500 - 515, set forth requirements for design, construction and operation of vessels and equipment used to store and transfer aqueous ammonia. These sections generally codify the requirements of several industry codes, including the American Society of Mechanical Engineers' (ASME) Pressure Vessel Code, the American National Standards Institute's (ANSI)

K61.1, and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia and they may also be used to design storage facilities for aqueous ammonia.

California Health and Safety Code, section 41700, requires that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

Gas Pipeline

The safety requirements for pipeline construction vary according to the population density and land use, which characterize the surrounding land. The pipeline classes are defined as follows (Title 49, Code of Federal Regulations, Part 192):

- Class 1: Pipelines in locations with 10 or fewer buildings intended for human occupancy.

- Class 2: Pipelines in locations with more than 10 but fewer than 46 buildings intended for human occupancy. This class also includes drainage ditches of public roads and railroad crossings.

- Class 3: Pipelines in locations with more than 46 buildings intended for human occupancy, or where the pipeline is within 100 yards of any building or small, well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12 month period (The days and weeks need not be consecutive).

The natural gas pipeline would be designed for Class 3 service and would meet California Public Utilities Commission General Order 112-E and 58-A standards as well as various PG&E standards. The natural gas pipeline must be constructed and operated in accordance with the Federal Department of Transportation (DOT) regulations, including:

- Title 49, Code of Federal Regulations, Part 190, which outlines the pipeline safety program procedures;

- Title 49, Code of Federal Regulations, Part 191, Transportation of Natural and Other Gas by Pipeline; Annual Reports, Incident Reports, and Safety-Related Condition Reports, which requires operators of pipeline systems to notify the U.S. Department of Transportation of any reportable incident by telephone and then submit a written report within 30 days;

- Title 49, Code of Federal Regulations, Part 192, Transportation of Natural and Other Gas by Pipeline; Minimum Federal Safety Standards, which specifies minimum safety requirements for pipelines and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use which

characterize the surrounding land. This part contains regulations governing pipeline construction, which must be, followed for Class 2 and Class 3 pipelines.

LOCAL AND REGIONAL

The Uniform Fire Code (UFC) contains provisions regarding the storage and handling of hazardous materials in Articles 79 and 80. The latest revision to Article 80 was in 1997 (Uniform Fire Code, 1997) and includes minimum setback requirements for outdoor storage of ammonia.

The California Building Code contains requirements regarding the storage and handling of hazardous materials. The appropriate jurisdiction's Chief Building Official must inspect and verify compliance with these requirements prior to issuance of an occupancy permit. A further discussion of these requirements is provided in the **Seismic** portion of this section.

The Certified Unified Program Authority (CUPA) with responsibility to review RMPs and Hazardous Materials Business Plans is the Fresno County Environmental Health Department (FCEHD).

SETTING

The proposed project is to be located in an industrial area in the southern portion of the City of San Joaquin in Fresno County. The land uses surrounding the proposed facility consist primarily of mixed agriculture, and low-density rural residences. Hazardous materials use and transportation are commonly associated with the industrial and agricultural activities in the vicinity of the project. Thus, hazardous materials are transported, stored, and used in the project vicinity.

Several factors associated with the area in which a project is to be located affect its potential to cause public health impacts from an accidental release of a hazardous material. These include:

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

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction and air temperature, affect 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 (8.1) of the AFC. Staff agrees with the applicant that use of F stability (stagnated air, very little mixing) and 1.5 meter per second wind speed is appropriate for

conducting the Offsite Consequence Analysis. Staff believes these represent a reasonably conservative scenario and thus reflect worst-case atmospheric conditions.

TERRAIN CHARACTERISTICS

The location of elevated terrain (terrain above the power plant stack height) 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. There is no elevated terrain near the proposed facility. For purposes of modeling, the terrain is rural in the immediate vicinity of the project but becomes urban near the developed area of The City of San Joaquin.

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. The AFC states that the nearest sensitive receptors are the Golden Plains School and San Joaquin Elementary school, located approximately 2000 feet north of the facility.

IMPACTS AND ANALYSIS

Staff thoroughly 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.

METHODOLOGY

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

Staff conducted a thorough review and evaluation of the applicant's proposed use of hazardous materials as described by the applicant in the AFC (Calpine 2001a, Sections

2.2.10 and 8.12) and in data responses (Calpine 2002a). 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 8.12-2 and 8.12-3 of the AFC and aqueous ammonia (as described in Informal Data Response I-5) 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 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.

PROJECT IMPACTS

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 would be stored in a solid form or in smaller quantities, have low mobility or have low levels of toxicity. These hazardous materials were eliminated from further consideration.

During the construction phase of the project, the only hazardous materials proposed for use include paint, paint thinner, cleaners, solvents, sealants, gasoline, diesel fuel, motor oil, hydraulic fluid, welding flux and gases, lubricants and emergency refueling containers. Any impact of spills or other releases of these materials will be limited to the site due to the small quantities involved. Fuels such as fuel oil #6, mineral oil, lube oil, and diesel fuel are all of very low volatility and represent limited off-site hazard even in larger quantities.

The use of hydrogen gas poses a risk of explosion. However, the moderate quantity present and the results of previous modeling of the blast effects of a hydrogen tank explosion demonstrate that any blast effect would be confined to the site and not significantly impact off-site. The Applicant will be required by **HAZ- 10** to store the hydrogen cylinders in an area isolated from combustion sources. The tanks and piping that are near potential traffic hazards would be protected from vehicle impact by traffic barriers.

After removing from consideration those chemicals that pose no risk of off-site impact in Steps 1 and 2, staff continued with Steps 4 and 5 to review the only remaining hazardous materials: sodium hydroxide, sulfuric acid, hydrochloric acid, sodium hypochlorite, petroleum fuels, natural gas, and aqueous ammonia.

Large Quantity Hazardous Materials

The volume of sodium hydroxide stored at the SJVEC site would be present in excess of the Reportable Quantity (RQ) and therefore must be included in the Hazardous Materials Business Plan (HMBP) and the Risk Management Plan (RMP). The amount of sulfuric acid that would be stored on site would trigger the RQ, and the hydrochloric acid (HCl) storage would be in excess of the RQ every three to five years and at start-up. During the interim periods, HCl stored would be less than the RQ. Sodium hydroxide and sulfuric acid do not pose a risk of off-site impacts because they have relatively low vapor pressures and thus spills would be confined to the site. Because of public concern at another proposed energy facility in 1995, staff conducted a quantitative assessment of the potential for impact associated with sulfuric acid use, storage, and transportation. Staff found no hazard would be posed to the public. However, in order to protect against risk of fire, an additional Condition of Certification (**HAZ-5**) will require that the project owner shall ensure that no combustible or flammable material is stored within 100 feet of the sulfuric acid tank. It appears from Figure 2.2-1 in the AFC that no combustible materials would be stored within 100 feet of the sulfuric acid storage areas.

In the case with HCl, it would be used infrequently and thus the risk of accidental release would be very small. Additionally, the HCl is used by a contractor to clean the HRSG and these contractors have a great deal of experience in safely handling this volume of HCl. Staff has not found a single incidence of accidental release of HCl at a CEC-certified gas-fired power plant in California during HRSG cleaning.

The aqueous mixture of sodium hypochlorite would will likewise have a low potential to affect the off-site public because its vapor pressure is also low and the concentration of hypochlorite is low (10 percent). In fact, hypochlorite is used at many such facilities as a substitute for chlorine gas, which is much more toxic and much more likely to migrate off-site because it is a gas and is stored in concentrated form. Thus, the use of a water solution of sodium hypochlorite is much safer to use than the alternative: chlorine gas. However, accidental mixing of sodium hypochlorite with acids or aqueous ammonia could result in toxic gases. Given the large volumes of both aqueous ammonia (approximately 52,000 gals) and sodium hypochlorite (8,000 gals) proposed for storage at this facility, the chances for accidental mixing of the two, particularly during transfer from delivery vehicles to storage tanks, should be reduced as much as possible. Thus, measures to prevent such mixing are extremely important and will be required as an

additional section within the required Safety Management Plan for delivery of aqueous ammonia. However, staff does note that the Applicant proposes to separate incompatible materials to prevent accidental mixing.

Natural Gas

Natural gas poses a fire and/or explosion risk as a result of its flammability. Natural gas is composed of mostly methane but also contains ethane, propane, nitrogen, butane, isobutane and isopentane. It is colorless, odorless, and tasteless and is lighter than air. Natural gas can cause asphyxiation at a concentration of 90 percent or greater. 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 explosions if a release were to occur. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1983), natural gas is less likely to cause explosions than many other fuel gases, such as propane or liquefied petroleum gas. While natural gas would be used in significant quantities at the SJVEC site, it would 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 combustion turbines and the Heat Recovery Steam Generators (HRSGs) 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 would significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas turbines prior to start-up, 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.

Since the proposed facility would require the installation of a new gas pipeline off-site, impacts from this pipeline need to be evaluated.

The design of the natural gas pipeline is governed by laws and regulations discussed above. These LORS require use of high quality arc welding techniques by certified welders and inspection of welds. Many failures of older natural gas lines have been associated with poor quality welds. Many failures in older pipelines have also resulted from corrosion. Current codes address this failure mode by requiring use of corrosion resistant coatings and cathodic corrosion protection. Another major cause of pipeline failure is damage resulting from excavation activities near pipelines. Current codes address this mode of failure by requiring clear marking of the pipeline route. An additional mode of failure particularly relevant to the project area is damage caused by earthquake. Existing codes also address seismic hazard in design criteria (see discussion below). Evaluation of pipeline performance in recent earthquakes indicates that pipelines designed to modern codes perform well in seismic events while older lines frequently fail. Staff believes that existing regulatory requirements are sufficient to reduce the risk of accidental release from the natural gas pipeline to insignificant levels.

Failures of gas pipelines, according to data from the U.S. Department of Transportation (the National Transportation Safety Board) from the period 1984 - 1991, occur as a

result of pipeline corrosion, pipeline construction or materials defects, rupture by heavy equipment excavating in the area such as bulldozers and backhoes, weather effects, and earthquakes. Given the gas line failures that occurred in the Marina District of San Francisco during the 1989 Loma Prieta earthquake, the January 1994 Northridge earthquake in Southern California, and the January 1995 earthquake in Kobe, Japan, as well as the January 19, 1995 gas explosion in San Francisco, the safety of the gas pipeline is of paramount importance. However, it must be noted that the pipelines that failed were older and not manufactured nor installed to modern code requirements.

The natural gas pipeline for the proposed facility would be installed, owned, and operated by the applicant. If loss of containment occurs as a result of pipe, valve, or other mechanical failure or external forces, significant quantities of compressed natural gas could be released rapidly. Such a release can result in a significant fire and/or explosion hazard, which could cause loss of life and/or significant property damage in the vicinity of the pipeline route. However, the probability of such an event is extremely low if the pipeline is constructed according to present standards.

According to DOT statistics, the frequency of reportable incidents is about 0.25 for all pipeline incidents per 1,000 miles per year or 2.5×10^{-4} incidents per mile per year (SERA 1993). DOT has also evaluated and categorized the major causes of pipeline failure. To summarize, the four major causes of accidental releases from natural gas pipelines are: Outside Forces-43 percent, Corrosion-18 percent, Construction/Material Defects-13 percent, and Other-26 percent.

Outside forces are the primary causes of incidents. Damage from outside forces includes damage caused by use of heavy mechanical equipment near pipelines (e.g., bulldozers and backhoes used in excavation activities), weather effects, vandalism, and earthquake-caused rupture as seen in the Marina District of San Francisco during the 1989 Loma Prieta Quake and in Kobe, Japan in January 1995. The fourth category, “Other,” includes equipment component failure, compressor station failures, operator errors and sabotage. The average annual service incident frequency for natural gas transmission systems varies with age, the diameter of the pipeline, and the amount of corrosion.

Older pipelines have a significantly higher frequency of incidents. This results from the lack of corrosion protection and use of less corrosion resistant materials compared to modern pipelines, limited use of modern inspection techniques, and higher frequency of incidents involving outside forces. The increased incident rate due to outside forces is the result of the use of a larger number of smaller diameter pipelines in older systems, which are generally more easily damaged, and the uncertainty regarding the locations of older pipelines.

In the United States, extensive federal and state pipeline codes and safety enforcement minimize the risk of severe accidents related to natural gas pipelines. Recently in November 2000, the DOT Office of Pipeline Safety proposed a program requiring the preparation of risk management plans for gas pipelines throughout the United States. These risk management plans will include the use of diagnostic techniques to detect internal and external corrosion or cracks in pipelines and to perform preventive

maintenance. The project owner would be required to develop and implement these plans if the proposal is promulgated as a regulation.

Staff believes the worst-case scenario for off-site natural gas hazard is a large rupture of the pipeline caused by improper use of heavy equipment near the pipeline. The applicant will provide an analysis of the likelihood (which is thought to be very low) of explosion and fire resulting from sparks generated from heavy equipment rupture of the pipeline if the DOT proposal for a pipeline risk management plan becomes regulation. This worst-case scenario would not result in significant asphyxiation hazard since natural gas disperses to the atmosphere rapidly when released. The worst-case scenario is primarily a safety hazard to construction workers and nearby residences. The project owner must mark the pipeline in conformance with State and Federal regulations to lower the probability the above scenario.

The following safety features will be incorporated into the design and operation of the natural gas pipeline (as required by current federal and state codes): (1) while the pipeline will be designed, constructed, and tested to carry natural gas at a certain pressure, the working pressure will be less than the design pressure; (2) butt welds will be X-rayed and the pipeline will be tested with water prior to the introduction of natural gas into the line; (3) the pipeline will be surveyed for leakage annually; (4) the pipeline will be marked to prevent rupture by heavy equipment excavating in the area; and (5) valves at the meter will be installed to isolate the line if a leak occurs. (See Conditions of Certification **HAZ-6** and **7**)

Aqueous Ammonia

Based on the discussion above, aqueous ammonia and natural gas are the only hazardous materials that may pose a risk of off-site impacts. Aqueous ammonia would be used in controlling the emission of oxides of nitrogen (NO_x) from the combustion of natural gas in the facility. The accidental release of aqueous ammonia without proper mitigation can result in large down-wind concentrations of ammonia gas. Two 30,000-gallon storage tanks would be used to store the aqueous ammonia, with a maximum of 26,000 gallons stored in each (Calpine 2002a, Page 3).

The use of aqueous ammonia can result in the formation and release of a cloud in the event of a release even without interaction with other chemicals. This is a result of its moderate vapor pressure and the large amounts of aqueous ammonia, which would be used and stored on-site. However, as with aqueous hypochlorite, the use of aqueous ammonia instead of the much more hazardous anhydrous ammonia (i.e. ammonia that is not diluted with water) poses far less risk.

To assess the potential impacts associated with an accidental release of ammonia, staff typically evaluates where four “bench mark” exposure levels of ammonia gas would occur off-site. These include: 1) the lowest concentration posing a risk of lethality, 2,000 parts per million (ppm); 2) the Immediately Dangerous to Life and Health (IDLH) level of 300 ppm; 3) the Emergency Response Planning Guideline (ERPG) level 2 of 200 ppm, which is also the RMP level 1 criterion used by EPA and California; and 4) the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75ppm. (A detailed discussion of the exposure criteria considered by staff and their applicability to different populations and exposure-

specific conditions is provided in Appendix A of this analysis.) If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will presume that the potential release poses a risk of significant impact. However, staff may also assess the probability of occurrence of the release and/or the nature of the potentially exposed population. Staff may, based on such analysis, determine that the likelihood and extent of potential exposure are not sufficient to support a finding of potentially significant impact.

Information provided by the Applicant (Informal Data Response I-5) describes the modeling parameters use for the worst case and alternative case accidental releases of aqueous ammonia. The worst-case release is associated with a failure of the ammonia storage tank so that it empties within 10 minutes into a 1,962 square foot containment area. An alternative scenario is a failure of a supply truck loading hose spilling approximately 33 gallons of aqueous ammonia. In conducting these two scenario analyses, it can be assumed that spilled material would be contained in the covered basin below the storage tank and below the tanker truck pad. In addition, winds of 1.5 meter per second and category F stability would exist at the time of the accidental release. The US Environmental Protection Agency's SLAB air dispersion model was used by the applicant to estimate airborne concentrations of ammonia. This model is designed to predict the maximum possible impacts based on distance from the storage tank without regard to specific direction of transport.

The results of the applicant's modeling showed that off-site airborne concentrations of ammonia would not exceed the level the CEC uses for to establish insignificance (75 ppm) at any off-site location. Staff conducted an independent review of the applicant's modeling and determined that it used the standard appropriate methods and assumptions. Therefore, staff finds that the modeling accurately estimates the potential airborne concentrations of ammonia during an accidental release.

The modeling indicated that concentrations exceeding 75 ppm would be confined within the project site (92 meters, or 302 feet, from the storage tanks for the worst-case). Therefore, the release of aqueous ammonia used for the project will not cause a significant impact.

Transportation of Hazardous Materials

Hazardous materials including aqueous ammonia, sulfuric acid, and sodium hypochlorite would be transported to the facility via tanker truck. While many types of hazardous materials would be transported to the site, it is staff's belief that transport of aqueous ammonia would pose the predominance of risk associated with such transport.

Staff agrees with the Applicant's transportation analysis, which focused on the project area after the delivery vehicle leaves the main highway (Appendix 8.12A). 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 U.S.C. §5101 et seq], the US Department of Transportation Regulations [49 C.F.R. 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 tank truck safety, the Applicant stated that aqueous ammonia would be delivered to the proposed facility only in DOT-certified vehicles with a design capacity of 7,500 gallons. These vehicles will be designed to DOT Code MC-307. These are high integrity vehicles designed for hauling caustic materials such as aqueous ammonia. Staff has proposed Condition **HAZ-8** to ensure that regardless of which vendor supplies the aqueous ammonia, delivery will be made in a tanker that meets or exceeds the specifications described 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 the following reference to determine the approach to preparing a hazardous materials transportation accident risk analysis:

(Rhyne 1994, Davies 1992, Harwood 1990, Harwood 1993, Vilchez 1995, Pet-Armacost 1999)

Staff used this information 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 maximum usage of aqueous ammonia each year of operation of the proposed SJVEC would at this risk level result in a negligible risk to those residing in the project area.

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) was approximately 0.1 in one million.

Staff therefore believes the risk of exposure to significant concentrations of aqueous 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 aqueous 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 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 existing transportation of aqueous ammonia.

Seismic Issues

The possibility exists that an earthquake would cause the failure of a hazardous materials storage tank and rupture of the natural gas pipeline. The quake could also cause the failure of the secondary containment system (berms and dikes) below the storage tank, as well as electrically controlled valves, pumps, neutralization systems and the foam vapor suppression system. 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 of 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 only displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards that should be followed in adequately designing and building storage tanks and containment areas, as well as the natural gas pipeline, to withstand a large earthquake. Staff notes that the proposed facility would be designed and constructed to the applicable standards of the Uniform Building Code for Seismic Zone 3, CPUC General Order 112E, and the CFR Regulation 49 Part 192.

CUMULATIVE IMPACTS

With the Applicant's proposed use of aqueous ammonia, impacts from a hazardous materials accident at the SJVEC facility would be confined to the project site. Staff concludes that with mitigation the facility cannot contribute to a cumulative impact. It is further extremely unlikely that an accidental release that has very low probability of occurrence (about one in a million per year) would independently occur at the SJVEC and another facility at the same time. Therefore, staff concludes that the facility would not contribute to a significant cumulative impact.

APPLICANT'S PROPOSED 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. Administrative controls include the development and implementation of a Safety Management Plan. 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:

- construction of dikes, berms, and/or catchment basins in the hazardous materials storage areas to contain accidental releases that might happen during storage or delivery;

- physical separation of stored chemicals in separate containment areas in order to prevent accidental mixing of incompatible materials, which may result in the evolution and release of toxic gases or fumes;

- construction of a secondary surface containment structure that would surround the aqueous ammonia storage tanks;

- construction of secondary containment areas that would surround other large quantity chemical tanks;

- installation of a sloped containment pad that will drain into a sump placed beneath the tanker truck aqueous ammonia delivering area; and,

- installation of sumps will be provided for each of the secondary diked areas around each large chemical storage tank.

ADMINISTRATIVE CONTROLS

Administrative controls also help to 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.

The worker health and safety program that would be proposed by the Applicant for use at this facility must include (but is not limited to) the following elements:

- worker training regarding chemical hazards, health and safety issues, and hazard communication;

- the proper use of personal protective equipment;

- safety operating procedures for operation and maintenance of systems utilizing hazardous materials;

- fire safety and prevention;

- and emergency response actions including facility evacuation, hazardous material spill cleanup, and fire prevention.

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

A facility Process Safety Management Program would be required for the facility. This is a program for the regular inspection and maintenance of equipment, valves, piping, and appurtenances. Additionally, the process safety management program requires that only trained facility personnel are assigned to the transfer and handling of hazardous chemicals.

ON-SITE SPILL RESPONSE

In order to address the issue of spill response, the facility owner must prepare and implement an Emergency Response Plan, which would include 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 would also be established, including provisions for evacuation, spill cleanup, hazard prevention, and emergency response. The county does not have a Hazmat team. However, the Fresno County Fire Protection District can be called upon for help in the event of a spill. These fire fighters can help with identifying the spill and with evacuation, but not with the clean-up process (Williams, 2002). Private companies hired by the project owner would be responsible for the clean-up work. Staff proposes a condition of certification (**HAZ-11**) to ensure that the Applicant enters into a contract with a clean-up company, and requires the Applicant to identify the contractor.

STAFF'S PROPOSED MITIGATION

Staff proposes 11 Conditions of Certification mentioned throughout the text (above) and listed below. **HAZ-1** ensures that no hazardous material would be used at the facility except those listed in the AFC (with the exception of aqueous ammonia, which is allowed) unless approved by the County and the Compliance Project Manager (CPM). **HAZ-2** requires that a RMP be prepared and submitted prior to the delivery of aqueous ammonia.

The worst-case accidental release scenario evaluated in the AFC assumed that accidental spills of aqueous ammonia would occur from the storage tank into the catchment system and during transfer during delivery from a tanker truck. Because staff believes that the most likely event resulting in a spill would be during transfer from the delivery tanker to the storage tank, staff proposes a condition (**HAZ-3**) requiring development of a safety management plan for the delivery of aqueous ammonia. The development of a Safety Management Plan addressing delivery of ammonia will further reduce the risk of any accidental release not addressed by the proposed spill prevention mitigation measures and the required Risk Management Plan (RMP). **HAZ-4** requires that the aqueous ammonia storage tank be designed to certain rigid specifications, **HAZ-5** addresses the storage of sulfuric acid, and **HAZ-6 & 7** address the safety of the gas pipeline. The transportation of hazardous materials is addressed in **HAZ-8 & 9**. Hydrogen storage is addressed in **HAZ-10** and accidental spill response and cleanup is addressed in **HAZ-11**.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is approximately 63 percent within a six-mile radius of the proposed SJVEC and Census 1990 information that shows the low income population is approximately 29 percent within the same radius. Since staff has concluded that there will be no significant direct or cumulative public health-related impacts associated with the use of aqueous

ammonia, there will also be no significant impact to any minority populations that are identified. Therefore, there are no environmental justice issues.

FACILITY CLOSURE

The requirements for handling of hazardous materials remain in effect until such materials are removed from the site regardless of facility closure. Therefore, the facility owners are responsible for continuing to handle such materials in a safe manner, as required by applicable laws. In the event that the facility owner abandons the facility in a manner that poses a risk to surrounding populations, staff will coordinate with the California Office of Emergency Services, Fresno County Environmental Health Department, and the California Department of Toxic Substances Control (DTSC) to ensure that any unacceptable risk to the public is eliminated. Funding for such emergency action can be provided by federal, state or local agencies until the cost can be recovered from the responsible parties (O.E.S. 1990).

RESPONSE TO PUBLIC AND AGENCY COMMENTS

AGENCY COMMENTS

Fresno County Department of Community Health

Comment: *The Fresno County Department of Community Health requested that prior to occupancy, the applicant shall complete and submit to them either a Hazardous Materials Business Plan or a Business Plan Exemption.*

Response: This is required by law. Staff has determined that the project intends to follow all LORS and thus the HMBP will be provided to the County as required by **HAZ-2**.

Comment: *The Fresno County Department of Community Health commented that the project description and site plan indicate the use of anhydrous ammonia as a refrigerant for the cold storage facility, and that depending on the quantity handled, this facility may have to comply with either the California Accidental Release Prevention Program (Cal-ARP) or the Federal Risk Management Plan (RMP).*

Response: There is no cold storage facility proposed for this power plant. An RMP for the use of anhydrous or aqueous ammonia for SCR is required by law. Staff has determined that the project intends to follow all LORS and thus the RMP will be provided to the County.

Comment: *The Fresno County Department of Community Health commented that depending on the amounts of sulfuric acid and oleum handled at the facility, the owner or operator may have to submit an RMP for these substances.*

Response: No oleum (fuming sulfuric acid containing a mixture of sulfuric acid and sulfur trioxide) will be handled, stored or used at the proposed power plant. The sulfuric

acid proposed for storage and use is 93 perent sulfuric acid in water and therefore there is no requirement for an RMP.

PUBLIC COMMENTS

None received.

CONCLUSIONS AND RECOMMENDATIONS

Staff's evaluation of the proposed project (with staff's proposed mitigation measures) indicates that hazardous materials use will pose little potential for significant impacts on the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations and standards (LORS). In response to Health and Safety Code, section 25531 et seq., the applicant would be required to develop an RMP. To ensure adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by EPA, Fresno County, and staff. In addition, staff's proposed conditions of certification require Fresno County's review, and staff review and approval of the RMP prior to delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia.

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 public from significant risk of exposure to an accidental ammonia release.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous material in reportable quantities, as specified in Title 40, C.F.R. Part 355, Subpart J, section 355.50, not listed in Appendix C below (with the exception that aqueous ammonia will be used), or in greater quantities than those identified by chemical name in Appendix C, unless approved in advance by the Fresno County Environmental Health Department and the CPM.

Verification: The project owner shall provide to the CPM, in the Annual Compliance Report, a list of hazardous materials contained at the facility in reportable quantities.

HAZ-2 The project owner shall concurrently provide a Business Plan and a Risk Management Plan to the Fresno County Environmental Health Department and the CPM for review at the time the plans are first submitted to the U.S. Environmental Protection Agency (EPA). The project owner shall include all recommendations of the Fresno County DEH and the CPM in the final document. A copy of the final plans, including all comments, shall be provided to the CPM once approved by the Fresno County DEH.

Verification: At least 60 days prior to handling reportable quantities of any hazardous material to the site, the project owner shall provide a copy of a final

Business Plan approved by the Fresno County DEH to the CPM. At least 60 days prior to the delivery of aqueous ammonia the project owner shall provide the final RPM listed above and accepted by the Fresno County DEH to the CPM for approval.

HAZ-3 If aqueous ammonia is used, the project owner shall develop and implement a Safety Management Plan for delivery of aqueous ammonia to the CPM for approval. If hydrogen is used, the project owner shall develop and implement a Safety Management Plan for delivery of hydrogen. The plans shall include procedures, protective equipment requirements, training and a checklist. The Safety Management Plan for hydrogen shall also include specifics about the storage and handling of hydrogen, including a plot plan describing the location of the storage, and of other flammable materials, measures for avoidance of areas that could be affected by a turbine over-speed accident and seismic design criteria for the hydrogen storage and handling systems. It shall also include a section describing all measures to be implemented to prevent mixing of aqueous ammonia with incompatible hazardous materials.

Verification: At least 60 days prior to the delivery of aqueous ammonia and/or hydrogen to the facility, the project owner shall provide a safety management plan as described above to the CPM for review and approval.

HAZ-4 The aqueous ammonia storage facility shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, a secondary containment basin capable of holding 150 percent of the storage volume shall protect the storage tank plus the volume associated with 24 hours of rain assuming the 25-year storm as specified in the AFC.

Verification: At least 60 days prior to delivery of aqueous ammonia to the facility, the project owner shall submit final design drawings and specifications for the ammonia storage tank and secondary containment basin to the CPM for review and approval.

HAZ-5 The project owner shall ensure that no combustible or flammable material is stored within 100 feet of the sulfuric acid tank.

Verification: At least 60 days prior to receipt of sulfuric acid on-site, the Project Owner shall provide copies of the facility design drawings showing the location of the sulfuric acid storage tank and the location of any tanks, drums, or piping containing any combustible or flammable materials

HAZ-6 The project owner shall require that the gas pipeline undergo a complete design review and detailed inspection 30 years after initial startup and every 5 years thereafter.

Verification: At least 30 days prior to the initial flow of gas in the pipeline, the project owner shall provide to the CMP for review and approval an outline of the plan to accomplish a full and comprehensive pipeline design review. The full and complete plan shall be amended, as appropriate, and submitted to the CPM for review and approval, not less than one year before the plan is implemented by the project owner.

HAZ-7 After any significant seismic event in the area where surface rupture occurs within one mile of the pipeline, the gas pipeline shall be inspected by the project owner.

Verification: At least 30 days prior to the initial flow of gas in the pipeline, the project owner shall provide to the CMP for review and approval a detailed plan to accomplish a full and comprehensive pipeline inspection in the event of an earthquake. This plan shall be amended, as appropriate, and submitted to the CPM for review and approval, at least every five years.

HAZ-8 The project owner shall direct all vendors delivering aqueous ammonia to the site to use only tanker truck transport vehicles that meet or exceed the specifications of DOT Code MC-307.

Verification: At least 60 days prior to receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

HAZ-9 The project owner shall direct all vendors delivering any hazardous material to the site to use only the route approved by the CPM (I-5 to Manning Ave. to Colusa Ave. to Cherry Lane and then into the facility). The project owner shall obtain approval of the CPM if an alternate route is desired.

Verification: At least 60 days prior to receipt of any hazardous materials on site, the project owner shall submit copies of the required transportation route limitation direction to the CPM for review and approval.

HAZ-10 The project owner shall ensure that the hydrogen gas storage cylinders are stored in an area out of the area that could be affected by a turbine over-speed event and that no combustible or flammable material is stored within 100 feet of the hydrogen cylinders.

Verification: At least 60 days prior to receipt of hydrogen gas on-site, the Project Owner shall provide copies of the facility design drawings showing the location of the hydrogen gas cylinders and the location of any tanks, drums, or piping containing any combustible or flammable material and the route by which such materials will be transported through the facility.

HAZ-11 The project owner shall contract with a hazardous spill response company that will respond to any spill on-site. The contract shall state the conditions, procedures, and estimated response time that shall govern the manner in which this contractor shall be contacted and with the specific number of personnel who shall respond.

Verification: At least 30 days prior to the receipt of any hazardous materials on-site the project owner shall provide copies of the contract to the CPM for review and approval and to the Fresno County Fire Protection District for information.

REFERENCES

AIChE (American Institute of Chemical Engineers). 1989. Guidelines for Technical Management of Chemical Process Safety, AIChE, New York, NY 10017.

AIChE (American Institute of Chemical Engineers). 1994. Guidelines for Implementing Process Safety Management Systems, AIChE, New York, NY 10017.

API (American Petroleum Institute). 1990. Management of Process Hazards, API Recommended Practice 750; American Petroleum Institute, First Edition, Washington, DC, 1990.

Baldcock, P.J. (date unknown). Accidental Releases of Ammonia: An Analysis of Reported Incidents.

Calpine 2001a. Application for Certification for San Joaquin Valley Energy Center (01-AFC-22), Dated October, 2001.

Calpine 2002a. Response to staff's informal Data Request I-5 Aqueous Ammonia Analysis. Dated May 2002.

Davies, P.A. and Lees, F.P. 1992. The Assessment of Major Hazards: The Road Transport Environment for Conveyance of Hazardous Materials in Great Britain. Journal of Hazardous Materials, 32: 41-79.

EPA (Environmental Protection Agency). 1987. Technical Guidance for Hazards Analysis, Environmental Protection Agency, Washington, DC, 1987.

EPA (Environmental Protection Agency). 1988. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Environmental Protection Agency, Research Triangle Park, NC, 1988.

EPA (Environmental Protection Agency). 2000 Risk Management Guidance For Ammonia Refrigeration Environmental Protection Agency, Research Triangle Park, NC, 2000.

FEMA (Federal Emergency Management Agency). 1989. Handbook of Chemical Hazard Analysis Procedures, Federal Emergency Management Agency, Washington, DC, 1989.

Harwood, D.W., Viner, J.G., and E.R. Russell. 1990. Truck Accident Rate Model for Hazardous Materials Routing. Transportation Research Record. 1264: 12-23.

Harwood, D.W., Viner, J.G., and E.R. Russell. 1993. Procedure for Developing Truck Accident and Release Rates for Hazmat Routing. Journal of Transportation Engineering. 119(2): 189-199.

Lees, F.P. 1998). Loss Prevention in the Process Industries, Vols. I, II and III. Second Edition, Butterworths.

NFPA (National Fire Protection Association). 1987. NFPA 85A, Prevention of Furnace Explosions in Fuel Oil and Natural Gas Fired Single Burner Boiler Furnaces, National Fire Protection Association, Batterymarch Park, Quincy, MA, 1987.

NRC (National Research Council). 1979. Ammonia. Subcommittee on Ammonia. Committee on Medical and Biologic Effects of Environmental Pollutants. Division of Medical Sciences, Assembly of Life Sciences, National Research Council (NRC), Baltimore, Maryland, University Park Press (NTIS No. PB 278-027).

Perry. 1973. Perry's Chemical Engineers' Handbook, Sixth Edition, McGraw-Hill, USA.

Pet-Armacost, J.J., Sepulveda, J. and M. Sakude. 1999. Monte Carlo Sensitivity Analysis of Unknown Parameters in Hazardous Materials Transportation Risk Assessment. Risk Analysis. 19(6): 1173-1184.

Rhyne, W.R. 1994. Hazardous Materials Transportation Risk Analysis. Quantitative Approaches for Truck and Train.
Chapter 2: Transportation Quantitative Risk Analysis
Chapter 3: Databases

Uniform Fire Code (UFC) 1997. International Fire Code Institute, 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.

Vilchez, J.A., Sevilla, S., Montiel, H. and J. Casal. 1995. Historical Analysis of Accidents in Chemical Plants and in the Transportation of Hazardous Materials. J. Loss Prev. Process Ind. 8(2): 87-96.

Data Bases:
National Response Center
Chemical Incident Reports Center, U.S. Chemical Safety Board
National Transportation Safety Board

APPENDIX A

HAZARDOUS MATERIAL MANAGEMENT

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. Appendix B provides a summary of adverse effects, which might be expected to occur at various airborne concentrations of ammonia.

HAZARDOUS MATERIAL MANAGEMENT
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.

References for Appendix A, Table 1

AIHA. 1989. American Industrial Hygienists Association, Emergency Response Planning Guideline, Ammonia, (and Preface) AIHA, Akron, OH.

EPA. 1987. U.S. Environmental Protection Agency, Technical Guidance for Hazards Analysis, EPA, Washington, D.C.

NRC. 1985. National Research Council, Criteria and Methods for Preparing Emergency Exposure Guidance Levels (EEGL), short-term Public Emergency Guidance Level (SPEGL), and Continuous Exposure Guidance Level (CEGL) Documents, NRC, Washington, D.C.

NRC. 1972. Guideline for short-term Exposure of The Public To Air Pollutants. IV. Guide for Ammonia, NRC, Washington, D.C.

NIOSH. 1994. National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Washington D.C., Publication numbers 94-116.

WHO. 1986. World health Organization, Environmental Health Criteria 54, Ammonia, WHO, Geneva, Switzerland.

Abbreviations for 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

Appendix B

SUMMARY OF ADVERSE HEALTH EFFECTS OF AMMONIA

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
- 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.

APPENDIX C

[Attach AFC Table 8.12-4 here.]

LAND USE

Dan Gorfain and Eileen Allen

INTRODUCTION

This land use analysis of the San Joaquin Valley Energy Center (SJVEC) 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 (LORS)

This section describes federal, state, regional, and local land use LORS applicable to the proposed project.

FEDERAL

There are no Federal land use-related LORS that apply to this project.

STATE

Subdivision Map Act (Pub. Resources Code § 66410-66499.58)

The Subdivision Map Act provides procedures and requirements regulating land divisions (subdivisions) and the determining of parcel legality. Regulation and control of the design and improvement of subdivisions, by this Act, has been vested in the legislative bodies of local agencies. Each local agency by ordinance regulates and controls the initial design and improvement of common interest developments and subdivisions for which the Map Act requires a tentative and final map.

Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000 (Government Code 56000 et seq.)

This Act mandates Local Agency Formation Commissions (LAFCOs), regulatory bodies established at the county level, to oversee changes in jurisdictional boundaries that may include annexations, detachments, formations, dissolutions, consolidations, mergers, incorporations, and disincorporations of local governments, including special districts. In reviewing annexation applications, LAFCO considers whether proposed annexations will lead to logical and orderly development. It also considers whether the annexing jurisdiction has the capacity to provide adequate public services to the future developments on the land being annexed. This law also requires LAFCO to establish and periodically review the spheres of influence for each agency under its jurisdiction.

Warren-Alquist Act

Public Resources Code § 25525 states that the Energy Commission shall not certify any facility when it finds "that the facility does not conform with any applicable state, local, or

regional standards, ordinances, or laws, unless the (Energy) commission determines that such a facility is required for public convenience and necessity and that there are not more prudent and feasible means of achieving such public convenience and necessity. In making the determination, the commission shall consider the entire record of the proceeding, including, but not limited to the impacts of the facility on the environment, consumer benefits, and electric system reliability." In no event shall the commission make any finding in conflict with applicable federal law or regulation. When determining if a project is in conformance with state, local or regional ordinances or regulations, the Energy Commission typically requests written conclusions, and meets and consults with applicable agencies to determine conformity.

LOCAL

Under California State planning law, each city and county must adopt a comprehensive, long-term general plan that governs the land use and physical development of all lands under its jurisdiction. The general plan is a broadly scoped document that outlines plans and proposals for the development of a city or county and any land outside its boundary that, in the planning agency's judgment, bears relation to its planning (California Government Code Section 65300 et seq.).

General plans must be comprehensive in both their geographic coverage and the range of subject matters they address. Their time horizon is typically 15 to 25 years.

At a minimum, a General Plan must include seven mandatory elements. These are: Land Use, Circulation, Housing, Conservation, Open Space, Noise, and Safety. Additional elements may be prepared to address issues that are particularly relevant to certain communities, such as economic development, historic preservation and urban design.

General Plans typically consist of a statement of goals, objectives, principles, policies, standards and programs for plan implementation.

CITY OF SAN JOAQUIN GENERAL PLAN

The City of San Joaquin (City) adopted its Comprehensive General Plan in 1996. The Plan is intended to serve the following three basic functions:

1. To enable the City Council, which also sits as the City Planning Commission, to express agreement on development policies;

2. To provide clear guidance in judging whether projects proposed by public agencies and private developers are in close agreement with policies of the General Plan; and

3. To allow and provide the basis for making intelligent changes to the Plan as time and circumstances may dictate, while true to its purposes.

In July 2001, the City Council amended the General Plan land use designation for the SJVEC site from Manufacturing Reserve (MR) to Heavy Manufacturing (HM).
The General Plan contains the following key goals, objectives and policies applicable to the proposed project:.

Goal No. 1: Policies and proposals of the General Plan should seek to expand job-creating and revenue generating activities, including levels of retail, commercial service and industrial expansion that are necessary to support government services required by the expanding population base consistent with the rate of growth to be allowed.

Objective 1.A. The City will promote development of new commercial activities and shall designate land for new commercial centers during the life of the General Plan Update.

Policy 1.A.1. New commercial centers shall be required to locate in areas that are next to major transportation corridors and provide design criteria that promotes adequate vehicle circulation and parking.

Policy 1.A.2. Commercial development shall be compatible with the surrounding area.

Objective 1.B. The City will promote development of new industrial activities and shall designate land for new industrial uses during the life of the General Plan Update.

Policy 1.B.1. The City shall reserve specific sites in a variety of parcel sizes to accommodate different types of industrial activities.

Policy 1.B.2. The City shall promote the diversification of industrial activities in order to provide employment opportunities in both the agricultural and non-agricultural sectors.

Policy 1.B.4. New industrial development shall be required to locate in areas that are next to major transportation corridors and provide a design criterion that promotes adequate vehicle circulation.

Objective 1.C*. The City will promote job-creating and job-retention activities within the next five years.*

Policy 1.C.1. The City shall focus its efforts in economic development activities that provide and maximize long-term net revenues to the City.

Policy 1.C.2. The City shall focus on the development of primary wage-earner job opportunities, to strengthen the economic well being of the residents of the community.

Goal No. 3: The City will seek to manage the rate of urban expansion at a level that does not exceed the capacity of the City, the Golden Plains Unified School District or other agencies of local government to provide the necessary levels of community services and facilities required consistent with all other goals of the General Plan.

Objective 3.A. The City will develop a Comprehensive Annexation Plan (CAP) to meet future needs of commercial, industrial and residential development. With the cooperation of the LAFCO and the County of Fresno, the City will annex land that will be needed for the next 10 years. Policies under this objective are also developed to reduce the amount of prime agricultural land that will be converted to urban uses. Implementation of this process should start within 18 months.

Goal No. 4: It is the goal of the General Plan to preserve and enhance the quality of living by preventing the degradation of the natural and man-made environment, and by taking steps to offset the effects of that degradation which already has occurred.

Objective 4.A. The General Plan Diagram designates certain undeveloped land as industrial, commercial and residential lands as "Reserves." The objective is to avoid premature development of agricultural land. The City will allow for the opening of reserve land for development, as the need arises.

Policy 4.A.1. Productive agricultural acreage should be developed under a phasing in program that will retain agricultural production as long as possible.

Industrial Land Use Policies and proposals:

The City's plans and policies promote industrial development southwest of Colorado Avenue, generally along the Union Pacific Railroad line and northeast of Railroad Avenue, as well as south of Manning Avenue and east of Colusa Avenue.

CITY OF SAN JOAQUIN ZONING ORDINANCE

The City's zoning ordinance implements the General Plan. It includes two classifications in which manufacturing uses are permitted:

- The "M" Manufacturing zone applies only to areas designated for heavy manufacturing and is designated "HM" by the General Plan.

- "M-2" Manufacturing Park zone may be applied to areas designated on the General Plan as HM or Light Manufacturing (LM).

The manufacturing zones provide standards for protecting the public health and welfare, and compatibility with surrounding land uses, including visual screening, and traffic circulation.

Section 17.60.030 of the San Joaquin Municipal Ordinance Code limits the height of buildings in the M zone to 75 feet, but provides that height variances may be granted. Chapter 17.84 of the Code "permits the issuance of a variance where special circumstances are applicable to a subject property, the granting of a variance would not be materially detrimental to the public welfare or to properties in the vicinity, and where the granting of the variance will not adversely affect the general plan or purpose of the zoning ordinance."

FRESNO COUNTY GENERAL PLAN

Fresno County (County) adopted its General Plan in October 2000. It's stated purpose is to:

- Establish a framework for analyzing local and regional conditions and needs to be able to respond effectively to problems and opportunities facing the County;

- Identify and articulate the County's economic, environmental and social goals;
- Adopt clear County policies and standards for maintaining and improving existing development and guiding the location and characteristics of future development;
- Provide residents of the County with information about their communities and with opportunities to participate in local planning and decision-making;
- Improve the coordination of community development and environmental protection activities among the County, cities, regional, State, and Federal agencies; and
- Establish a basis for subsequent planning efforts, such as preparing and updating community plans, specific plans, redevelopment plans and special studies.

The Plan contains the following goals and policies that are particularly applicable to the proposed project:

Goal LU-A: To promote the long-term conservation of productive and potentially productive agricultural land and to accommodate agricultural support services and agriculturally related activities that support the viability of agriculture and further the County's economic development goals.

Policy LU-A.1: The County shall maintain agriculturally-designated areas for agricultural use and shall direct urban growth away from valuable agricultural lands to cities, unincorporated communities, and other areas planned for such development where public facilities and infrastructure are available.

Policy LU-A.13: The County shall minimize potential land use conflicts between agricultural activities and urban land uses through the provision of appropriate buffers and other measures.

Policy LU-A.15: The County should consider the use of agricultural land preservation programs that improve the competitive capabilities of farms and ranches, thereby ensuring long-term conservation of viable agricultural operations. Examples of programs to be considered should include: land trusts; conservation easements; dedication incentives; agricultural fee mitigation program; purchase of development rights; and agricultural buffer policies.

Goal **LU-G:** To direct urban development within city spheres of influence to existing incorporated cities and to ensure that all development in city fringe areas is well planned and adequately served by necessary public facilities and infrastructure and furthers countywide economic development goals.

Policy LU-G.1: The County acknowledges that the cities have primary responsibility for planning within their LAFCO-adopted spheres of influence and are responsible for urban development and the provision of urban services within their spheres of influence.

Policy LU-G.2: Fresno County shall work cooperatively with all cities of the County to encourage each city to adopt and maintain its respective (general) plan consistent with the Fresno County General Plan. The County shall adopt complementary planning policies through a cooperative planning process to be determined by the respective legislative bodies.

FRESNO COUNTY ZONING ORDINANCE

The County's Zoning Ordinance, as supplemented by the County Board of Supervisors on July 16, 2001, provides for the formation of two types of agricultural districts (i.e. zones). These are:

- Section 816: "AE" – Exclusive Agricultural District, with minimum parcel sizes ranging from 5 to 640 acres. "AE" zoned areas are established to protect general agricultural use from encroachment by non-agricultural uses.

- Section 817: "AL" – Limited agricultural District, with minimum parcel sizes ranging from 20 to 640 acres. "AL" zoned land is intended to allow limited agricultural use that would be protected from more intensive uses that are incompatible or injurious to their limited use. This zone is also intended to reserve and hold certain cultivated lands for future urban development.

SETTING

POWER PLANT SITE AND VICINITY

The proposed power plant site is located at the southeast end of the City, north of Springfield Avenue and southwest of Colorado Avenue and the adjacent railroad tracks. The site, surrounding land and developed portions of the City are flat. The site is currently in cotton production. An irrigation canal borders the site along Springfield Avenue. It is crossed by electrical transmission lines. Pacific Gas & Electric's Helm substation is located 0.25 mile to the south.

The developed portions of the City are located to the north and west. The nearest residences are approximately one-half mile away, west of Colusa Avenue and south of Manning Avenue. Adjacent to the northern end of the site, south of Manning Avenue between Colorado and Colusa, is a variety of largely vacant commercial and industrial buildings, previously used as agricultural packing houses, computer assembly facility and retail outlets (Estrada 2002b).

The SJVEC is proposed to be built on a portion of a single parcel, Assessor Parcel Number (APN) 33-020-31. The parcel is divided into five lots totaling approximately 85 acres. Calpine has an option to purchase four of the lots at the project site, which constitute the vast majority of the parcel. Of the 85-acre site, 25 acres would be permanently cleared, graded, filled, and paved; 20 acres would be temporarily used as a construction lay-down area, and then returned to agricultural use following construction. The undeveloped portion of the project site, totaling approximately 60

acres, would be offered by the Applicant for lease as agricultural land for an indefinite period, until it is ready to be developed.

The SJVEC site is located on a parcel recently annexed by the City. On July 25, 2001, in approving its annexation proposal to LAFCO, the City Council amended its General Plan land use designation for the SJVEC site to HM, amended the Zoning Map by pre-zoning the site to M and approved a conceptual Site Plan subject to 17 Planning- and Engineering-related conditions. On August 1, 2001, LAFCO approved the annexation subject to several conditions. On May 20, 2002, the annexation was completed and became effective.

ELECTRICAL TRANSMISSION LINE

The proposed 230-KV electrical transmission line for the project would be extended to the Helm substation, located 0.25 miles south of the SJVEC site. It would mainly cross agricultural land in Fresno County, south of the proposed SJVEC site. This land is zoned Exclusive and Limited Agriculture (AE20, AE40 and AL20)

The 70-kV sub-transmission line that currently crosses the project site would be re-routed to cross similarly designated and zoned land.

NATURAL GAS SUPPLY LINE

Natural gas would be delivered to the SJVEC site via a new 20-mile long, 24-inch pipeline from PG&E's existing main pipelines near Manning Avenue and Jerrold Avenue, 4 miles east of I-5. In the County's jurisdiction, the pipeline would run through land cultivated in field and row crops and through an orchard adjacent to existing road rights-of-way. These agricultural lands are zoned AE20 and AE40. In the City, the gas line route would also follow public streets adjacent to agricultural and urban uses, including manufacturing, commercial and residential.

Construction of the pipeline will require a 75-foot-wide construction easement and a 30-foot-wide permanent easement to facilitate leak inspection and related monitoring and maintenance over the life of the project. The pipeline would be aligned along the edge of public roadways. During construction, 169.7 acres of cultivated land would be temporarily taken out of production primarily along Manning Avenue (Calpine 2002).

Pipeline crossings of wetlands, canals, aqueducts, and major roads would be accomplished using either jack and bore techniques, or directional boring. Staging areas would be required for equipment, but should not extend substantially beyond the pipeline's linear construction right-of-way.

COOLING WATER SUPPLY LINE

Up to 7,000 acre-feet per year of secondary effluent would be supplied to the SJVEC via a new 21-mile, 27-inch pipeline from the Fresno-Clovis Wastewater Treatment Facility (WWTF) located east of San Joaquin. In the unincorporated County, the pipeline would run through agricultural land (AE20 and AE40) adjacent to existing road rights-of-way, cultivated in field and row crops, vineyards and orchards. In the City, its route would also follow public streets adjacent to urban uses.

Construction of the pipeline would require a 70-foot-wide construction easement and a 15- to 20-foot-wide permanent easement to facilitate leak inspection and related monitoring and maintenance over the life of the project. During construction, 178.2 acres of cultivated land would be temporarily taken out of production (Calpine 2002).

Pipeline crossings of wetlands, canals, aqueducts, and major roads would be accomplished using either jack and bore techniques, or directional boring. Staging areas would be required for equipment, but should not extend substantially beyond the pipeline's linear construction right-of-way.

SURROUNDING LAND USE

All of the unincorporated County land surrounding the SJVEC site is in agricultural use. An irrigation canal borders the site on the south, along Springfield Avenue. The Union Pacific Railroad tracks run parallel to Colorado Avenue to the northeast. The site is crossed by electric distribution lines. The Helm substation is located 0.25 miles to the south.

The developed portion of the City is located northwest of the site north of Manning Avenue, with some residences lying south of Manning. Schools, local parks and religious facilities are located within the urbanized portion of the City. The business district and residential areas of the City are separated from the SJVEC site by a variety of largely vacant commercial and industrial buildings along the south side of Manning Avenue (Estrada 2002b).

Regional recreational areas include Fresno Slough, a bird watching area, located 5 miles southwest of the SJVEC site, and the Mendota Wildlife Protection Area some 15 miles to the north.

PLANNED LAND USES

No major development projects are currently planned within the urbanized portions of the City of San Joaquin, or the surrounding area within Fresno County. The City has planned for industrial development in the area surrounding the SJVEC site, through its General Plan manufacturing designations of LM and HM, and the area's M zoning classification, but no specific projects have been proposed as yet. Fresno County's General Plan and Zoning Ordinance indicate that the unincorporated area surrounding the site will remain in agricultural use.

IMPACTS

ENVIRONMENTAL CHECKLIST

The following table presents the criteria and staff determination of the significance of potential land use impacts of the proposed SJVEC project as provided in Appendix G of the California Environmental Quality Act (CEQA) Guidelines:

	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
LAND USE – Would the Project:				
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				X
d) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
e) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?				X
f) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?		X		
g) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
h) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?			X	

a) Relationship to Established Community

The SJVEC is proposed to be located on land recently annexed by the City, on its south end. The site is also located on the edge of the City's sphere of influence, which has been reserved for future manufacturing use. New natural gas and water pipelines that would be built to serve the project would run along existing roads. The entire established community of the City is located north and west of the site. As such, the proposed project will not divide an established community.

b) Consistency with Laws, Ordinances, Regulations and Standards (LORS)

City of San Joaquin Land Use LORS and Policies

The City's Comprehensive General Plan, adopted in 1996, is designed to provide clear guidance to the Planning Commission and City Council for orderly development and

growth of San Joaquin. Looking to the future, the Plan designated the SJVEC site, within its sphere of influence, as a Manufacturing Reserve (MR) area, suitable for future industrial development.

In July 2001, in preparation of its annexation application to LAFCO, the City amended its General Plan, designated the proposed SJVEC site as Heavy Manufacturing (HM) and pre-zoned it "M." The San Joaquin Municipal Code Section 17.60.020 includes thermal power plants as a permitted use on M-Zoned land (City of San Joaquin 2001b). Ordinarily, all projects proposed in this zone must undergo Site Development Review and obtain a Special Use Permit from the City. However, for power plant licensing, pursuant to the Warren-Alquist Act (California Public Resources Code Section 25500), the City is not going through the Site Development Review and Special Use Permit evaluation process. Instead, it will comment on the project's consistency with its LORS, and conditions it would normally place on a Special Use Permit, through an advisory resolution.

On April 10, 2002, the San Joaquin City Council adopted Resolution No. 02-08 entitled: "A Resolution of the City Council of the City of San Joaquin Expressing an Advisory Opinion on the Appropriateness of a Height Variance for the San Joaquin Valley Energy Center." (City of San Joaquin 2002a). In its resolution, the Council said:

> "The granting of a variance to allow the San Joaquin Valley Energy Center to erect exhaust stacks, heat recovery steam generators, ventilation equipment and other appurtenant structures up to a height of 165 feet, would be permissible at the proposed location for the project and the height variance would be granted by the City Council, provided that the San Joaquin Valley Energy Center provides the planned landscaping and other appropriate mitigation measures described in the resolutions approved concurrently herewith that will reduce the potential visual impacts of the structures to a level of less than significant."

The concurrently adopted resolutions, No's 02-09 and 02-07, adopted the recommendations of the Landscape Committee and Conceptual Landscape Plan for the SJVEC (City of San Joaquin 2002b), and approved an interpretation of the City's noise ordinance as a nuisance abatement mechanism (City of San Joaquin 2002c).

The footprint of the proposed SJVEC, including associated facilities, improvements and buffer areas, which would allow adjacent lots and/or parcels to be developed to their full extent as presently zoned, may extend to more than one of the lots acquired by the project owner. Condition **LAND-1** is designed to ensure that all of these facilities will be located on a single legal lot as an integral part of a single development under the consolidated ownership of the project owner. Staff concludes that the proposed project is consistent with the City's LORS.

Annexation History

In August 2001, LAFCO approved the Colorado-Springfield Annexation No. 1, which would allow the SJVEC site to be annexed to the City and put the M re-zone into effect. In approving this annexation, LAFCO found it to be consistent with the City and County General Plans policies and local ordinances, the adopted sphere of influence, and

LAFCO policies. It found that all necessary urban services are available to serve the site and that the annexation for the purpose of building the SJVEC would be a logical and timely extension of the City's existing urban pattern.

For the annexation to become effective, the City had to comply with the following three conditions imposed by LAFCO:

a. The current Transition Agreement between the City and County Fire Protection District regarding the transfer of Ad Valorem (value added) Real Property Tax revenue generated by the annexation remains in effect;

b. A revised map and legal description of the parcels to be annexed, is approved by the County by the County Assessor's Office and submitted to LAFCO; and

c. The property tax revenue exchange agreed to by the responsible local agencies shall be in accordance with the master property tax exchange agreement on file with LAFCO.

On May 6, 2002, the City submitted the necessary documentation for compliance with these conditions to LAFCO. On May 20, 2002, LAFCO notified the City Clerk that the annexation has been recorded and "is now complete and effective." It provided the City with a certified copy of the "Certificate of Completion," along with the map and legal description indicating the recording numbers affixed by the County Recorder. A Statement of Boundary Change was sent to the County Assessor, County Auditor and the State Board of Equalization (Local Agency Formation Commission of Fresno County 2002c).

Staff concurs and concludes that the proposed project is consistent with the City's General Plan land use policies and zoning ordinances, now that the annexation has taken effect.

Fresno County Land Use LORS and Policies

The principal County General Plan goals and policies applicable to the proposed project provide for the long-term conservation of the productivity of agricultural land, in order to support a viable agricultural industry and further the County's economic development goals.

County policies also call for cities to adopt and implement LORS that are consistent with the County's General Plan. These include policies regarding traffic generation on County roads surrounding development within City boundaries and LORS governing impacts on air, water, land and other community resources. These are addressed in other respective sections of staff's analysis of this project.

County lands that would be affected by this project are in the rights-of-way of the natural gas and cooling water pipelines, and transmission lines connecting the SJVEC to PG&E's electric transmission system. These include construction lay-down areas and staging areas for directional boring. These lands are almost exclusively in agricultural use. Disturbance would be limited to the construction period. The Applicant is

proposing to route the gas and cooling water lines along existing road rights-of-way, which would minimize the need to cross cultivated land to reach the pipelines. Subject to the agreements with farmers along the pipeline routes, disturbed soils would be replaced and the land re-cultivated; uprooted trees and grapevines would be re-planted; and farmers would be compensated for lost production during construction and for disruptions due to maintenance and repair (Lagerquist 2002).

Staff concurs that, as proposed, the project is consistent with the County's land use plan, General Plan policies and ordinances.

c) Habitat Conservation Plan or Natural Community Conservation Plan

There are no adopted applicable habitat conservation plans or natural community conservation plans for lands affected by the proposed project (City of San Joaquin 2001).

d) Increased Use of Neighborhood or Regional Parks or Recreational Areas

Neighborhood parks are located within the developed portions of the City. The City's policy is to expand the availability of local recreational facilities commensurate with population growth (City of San Joaquin 1996).

Regional recreational areas include Fresno Slough, a bird watching area, located 5 miles southwest of the SJVEC site, and the Mendota Wildlife Protection Area, 15 miles to the north. They are not expected to be adversely affected by the proposed project.

The proposed project is not expected to result in substantial population growth of the City. Few, if any, construction workers are expected to move to the City. Some of the 30 or so plant operational staff may move to the City. As such, the proposed project should not substantially increase the demand for recreational facilities within City boundaries.

During construction, the demand for use of recreational facilities within the City may increase temporarily if the City sets up an overnight RV parking area and a significant number of construction workers choose to reside in the City during the week. However, because of the temporary nature of this potential use, the strain on the use of neighborhood or regional recreational areas is not considered to be significant.

Completion of the SJVEC would substantially increase the property tax revenue to the City and should enable it to maintain, improve and expand neighborhood recreational facilities consistent with its policy, along with other community expenditure priorities.

Staff concludes that the proposed project will not increase the use of neighborhood and regional parks or other recreational facilities such that their physical deterioration will occur or be accelerated.

e) Impact of New or Expanded Recreational Facilities

Construction of the SJVEC does not include the construction or expansion of recreational facilities. However, with the additional property tax revenue the project

would generate for the City, such projects may be proposed and evaluated separately for their potential environmental impacts as required by CEQA.

f) Conversion of Prime or Unique Farmland, or Farmland of Statewide Importance

The proposed SJVEC power plant site is classified as prime agricultural land by the California Department of Conservation. The site is in use for cotton production. In 2000, there were 1.22 million acres of cultivated cropland in Fresno County, of which 291,500 were in cotton (Clayton 2002). Of the total croplands, 645,000 acres were classified "Important Farmlands' (Fresno County 2000a).

As proposed, 25 acres of this 85-acre site would be permanently cleared, graded and paved for the power generation facility. An additional 20 acres would be temporarily used as a construction lay-down area and returned to agricultural use following plant construction. The Applicant has stated in its AFC that once the SJVEC is in operation, the land around the plant's footprint, or approximately 60 acres, will be offered for lease for cultivation until it is proposed for development consistent with its M zoning (Lagerquist 2002).

Conversion of this prime agricultural land was considered by LAFCO when it established the City's Sphere of Influence and by the City when it: a) certified the Environmental Impact Report (EIR) for and adopted its General Plan in 1996; and b) adopted the Negative Declaration (ND) for its land use re-designation and SJVEC site pre-zone in preparation for its annexation application submittal to LAFCO. In adopting the ND, the City found that: "The threshold decision to eventually convert the project site to urban use has already occurred. The conversion of areas of both the City of San Joaquin and Fresno County from agricultural to non-agricultural use has previously been evaluated in the EIRs for the General Plans of the two jurisdictions. No additional conversion to urban uses beyond that previously planned would occur. Thus, no additional significant impact would occur beyond that previously evaluated, and no mitigation would be necessary." Furthermore, the City "determined that the conversion of agricultural resources in the project area is necessary and timely to ensure the availability of properly designated land to serve industrial development in the community." (City of San Joaquin 2001).

In summary, the City found that the conversion of agricultural land for the proposed project would not have significant adverse environmental effect either singularly or cumulatively and LAFCO concurred.

In the EIR prepared for its 2000 General Plan Update, Fresno County concluded that while the permanent loss of agricultural land to individual development projects, mostly within incorporated cities where the County has no jurisdiction, may not be significant, the cumulative impact of such loss countywide will be significant. The County estimated that during the General Plan's 2000-2020 time frame, approximately 37,737 acres of agricultural land would be converted, with the majority of the land having prime or important soil characteristics. It further concluded that while implementation of the Draft General Plan land use policies (e.g. LU-A.15) would reduce the amount of land that would be permanently lost to development, they would not reduce the cumulative effect

to a level that was less-than-significant, and that no other mitigation other than the General Plan policies was available (Fresno County 2000b).

Although the proposed SJVEC is within the incorporated area of the City and is consistent with the City General Plan, staff has evaluated the permanent loss of 25 acres of prime agricultural land in a countywide cumulative context, and from the statewide perspective of a cumulative loss of productive farmland. We agree with Fresno County's conclusion regarding a significant cumulative impact from long-term conversion of the overall acreage.

The County's Draft General Plan land use policy LU–A.15, which encourages the use of agricultural land preservation programs such as land trusts and conservation easements, was considered in the County's EIR. It was considered along with the County's other General Plan land use policies for mitigation of the significant cumulative impact of conversion of the overall countywide agricultural acreage (i.e.37,737), but it was not implemented.

We believe that measures consistent with policy LU–A.15 are appropriate mitigation for the SJVEC's proposed conversion of 25 acres of prime farmland. Proposed condition **LAND-2** would require the project owner to provide appropriate compensation for the loss of this land through the purchase of comparable land or agricultural conservation easements in perpetuity**,** either through its own management, or through the American Farmland Trust, or some other entity acceptable to the Commission.

A total of 348 acres would be affected by the construction of the natural gas and water pipelines, and electric transmission line. The disruption of agricultural activity, whether during construction, maintenance or repair, would be temporary, and would occur along the pipeline alignment and in lay-down areas for materials and equipment. However, prior to the start of construction, the project owner must enter into right-of-way lease agreements with each landowner affected by the pipeline construction. These agreements will provide for the restoration of disturbed land and compensation for lost crop production.

Staff concludes that the conversion of prime agricultural land required for the SJVEC, together with the proposed mitigation measure, and the temporary disturbance of cultivated land for pipeline construction will have a less than significant impact on the County's agricultural resources.

g) Existing Zoning and California Land Conservation Act of 1965

As discussed above, the proposed project is consistent with existing City and County zoning ordinances.

No land involved in this project is subject to a Williamson Act contract under the California Land Conservation Act of 1965. This includes the SJVEC site, gas and water supply pipeline routes, utility lines, and transmission facilities.

h) Other Changes in Existing Environment Which Could Result in Further Conversion of Farmland to Non-Agricultural Use

As discussed above, the SJVEC site annexation is within the city's approved sphere of influence, which includes land beyond the project site, designated as manufacturing or residential reserve. This land is intended to accommodate growth of the City over time, in a gradual and orderly manner, in coordination with the County.

COMPATIBILITY WITH EXISTING AND PLANNED LAND USES

The SJVEC project will be compatible with the existing industrial and agricultural uses in the site vicinity, in that it will not interfere with current activities. The project is consistent and compatible with the planned land uses in the vicinity, which are additional industrial/manufacturing on the southern edge of the City as noted in the San Joaquin General Plan, and agriculture within Fresno County as noted in the County's General Plan.

RESPONSE TO PUBLIC AGENCY COMMENTS

FRESNO COUNTY

In a letter dated March 8, 2002, Bernard Jimenez, Senior Staff Analyst, Development Services Division, Planning & Resource Management Department, noted that the annexation of the SJVEC is still pending and that the land is still within the unincorporated County and subject to its LORS.

Response: When Mr. Jimenez's letter was received, staff inquired with LAFCO and the City, and confirmed that, while the annexation was approved on August 1, 2001, the City was still working to prepare the documentation needed to comply with LAFCO's conditions.

On May 20, 2002 LAFCO notified the San Joaquin City Clerk that the conditions of annexation have been met and that it is complete and effective.

CUMULATIVE IMPACTS

Cumulative impacts of a project could result when the incremental impacts of related past, present and reasonably foreseeable probable future projects are added together. Most projects in the area surrounding the City have been within the City boundary. They consist of residential, commercial and industrial development. No major development projects are currently proposed in the City and surrounding area.

Consistent with the adopted City and County general plans, and with LAFCO's designation of the City's sphere of influence, which includes land surrounding the SJVEC site, additional residential, commercial and manufacturing development is expected to occur over the next two decades as the City's population grows. However, the nature, extent and timing of such future projects are unknown and too speculative to be considered in this analysis.

The conversion of prime agricultural land has been addressed in the "Conversion of Prime Farmland…" section above, and in LAND-2. The continued cultivation of surrounding agricultural land beyond the City's sphere of influence should not be adversely affected by the proposed project, in that construction and operation of the proposed project will be compatible with agricultural activity.

Based on the review of the proposed project, together with past and present development, staff concludes that the SJVEC would not result in significant adverse cumulative impacts on the City's or County's land use.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows that minority population constitutes 96.5 percent of the population within a 6-mile radius of the proposed project. The 1990 Census (the latest available) also shows that 25.4 percent of the population within the 6-mile radius was below the poverty level.

Based on the land use analysis, staff has not identified significant direct or cumulative impacts resulting from the construction or operation of the project. Therefore, staff concludes that there are no land use Environmental Justice issues related to this project.

FACILITY CLOSURE

At some point in the future, the proposed facility would cease operation and close down. At that time, it would be necessary to ensure that closure occurs in such a way that public health and safety, and the environment are protected from adverse impacts.

The planned lifetime of the SJVEC is estimated at 30 years. At least 12 months prior to the initiation of decommissioning, the Applicant would prepare a Facility Closure Plan for Energy Commission review and approval. This review and approval process would be public and allow participation by interested parties and other regulatory agencies. At the time of closure, all applicable LORS would be identified and the closure plan would discuss conformance of decommissioning, restoration, and remediation activities with these LORS. All of these activities would fall under the authority of the Energy Commission.

There are at least two other circumstances under which a facility closure can occur, unexpected temporary closure and unexpected permanent closure. Staff has not identified any LORS from a land use perspective that the applicant would have to comply with in the event of unexpected temporary closure or unexpected permanent closure of the SJVEC.

CONCLUSIONS

1. The proposed project would be located on the south end of the City of San Joaquin and, as such, would not divide an established community.

2. The proposed project is consistent with the City's General Plan and Zoning Ordinance, and the County General Plan and Zoning Ordinance.

3. The loss of prime agricultural land at the SJVEC plant site is a potentially significant cumulative impact, which would be mitigated to a less than significant level with the adoption of LAND-2. This conclusion is consistent with Fresno County's conclusion in the EIR for its 2000 General Plan Update regarding a significant cumulative impact.

4. Disturbance to Important Farmlands along the natural gas and water pipelines and transmission line corridors would be temporary. The Applicant would compensate farmers for their lost production in accordance with agreements to be entered into with them. Therefore, disturbance to these lands will not be significant.

5. The proposed project does not include land covered by a Habitat Conservation Plan or by a Williamson Act contract. Therefore, it would neither conflict with, nor adversely affect, such lands.

6. The proposed project is compatible with existing and planned land uses.

PROPOSED CONDITION OF CERTIFICATION

LAND-1 Prior to the start of construction, the project owner shall obtain the necessary approval(s) from the City and complete any lot merger or lot line adjustments necessary to ensure that the proposed project, including associated facilities, improvements and buffer areas that would allow adjacent parcels to be developed to their full extent as presently zoned, will be located on a single legal lot.

Verification: At least 30 days prior to the start of construction, the Project Owner shall provide the CPM with proof of completion of the above adjustments or satisfactory evidence that no such adjustments are necessary.

LAND-2 Prior to the start of construction, the project owner shall submit an agricultural mitigation plan subject to the CPM for approval. The agricultural mitigation plan shall describe how the project owner will mitigate for the permanent conversion of 25 acres of agricultural land to non-agricultural use for the construction of the power generation facility.

The plan shall describe the project owner's off-site mitigation, involving one or both of the following:

1. The purchase of comparable land or agricultural conservation easements at a one-to-one ratio for agricultural land converted by the project owner. The agricultural mitigation plan shall describe the approach for management in perpetuity, including funding, endowment, maintenance, and monitoring; or

2. The project owner's payment of monies to the American Farmland Trust or some other entity acceptable to the Commission for the purpose of purchasing agricultural mitigation land or conservation easements.

Verification: Sixty (60) days prior to the start of construction, the project owner shall provide the CPM with the final agricultural mitigation plan for approval. If this plan is not managed by the project owner it shall include a copy of the final agreement signed between the project owner and the American Farmland Trust, or a similar entity acceptable to the Commission that is publicly recognized and authorized to hold agricultural conservation easements.

Thirty (30) days prior to the start of construction, the project owner shall provide to the CPM for his/her approval a copy of document(s) confirming the executed purchase of land or agricultural conservation easements, or the transfer of funds to a third party entity for the purpose of purchasing agricultural land or conservation easements.

REFERENCES

Argentine, Mike. 2002. Personal communication between Mike Argentine, Calpine, and Dan Gorfain, Aspen Environmental Group. March 12, 2002.

Blanford Bob. 2002. Personal Communication between Bob Blanford, California Department of Conservation, and Dan Gorfain, Aspen Environmental Group. March 8, 2002.

Calpine Corporation. 2002. San Joaquin Valley Energy Center (01-AFC-22). Data Response Set 1A. February 26, 2002.

Central Valley Energy Center, LLC. 2001a. Application for Certification, San Joaquin Valley Energy Center (01-AFC-22), Submitted October 16, 2001.

City of San Joaquin. 2001. Initial Study/Negative Declaration, Southeast Area Annexation (General Plan Amendment/Rezoning). May 2001

City of San Joaquin. 1996. Comprehensive General Plan and EIR. Final Document, 1996.

City of San Joaquin. 2001a. Application and Permit. Central Valley Energy Center, LLC Site Plan Review. July 24, 2001.

City of San Joaquin. 2001b. Municipal Code. Amended July 11, 2001.

City of San Joaquin. 2002a. City Council Resolution 02-08: "A Resolution of the City Council of the City of San Joaquin Expressing an Advisory Opinion on the Appropriateness of a Height Variance for the San Joaquin Valley Energy Center." Approved April 10, 2002.

City of San Joaquin. 2002b. City Council Resolution 02-09: "A Resolution of the City Council of the City of San Joaquin Adopting Recommendations of the Landscape

Committee and Approving a Conceptual Plan for the San Joaquin Valley Energy Center." Approved April 10, 2002.

City of San Joaquin. 2002c. City Council Resolution 02-07: "A Resolution of the City Council of the City of San Joaquin Approving an Interpretation of its Noise Ordinance as a Nuisance Abatement Mechanism." Approved April 10, 2002.

Clayton, Bruce. 2002. Personal communication between Bruce Clayton, Supervising Agricultural Standards Specialist, Fresno County Department of Agriculture, and Dan Gorfain, Aspen Environmental Group. March 18, 2002.

Estrada, Lupe. 2002a. Meeting with Lupe Estrada, Administrative/Grant Coordinator, City of San Joaquin. March 7, 2002.

Estrada, Lupe. 2002b. personal communication between Lupe Estrada, Administrative/Grant Coordinator, City of San Joaquin, and Dan Gorfain, Aspen Environmental Group. March 22, 2002.

Fresno County. 2000a. Fresno County General Plan, Background Report. Adopted October 3, 2000.

Fresno County. 2000b. Fresno County General Plan, Final Environmental Impact Report (SCH #99051024). Certified October 3, 2000.

Fresno County. 2000c. Fresno County General Plan, Policy Document. Adopted October 3, 2000.

Fresno County. 1980. The Zoning Division of the Fresno County Ordinance Code. Second Edition adopted by the Board of Supervisors, June 9, 1980

Lagerquist, Tom. 2002. Personal Communication between Tom Lagerquist, Peregrine Environmental, and Dan Gorfain, Aspen Environmental Group. March 8, 2002.

Local Agency Formation Commission of Fresno County (LAFCO). 2001a. Agenda Item No. 4: City of San Joaquin "Colorado-Springfield No.1 Annexation" – Reorganization Proposal – LAFCO File No. RO-01-6. August 1, 2001.

Local Agency Formation Commission of Fresno County (LAFCO). 2001b. Resolution No. RO-01-6: Making Determination and approving proposed "Colorado-Springfield Annexation No. 1" Reorganization. August 1, 2001.

Local Agency Formation Commission of Fresno County (LAFCO). 2002c. Notice of Completion of Boundary Change with three attachments: Certificate of Completion; boundary map; and legal description. May 20, 2002.

Vital, Mary. 2002. Personal communication between Mary Vital, Acting City Manager, City of San Joaquin, and Dan Gorfain, Aspen Environmental Group. May 9, 2002.

Waiczis, Michael R. 2002. Personal communication between Michael R. Waiczis, AICP, Executive Officer, Local Agency Formation Commission of Fresno County, and Dan Gorfain, Aspen Environmental Group. March 1, 2002.

Yusuf, Fatima and Carrier, John. 2002. Meeting between Fatima Yusuf and John Carrier, CH2MHill, and Dan Gorfain, Aspen Environmental Group. January 25, 2002.

Yusuf, Fatima a. 2002. Personal communications between Fatima Yusuf, CH2MHill, and Dan Gorfain, Aspen Environmental Group. March 11, 2002.

Yusuf, Fatima b. 2002. Personal communications between Fatima Yusuf, CH2MHill, and Dan Gorfain, Aspen Environmental Group. March 12, 2002.

Yusuf, Fatima c. 2002. Personal communications between Fatima Yusuf, CH2MHill, and Dan Gorfain, Aspen Environmental Group. March 13, 2002.

NOISE AND VIBRATION

Testimony of Bill Thiessen

INTRODUCTION

This section evaluates the potential noise and vibration effects associated with the construction and operation of the San Joaquin Valley Energy Center (SJVEC) (formerly known as Central Valley Energy Center), which would be located in the southern part of the City of San Joaquin. As described in the Application for Certification (01-AFC-22), the proposed project would be to construct a natural gas-fired combined-cycle power plant within a 85-acre parcel developed by SJVEC LLC. The plant would have a nominal 1,060 megawatt (MW) rating. The proposed project would include a new transmission line, a new natural gas pipeline, and new water supply lines. (For an explanation of technical terms employed in this testimony, please see **Noise: Appendix A** following this section.)

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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. **Noise: Table 1** lists permissible noise level exposure as a function of the amount of time during which the worker is exposed. 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 offsite (community) noise.

NOISE: Table 1 - 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: OSHA Regulation

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" (VdB),

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). This is the level of vibration that a person could barely feel. 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. Vibration levels greater than this could cause damage (e.g., cracking in walls) to buildings and other structures.

STATE

California Government Code Section 65302(f) encourages each local government 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 “pure tone,” which can be used to determine whether a noise source contains significant 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 5 dBA.

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 ground borne vibration or ground borne noise levels;

3. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Energy Commission staff, in applying Item c) 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 to 10 dBA L_{90} at the nearest sensitive receptor. Increases in ambient noise levels that are over 10 dBA are considered clearly significant.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

1. the construction activity is temporary;
2. use of heavy equipment and noisy activities is limited to daytime hours; and
3. all feasible noise abatement measures are implemented for noise-producing equipment.

California Occupational Safety and Health Administration (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 described above.

LOCAL

City of San Joaquin Noise Element

The Noise Element of the City of San Joaquin General Plan establishes land use-based allowable noise levels. For low-density housing, a noise level of 50 dBA or less is satisfactory during any time of the day or night. For multi-family residential uses, a noise level of 55 dBA or less is satisfactory from 7 a.m. to 10 p.m.; for the hours of 10 p.m. to 7 a.m., the recommended noise level is 50 dBA or less.

City of San Joaquin Noise Ordinance

Section 8.24.060 of the City of San Joaquin noise ordinance states: "Any noise or sound exceeding the ambient noise level at the property line of any person offended thereby, or, if a condominium or apartment house, within any adjoining living unit, by more than 5 decibels shall be deemed to be prima facie evidence of a violation of Section 8.24.050." Section 8.24.050 indicates that it is unlawful to make any unreasonably loud, unnecessary and unusual noise which disturbs the peace or quiet of any neighborhood.

Fresno County General Plan

There are six to eight residences located in unincorporated Fresno County that are within 3,000 feet of the project boundaries. The Noise Element of the Fresno County General Plan indicates that day-night average (DNL) noise levels that are 60 dB or less are "normally acceptable." Since power plants generally operate 24 hours/day and generally emit constant levels of noise, a 60 dB DNL criterion would be approximately equivalent to an hourly average (L_{eq}) noise level of 54 dB.

Fresno County Noise Ordinance

The Fresno County Noise Ordinance specifies maximum allowable noise exposure based on the minutes of operation during an hour of the noise source. For power plants that operate constantly, the applicable criterion would be the allowable noise level that occurs 30 minutes or more during an hour. For residences, the allowable exterior noise levels would be 50 dBA from 7 a.m. to 10 p.m. and 45 dBA from 10 p.m. to 7 a.m.

SETTING

The SJVEC site would be located southwest of Colorado Avenue and the Union Pacific rail line, east of Colusa Avenue, and north of Springfield Avenue. The uses directly adjacent to the site are agricultural.

Linear facilities serving the project would include a short electrical transmission interconnection line, a 20 mile-long natural gas pipeline, a 21 mile-long reclaimed water pipeline, and shorter pipelines connecting to the City of San Joaquin municipal water supply and municipal sewer system.

SENSITIVE RECEPTORS

Within unincorporated Fresno County, there are six to eight residences within 3,000 feet of the project site boundary. One residence was identified in the San Joaquin city limits. See **Noise: Figure 1** and below for a description of site locations.

AMBIENT NOISE LEVELS

The Energy Commission's power plant certification regulations require that noise measurements be made at noise-sensitive locations where there is a potential for an increase of 5 dBA or more over existing background noise levels during operation of a power plant.

Noise: Figure 1

{INSERT FIGURE 8.5-1 FROM AFC HERE}

In late December 2000 and late January 2001, the applicant conducted continuous background noise measurements for approximately 48 hours at five locations. One location was in the City of San Joaquin and four were at rural residential locations in unincorporated Fresno County. **Noise: Figure 1** shows the measurement locations and the residences located near each location. **Noise: Table 2** is a description of the monitoring sites and nearby residences.

Noise: Table 2 – Measurement Sites and Residential Descriptions

Noise Monitoring Map I.D.	Residential Site Map I.D.	Description
G1	1 & 2	So. Side Dinuba Ave., Between Colusa & Placer Aves.
G2	G2	E. Side Colusa Ave., So. of Manning Ave.
G3	5,6 &7	So. Side Springfield Ave., E. of Sutter Ave.
G4	9	N.E. Corner Yuba & Springfield Aves.
G5	10	N.W. Corner Yuba and Manning Aves.

Noise: Table 3 is a summary of background L_{90} and L_{eq} noise levels, and the DNL values calculated from reported hourly L_{eq} values. The L_{90} and L_{eq} values are the arithmetic means (averages) of the four quietest nighttime or daytime hours.

Noise: Table 3 - Background Noise Measurement Summary

Site/Day	Mean L_{90}	Mean L_{eq}	DNL
G1/Day 1	29	34	45
G1/Day 2	28	41	--
G2/Day 1	43	46	62
G2/Day 2	46	48	--
G3/Day 1	26	46	54
G3/Day 2	27	42	--
G4/Day 1	31	45	57
G4/Day 2	28	40	--
G5/Day 1	36	64	68
G5/Day 2	30	49	--

.

Noise: Table 3 shows that background noise levels in terms of the L_{90} descriptor as measured in late December and January can be characterized as extremely quiet at the rural residences in unincorporated Fresno County. The background noise levels at the site within the City of San Joaquin (G2) are typical of residential urban areas in small communities.

IMPACTS

Noise impacts associated with the project can be created by short-term construction activities, and by normal long-term operation of the power plant.

PROJECT SPECIFIC IMPACTS — CONSTRUCTION

Community Effects

General Construction Noise

Construction noise is a temporary phenomenon; the construction period for the SJVEC facility is scheduled to last approximately 24 months (SJVEC 2001). Construction hours are scheduled from 6 a.m. to 6 p.m., Monday through Saturday. Additional hours may be needed to make up for schedule deficiencies or to complete critical tasks.

Construction of an industrial facility such as a power plant may be noisier than what is usually permissible under noise ordinances for the operation phase. In order to allow the construction of new facilities, construction noise during certain hours is commonly exempt from enforcement by local ordinances. The City of San Joaquin does not have any noise limits for construction.

Noise levels were predicted by the applicant for the construction of the SJVEC facility using information from the USEPA and from an electric utility company (USEPA,1971; Barnes et al., 1976). Since these data are quite old, the applicant believes that they are conservative. Due to its intermittent nature, construction noise is best compared to the existing average (L_{eq}) noise level. Noise levels due to construction activities are predicted to range from 48-59 dBA at the nearest receiver. These noise levels would be within the range of existing ambient noise levels at the receptors. As a result, construction noise would be considered less than significant. Staff recommends the implementation of the measures described in proposed Conditions of Certification **NOISE-1, NOISE-2, NOISE-3** and **NOISE-8** to further reduce any potential for noise impacts to the local community associated with construction activities.

Pile Driving Vibration

Conventional pile driving produces potentially significant ground-borne vibration at nearby receivers. In this case, the nearest potentially affected receptor is about 0.5 miles from the construction site, which is beyond the range over which pile driving vibration is expected to be potentially significant. Therefore, it is not expected that pile driving, if it occurs, will produce any significant vibration at the nearest receptors.

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feed water and steam systems, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale and construction debris such as weld spatter, dropped welding rods and the like. If the plant were started up without

thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. High-pressure steam is then raised in the heat recovery steam generator (HRSG) or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow, is quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, is performed several times daily over a period of two or three weeks. At the end of this procedure, the steam line is connected to the steam turbine, which is then ready for operation.

These high-pressure steam blows can produce noise as loud as 130 dBA at a distance of 100 feet. In order to reduce disturbance from steam blows, the applicant proposes to equip steam blow piping with a silencer that would reduce noise levels by 40 to 45 dBA. The resulting noise levels with this proposed mitigation will range from 54 to 59 dBA at the nearest receptor (R5). This range of noise levels is not expected to result in a significant noise impact. Conditions of Certification **NOISE-4** and **NOISE-5** are recommended to ensure that significant noise impacts from steam blows do not occur.

Linear Facilities

The plant would connect to existing electrical transmission lines located approximately one-quarter mile south of the project site. Since there are no noise-sensitive receptors near the line, construction of this line will not present a significant impact.

New gas and water lines would be constructed for this project. Pipeline construction work moves continuously, impacting particular receptors for only a few days. Further, this work will be performed only during daytime hours. Significant adverse impacts would not occur if proposed Conditions of Certification **NOISE-1, NOISE-2 and NOISE-3** are adopted.

Worker Noise Impacts

Construction workers for the SJVEC would be subjected to occasional noise levels above 85 dBA. Where the noise exposure exceeds 85 dBA, Cal-OSHA standards require that warning signs be posted, and that a Hearing Conservation Program be implemented. With proper execution of the Hearing Conservation Program, as well as with the implementation of the measures described in proposed Condition of Certification **NOISE-7**, no occupational noise impacts are anticipated from construction activities.

PROJECT SPECIFIC IMPACTS — OPERATION

Community Effects

During its operating life, the SJVEC represents essentially a steady, continuous noise source day and night. Occasional brief increases in noise levels would occur as steam relief valves open to vent pressure, or 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 would decrease.

The primary noise sources anticipated from the facility include the combustion turbines, heat recovery steam generators (HRSGs), cooling towers, air inlet chillers, pumps, motors, main transformers and an instrument air compressor. The noise emitted by power plants during normal operation is generally broadband and steady state in nature, meaning that they generally produce constant noise levels across a wide range of frequencies. The resulting hourly average noise levels are typically dominated by the steady-state noise sources.

The applicant performed acoustical calculations to determine the facility noise emissions, and to develop noise mitigation measures. The calculations were based on typical manufacturer noise data for the major equipment planned for the facility. Specific noise mitigation design measures included in the project were:

- Combustion turbines enclosed in an acoustical enclosure designed to limit near field noise levels to 85 dBA at 3 feet.
- Noise enclosure on the steam turbine generator.
- Silencers on relief valve stacks.
- Design of major components to limit near field maximum noise levels to less than 90 dBA at 3 feet (or 85 dBA where available as a vendor standard).
- Location of power block on the project site to maximize distance to nearest residential areas.
- Temporary silencers to be used during steam blow operation to quiet the steam blow noise to no greater than 100 dBA measured at a distance of 100 feet.

NOISE: Table 4 lists the predicted project noise levels at the nearest receptors in terms of background noise levels (L_{90}). The predicted noise levels include the applicant's proposed mitigation (see above).

NOISE: Table 4-Summary of Predicted Plant Operational Noise Levels

Receptor Sites	Noise Level, dBA			
	4-Hour Background Noise Level	Plant	Cumulative	Change
1 & 2	28-29	45	45	+16 to +17
G2	43-46	49	50 to 51	+5 to +7
5,6 &7	26-27	48	48	+21 to +22
9	28-31	48	48	+17 to +20
10	30-36	46	46	+10 to +16

Plant operational noise levels are predicted to exceed Fresno County's nighttime noise ordinance L_{50} standard of 45 dBA at residential sites 5, 6, 7, 9 and 10 (since plant noise is steady-state, the L_{50} statistical metric is the same as the L_{90}). Although county staff has concluded that their noise ordinance does not apply to noise sources originating in a city that impacts county residents, Energy Commission staff is of the opinion that 45 dBA is a reasonable and very common local noise compatibility criterion. Therefore, plant operational noise levels without additional mitigation will constitute a significant impact since they exceed local noise regulations.

At site G2 in the City of San Joaquin, plant operational noise levels would exceed background noise levels by +5 to +7 dBA. Since noise levels from the plant would exceed background noise levels by more than 5 dBA (during night No. 2), they will not be in compliance with the City's noise ordinance, and therefore will be significant unless they are mitigated. The City Attorney (San Joaquin 2002a) is of the opinion that the City's noise ordinance only should be used to abate noise nuisances, and that the standards of the noise ordinance (ambient plus 5 decibels) should not be used as siting criteria for the plant. Energy Commission staff is of the opinion that although the ordinance's primary function is a noise abatement tool, it is appropriate to use the standards of the ordinance as compatibility criteria to ensure the plant will not violate the ordinance provisions when it is in operation.

CEQA requires that noise impacts from a project be mitigated to a level of insignificance. In determining if a significant impact will likely occur, Energy Commission staff has followed state regulatory agency practice of assuming that a project that increases the existing noise level at a sensitive receptor by 5 dBA or more holds the potential to produce a significant adverse impact, and that further study is warranted in such situations. (Five dBA is considered to represent an increase in noise that is noticeable, but not necessarily annoying, to a majority of receptors.) An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of the situation. See **NOISE: APPENDIX A** for additional descriptions of the effects of noise on people.

A power plant operates as essentially a steady, continuous noise source, unlike the relatively random intermittent sounds that normally comprise a 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. When no traffic is driving by, no airplanes are flying overhead, no dogs are barking, no frogs are croaking, and no strong wind is blowing, what remains is background noise. This "background noise level" is commonly described by the L_{90} value, which is the noise level exceeded 90 percent of the time. In most cases, a power plant will operate around the clock for most of the year. The plant will thus contribute to, and often define, the background noise level.

In noisy urban/industrial environments, staff has traditionally utilized the lowest hourly L_{90} value as a basis for determining the threshold of noise impacts. In a quiet rural environment, this is not necessarily the most reliable measure. Under certain circumstances, it is common in the noise industry to average noise descriptors over some relevant period of time. For example, where traffic noise defines the background noise regime, it is common to average the noise measurements over some period of time, typically the nighttime hours.

Nighttime ambient noise levels in rural areas are typically lower than the daytime levels; differences in background noise levels of 5 to 10 dBA between day and night levels are common. Exceptions may occur when insects and frogs are active at night, and when winds blow far into the night. With this assumption, staff usually believes it both prudent and conservative to employ the lowest nighttime background noise level values as the

relevant noise regime. To reflect the fact that noise levels vary naturally over the quietest periods, staff does not assume that the single quietest hourly background noise level is the standard for determining potential impact. Rather, it is usual to calculate the average L_{90} value for the quietest period of the night, typically a period of four hours or more.

Staff also considers the potential for annoyance by plant noise at night when residents are trying to sleep. It is common in rural areas to find that ambient noise levels are lower in winter months than in summer months. However, in summer, residents are more likely to sleep with windows open, exposing them to higher plant noise levels inside the house than in the winter months, when windows are typically closed.

The projected cumulative power plant noise levels, after including the proposed noise mitigation measures, are in the range of 45 dBA to 48 dBA (see **NOISE: Table 4**). If constructed as proposed, the project's noise level at the nearest sensitive receptors will represent an increase of up to 22 dBA over the nighttime ambient background noise levels. Such increases in background noise levels will be clearly noticeable, and are liable to draw complaints. Energy Commission staff considers such an increase to be clearly significant.

The proposed Condition of Certification **NOISE-6** would require that noise levels produced by the plant operation not exceed the limits shown in **NOISE: Table 5**.

NOISE: Table 5-Conditioned Plant Operational Noise Levels and Resulting Ambient Noise Levels

Site	Noise Level, dBA			
	4-Hour Background Noise Level	Plant Noise Level, As Conditioned[1]	Cumulative	Resulting Increase in Ambient Noise Levels
1&2	28-29	38 or Less	38	+10
G2	43-46	47 or Less	49	+5
5,6&7	26-27	36 or Less	36	+10
9	28-31	38 or Less	38	+10
10	30-36	40 or Less	40	+10

[1]See Condition of Certification **NOISE-6**

NOISE: Table 5 shows that if operational plant noise levels are reduced to the values shown in the third column, the resulting background noise levels shown in column five would be increased by no more than 10 dBA, except at Site G2 which would increase by no more than 5 dBA. At Site G2, it is necessary to limit the increase in background noise levels to no more than 5 dBA to satisfy the City of San Joaquin's noise ordinance. At the remaining sites, which are in unincorporated Fresno County, an increase not exceeding 10 dBA is believed by staff to be an acceptable increase in background noise levels that satisfies the intent of CEQA. In addition, the resulting noise levels would satisfy Fresno County LORS.

In judging the significance of the proposed noise limits, staff considered the potential effects of the resulting noise levels. Staff recognizes that a noise level of 40 dBA would be considered quiet in many locations; application of 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 the text supporting the noise guidelines of the World Health Organization. The proposed noise limits shown by **Noise: Table 5** would result in an increase in noise no greater than 10 dBA at the nearby sensitive receptors, and the resulting noise levels in most cases would be 40 dBA or less. Therefore, in those cases, the noise impact would be less than significant (see proposed Condition of Certification **NOISE-6**). At Receptor G2, the proposed noise limit would ensure that the project would not cause an increase of more than 5 dBA, which would be less than significant, and the resulting noise level would be in compliance with LORS.

The following additional factors were considered in reaching this conclusion:

1. No unusual noise duration or frequency characteristics are predicted at the plant.

2. There will be a relatively small number of people affected by plant noise.

3. The land use designation in Fresno County is “Agricultural.” It is zoned “Exclusive Agriculture.”

4. There has been no concern about plant noise expressed by the public or other government agencies.

5. There have been no prior conflicting CEQA determinations by other agencies specific to this project.

The applicant has offered no additional noise mitigation other than what was proposed in its AFC, as described above. Staff believes, on the basis of Energy Commission experience with other power plants, that significant additional noise reduction can be achieved using a variety of measures, such as those listed below:

1. Specifying low-noise equipment such as pumps and electrical transformers.

2. Specifying quieter gas turbine inlet air mufflers.

3. Specifying noise attenuating vents on turbine generator enclosures.

4. Providing noise lagging on the HRSG transition ducts.

5. Equipping the cooling tower with low noise cooling fans incorporating additional fan blades or specially-designed “super low noise” fans combined with noise-reducing motor enclosures.

Energy Commission staff does not know whether it will be feasible to achieve the plant operational noise levels shown in **NOISE: Table 5** which are set as project conditions

in Condition of Certification **NOISE-6** for the SJVEC project. To determine feasibility, it will be necessary for the applicant to provide:

1. Identification of the significant noise sources in terms of the noise level contribution from each source as received at one or more critical sensitive receptors;
2. Specifics on the mitigation measures that could be applied to reduce project noise to a level of no significant adverse impact (i.e., no more than a 5 dBA increase);
3. The estimated noise level reductions achieved by these mitigation measures for the significant noise sources identified above;
4. Cost estimates for these mitigation measures;
5. A statement whether it is feasible (in the applicant's opinion) to mitigate to a level of insignificance; and if not,
6. The minimum level of increase in post-project noise levels that the applicant deems feasible.

Staff may then evaluate the applicant's response, considering, among other factors, mitigation measures that have been proven feasible in previously certified projects. If staff agrees with the applicant, staff will then support those mitigation measures deemed feasible. If staff disagrees with the applicant, staff will then recommend that further mitigation be required.

Depending on the situation and willingness of the receptors, staff may also consider mitigation measures applied to the houses to help ensure that normal indoor household activities would not be adversely affected by plant operation noise. In such cases, staff may consider 1) mitigating the project to a reasonable noise level, and 2) accepting an applicant's proposal to provide noise mitigation measures for all residences exposed to plant noise greater than the impact threshold noise level (normally a 5 dBA increase). Such mitigation can include enhanced insulation, acoustical windows, solid core doors, and/or air conditioning.

Tonal and Intermittent Noises

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant has stated that no strong tonal noises will be generated during the operation of the project.

The applicant has also stated that steam relief vents would be silenced to mitigate the intermittent noise from pressure relief valves. Although these noise sources are expected to be in compliance with the LORS, their noise effects may be significant in the context of the quiet ambient noise environment.

To ensure that no strong tonal noises are present and that intermittent noises are mitigated, Energy Commission staff has proposed a Condition of Certification **NOISE-6**, which requires the applicant to mitigate pure tones and the noise from steam relief valves.

Linear Facilities

The electrical output of the plant would be connected to the existing 230 kV transmission line about 1,500 feet south of the project site. Noise from the transmission lines includes a corona discharge hum, which is expected to be audible within 100 feet of the power lines. The nearest residences are located more than 100 feet from the transmission lines. The proposed 230 kV switchyard would be located on the project site, and would be at least 2,000 feet from the nearest residence. As a result of the large setbacks of the linear facilities from residences, no noise impacts will occur from the transmission facilities.

The water and natural gas pipelines would be inaudible during operation.

Worker Noise Impacts

The Applicant recognizes the need to protect plant operating and maintenance personnel from noise hazards, and commits to comply with applicable LORS. A measure to be implemented for noise-related impacts includes a Hearing Conservation Program. With proper execution of the Hearing Conservation Program, as well as the implementation of the measures described in proposed Condition of Certification **NOISE-7**, no occupational safety impacts are anticipated from operational noise.

CUMULATIVE IMPACTS

No other major new or proposed sources of noise were identified that might cause cumulative effects that could exceed the noise standards or criteria for this project. Staff concludes there are no cumulative noise impacts.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than 50 percent within a six-mile radius of the proposed SJVEC project (refer to **Figure 1** of the **Socioeconomics** portion of this document). If the project is constructed and operated as recommended by Energy Commission staff, there would be no significant adverse noise impacts, and therefore no environmental justice issues related to this project. Should the project be constructed and operated as proposed in the Application, however, significant unmitigated adverse noise impacts would occur, and it is possible that an environmental justice issue would exist.

PUBLIC AND AGENCY COMMENTS

No public or agency comments were received regarding noise issues for the SJVEC.

CONCLUSIONS AND RECOMMENDATIONS

If the project is constructed and operated as proposed in the Application, significant unmitigated adverse noise impacts will occur. Staff concludes that noise from the construction and operation of the proposed SJVEC will not significantly impact the public or environment if the proposed Conditions of Certification are implemented.

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 CPM a statement, signed by the 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:

1. Use the Noise Complaint Resolution Form (below), or functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
2. Attempt to contact the person(s) making the noise complaint within 24 hours;
3. Conduct an investigation to determine the source of noise related to the complaint;
4. If the noise is project related, take all feasible measures to reduce the noise at its source; and
5. 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 5 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.

STEAM BLOW MANAGEMENT

NOISE-4 If a traditional, high-pressure steam blow process is employed, the project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 89 dBA measured at a distance of 50 feet and no greater than 59 dBA at any noise-sensitive receptor. The project owner shall conduct steam blows only during the hours of 6 a.m. to 6 p.m., unless the CPM agrees to longer hours based on a demonstration by the project owner that offsite noise impacts will not cause annoyance.

If a low-pressure continuous steam blow or air blow process is employed, the project owner shall submit a description of this process, with expected noise levels and projected hours of execution, to the CPM, who shall review the proposal with the objective of ensuring that the resulting noise levels will not exceed the LORS night-time noise standard), and will not exceed the average night-time hourly L_{90} value by more than 10 dBA. If the low-pressure process is approved by the CPM, the project owner shall implement it in accordance with the requirements of the CPM.

Verification: At least 15 days prior to the first high-pressure steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer and the noise levels expected, and a description of the steam blow schedule.

At least 15 days prior to any low-pressure continuous steam blow, the project owner shall submit to the CPM drawings or other information describing the process, including the noise levels expected and the projected time schedule for execution of the process.

STEAM BLOW NOTIFICATION

NOISE-5 Prior to the first high-pressure steam blow(s), the project owner shall notify all residents or business owners within one mile of the site of the planned steam blow activity, and shall make the notification available to other area residents in an appropriate manner.

The notification may be in the form of letters to the area residences, telephone calls, fliers or other effective means. The notification shall include a description of the purpose and nature of the steam blow(s), the proposed schedule, the expected sound levels, and the explanation that it is a one-time operation and not a part of normal plant operations.

Verification: Project owner shall notify residents and businesses at least 15 days prior to the first high-pressure steam blow(s). Within five days of notifying these entities, the project owner shall send a letter to the CPM

confirming that they have been notified of the planned steam blow activities, including a description of the method(s) of that notification.

NOISE RESTRICTIONS

NOISE-6 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that noise due to operation of the project will not exceed the values shown below:

Site	Noise Level, dBA
1&2	38 or Less
G2	47 or Less
5,6&7	36 or Less
9	38 or Less
10	40 or Less

No new pure-tone components may be 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.

1. Within 30 days of the project achieving a sustained output of 80 percent or greater of rated generating capacity, the project owner shall conduct short-term survey noise measurements at monitoring sites 1, 3, 5, 9 and 10. The short-term noise measurements shall be conducted during both daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods. In addition, the applicant shall conduct a 25-hour community noise survey at monitoring site 5. The survey during power plant operations shall also include measurement of one-third octave band sound pressure levels at each of the above locations to ensure that no new pure-tone noise components have been introduced.
2. If the results from the pre-construction and operational noise surveys indicate that the noise level (L90) due to power plant noise exceeds the noise limits shown above mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.
3. If the results from the pre-construction and operational noise surveys indicate that pure-tones are present, mitigation measures shall be implemented to eliminate the pure-tones.

Verification: Within 15 days after completing the post-construction survey, the project owner shall submit a summary report of the survey to the City of San Joaquin, Fresno County, and to the CPM. Included in the post-construction survey 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. When these measures are in place, the project owner shall repeat the operational noise survey.

Within 15 days of completion of the new survey, 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-7 Following the project first achieving a sustained output of 80 percent or greater of rated generating 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-8 Heavy equipment operation and noisy construction work shall be restricted to the times of day delineated below:

Monday-Saturday	6 a.m. to 6 p.m.

Noise due to start-up steam blows shall be restricted to the times of day delineated below:

Monday-Saturday	6 a.m. to 6 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.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

SJVEC Project
(01-AFC-22)

NOISE COMPLAINT LOG NUMBER _____

Complainant's name and address:

Phone number: _____

Date complaint received: _____
Time complaint received: _____

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

Initial noise levels at 3 feet from noise source _____ dBA Date: _____

Initial noise levels at complainant's property: _____ dBA Date: _____

Final noise levels at 3 feet from noise source: _____ dBA Date: _____

Final noise levels at complainant's property: _____ dBA Date: _____

Description of corrective measures taken:

Complainant's signature: _____ Date: _____

Approximate installed cost of corrective measures: $ _____
Date installation completed: _____
Date first letter sent to complainant: _____ (copy attached)
Date final letter sent to complainant: _____ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

REFERENCES

Barnes et al. (Barnes, J.D., L.N. Miller, and E.W. Wood). 1976. Prediction of Noise from Power Plant Construction. Bolt Beranek and Newman, Inc., Cambridge, Massachusetts. Prepared for Empire State Electric Energy Research Corporation, Schenectady, New York.

FTA (Federal Transit Administration). Transit Noise and Vibration Impact Assessment, PB96-172135, April 1995.

Fresno (Fresno County). Telephone conversation between Bill Thiessen of California Energy Commission staff and Sheri Clark of Fresno County Environmental Health Department re: Applicability of Fresno County Noise Ordinance to SJVEC project, February 25, 2002.

Office of Planning and Research. State of California General Plan Guidelines. June 1990.

San Joaquin (City of San Joaquin). 1996. Comprehensive General Plan and EIR.

San Joaquin (City of San Joaquin). 2001. San Joaquin Municipal Code.

San Joaquin (City of San Joaquin). 2002 x. Memo from Mark A. Blum, City Attorney to Shahid Hami, City Manager re: Inapplicability of Noise Ordinance to Proposed Calpine Energy Center, March 7, 2002.

SJVEC (San Joaquin Valley Energy Center) 2001 a. Application for Certification for the San Joaquin Valley Energy Center (01-AFC-22). Docketed October 31, 2001.

NOISE: APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

Noise levels can be measured in a number of ways. One common measurement, the equivalent sound level (L_{eq}), is the long-term A-weighted sound level that is equal to the level of a steady-state condition having the same energy as the time-varying noise, for a given situation and time period. (See NOISE: Table A1, below.) A day-night (L_{dn}) sound level measurement is similar to L_{eq}, but has a 10 dB weighting added to the night portion of the noise because noise during night time hours is considered more annoying than the same noise during the day.

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, dB	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 4.77 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 Average Sound Level, DNL or L_{dn}	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.
Source: California Department of Health Services 1976.	

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 dBA levels.

NOISE: Table A2
Typical Environmental and Industry Sound Levels

Source and Given Distance from that Source	A-Weighted Sound Level in Decibels (dBA)	Comparable Environmental Noise	Subjectivity/ Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		
Very Loud Music	110	Rock Music Concert	Very Loud
Pile Driver (50')	100		Very Loud
Ambulance Siren (100')	90	Boiler Room	Very Loud
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	Quiet
Large Transformer (200')	40		
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
Source: Peterson and Gross 1974			

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 (Kryter 1970) can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.
2. Outside of the laboratory, a 3-dB change is considered a barely noticeable difference.
3. A change in level of at least five dB is required before any noticeable change in community response would be expected.
4. A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

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: Thumann, Table 2.3

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: OSHA Regulation

Relationships

$L_{dn} = 10 \log (1/24)[15x10^{(Ld/10)} + 9x10^{(Ln+10)/10}]$

Note: the 10-dB weighting added to the nighttime noise level. Daytime and nighttime are 15 hours (0700~2200 hrs) and 9 hours (2200~0700 hrs) respectively. L_d and L_n are the L_{eq} values over the 15 and 9 hours respectively. L_{dn} does not contain any consideration for tonal sounds, since it is derived from L_{eq} measurements.

CNEL is essentially the same as L_{dn}, except that different time segments are used in computation. The 24-hour period is divided into three segments instead of two. The day period (0700~1900 hours), evening (1900~2200 hours) and night (2200~0700 hours). The evening period is assigned 5-dB weighting and the nighttime is assigned 10-dB weighting. The extra 5 dB weighting during the evening results in higher values for CNEL that L_{dn}, but the difference is not statistically significant.

Noise Attenuation

$[L_p]$ (at x = r) = $[L_p]$(at r = y) – 20log(x/y).

Where: x = distance to point where noise level is to be determined.
y = reference point.

$\Delta_{Loss} = 20\log (x/y)$.

Special case where x = 2y
$\Delta_{Loss} = 20\log (2y/y) = 20\log (2) = 6$

Therefore, as we double the distance, from a point source in free space, the noise level decreases by 6 dB.

PUBLIC HEALTH

Testimony of Alvin J. Greenberg, Ph.D.

INTRODUCTION

The purpose of staff's public health analysis is to determine if toxic emissions from the proposed San Joaquin Valley Energy Center (SJVEC) have 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.

Staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section (please see **Public Health** Attachment A for a discussion of the health effects of criteria 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 that could be released from the project in wastewater streams are discussed in the **Soils and Water Resources** section. (Although this facility will be equipped with a Zero Liquid Discharge system that reduces discharges, some discharge of non-hazardous liquid wastes would occur.) Plant releases in the form of hazardous and non-hazardous wastes are described in the **Waste Management** section.

METHOD OF ANALYSIS

Public health staff is concerned about 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 (skin) contact, or ingestion via contaminated food or water.

Air pollutants for which no air quality standards have been set are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a 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:

1. Identify the types and amounts of hazardous substances that the SJVEC project could emit to the environment;
2. Estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
3. Estimate amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact; and

4. 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 a power plant will be much lower than the risks that are 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 that predicts the greatest plausible impacts;
- Calculating health risks at the location where the pollutant concentrations are calculated to be the highest;
- Using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses); and
- Assuming that an individual's exposure to cancer-causing agents occurs for 70 years.

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from noninhalation pathways of exposure (see CAPCOA 1993, Table III-5). 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 (CAPCOA 1993, p. III-19).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer effects, and cancer risk (also long-term). Acute health effects result from short-term (1-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature, and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those that arise as a result of long term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from 10 to 100 percent of a lifetime (from 7 to 70 years). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called "reference exposure levels" or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (CAPCOA 1993, p. III-36). 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 California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (CAPCOA 1993, p. III-37). In those cases where the actions may be synergistic (where the effects are greater than the sum), this approach may underestimate the health impact (Id).

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 calculated risk is not meant to predict the actual expected incidence of cancer, but rather is a theoretical upper-bound number based on worst-case assumptions. In reality, the risk is generally too small to actually be measured. For example, the 1 in one million risk level represents a one in one million increase in the normal risk of developing cancer over a lifetime, at whatever location is estimated to have the worst-case risk.

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 lower or even considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions would be performed to obtain a more accurate assessment of potential public health risks.

SIGNIFICANCE CRITERIA

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) noncancer 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 Noncancer 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 that has the same type of health effect is added to yield a total hazard index. The total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than 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, § 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.

The significant risk level of ten in one million is consistent with the level of significance adopted by the SCAQMD pursuant to Health and Safety Code § 44362(b), which requires notification of nearby residents when an air district determines there is a significant health risk from a facility. In addition, the SCAQMD Risk Management Policy states that a project with an incremental cancer risk of between one and ten in a million is acceptable if best available control technology has been applied to reduce risk. In general, SCAQMD would not approve a project with a cancer risk exceeding ten in one million.

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. 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.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following federal, state, and local LORS generally apply to the protection of public health. These provisions have established the basis for Energy Commission staff's determination regarding the significance and acceptability of project-related impacts on public health.

FEDERAL

Clean Air Act section 112 (42 U.S. Code section 7412)

Section 112 requires new sources that emit more than 10 tons per year of any specified hazardous air pollutant (HAP), or more than 25 tons per year of any combination of HAPs, to apply Maximum Achievable Control Technology (MACT).

STATE

California Health and Safety Code sections 39650 et seq.

These sections require the Air Resources Board 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 section 41700

This section states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

LOCAL

San Joaquin Valley Air Quality Management District Rule 2201

This Rule governs new sources of emissions. All power plant owners within the District's jurisdiction are required to secure a Determination of Compliance from the District prior to commencing construction, as well as demonstrate continued compliance with regulatory limits when the project becomes operational. The pre-construction review includes demonstrating that the project will use best available control technology (BACT) and will provide any necessary emission offsets.

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 impact include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

The proposed site is located in the San Joaquin Valley, on approximately 25-acres of land near the southeast corner of an 85-acre parcel of land available in an industrial area in the southeast portion of the City of San Joaquin, in Fresno County, California. The site is bounded by S. Colorado, S. Colusa and W. Springfield Avenues. The topography of the site vicinity is level, at an elevation of approximately 170 feet above mean sea level. The terrain is flat on all sides of the site. The foothills of the Coast Range lie approximately 20 miles southwest of the project site. Most of the site is used to grow cotton. Urbanized uses are generally located to the north and west 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 nearest sensitive receptors is the San Joaquin Elementary School located about 1.0 mile north of the project site. There are also a few residences in the vicinity of the site.

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air, as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

The climate of the San Joaquin Valley is influenced by the mountains on three sides and the semi-permanent Pacific High pressure system over the eastern Pacific Ocean. The Great Basin high pressure system to the east also affects the Valley, primarily during the winter months. During the summer, the pressure system moves northward and dominates the regional climate, producing persistent temperature inversions and a predominantly southwesterly wind field. During this period, inversions become strong, winds are light, and the pollution potential is high. Clear skies, high temperatures, and low humidity characterize this season (Calpine 2001a AFC p. 8.1-2). The winter is characterized by rain and gusty winds, clear weather that can occur after a storm, or persistent fog caused by temperature inversion. About 70 percent of the region's annual rainfall (approximately 7 inches) occurs between December and March. During

this time, inversions are weak, winds often moderate, and the potential for air pollution is low.

Wind patterns at the project site show a fairly consistent diurnal cycle associated with a modified sea breeze passing through the San Joaquin/Sacramento Delta into the San Joaquin Valley, occasional occurrence of high wind speeds and a predominant wind direction of north through west-northwest (Calpine 2001a AFC p. 8.1-2, and Figures 8.1-5a through 5e).

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents more detailed meteorological data.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the San Joaquin Valley Air Quality Management District (District), which includes all or portions of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and Kern counties.

Background cancer risk due to toxic air contaminants emitted from all sources (stationary and mobile) has not been specifically determined for the area surrounding the town of San Joaquin. However, the California Air Resources Board (CARB) has monitoring stations in Modesto and Fresno. The CARB toxic air monitoring station on First Street in Fresno reported a year 2000 background cancer risk of 225 in one million (CARB 2001). The pollutants 1,3-butadiene and benzene, emitted primarily from mobile sources, were the two highest contributors to risk and together accounted for over half of the total. The risk from 1,3-butadiene was about 73 in one million, while the risk from benzene was about 68 in one million. Formaldehyde accounts for about 12 percent of the ambient cancer risk determined for Fresno, with a risk of about 26 in one million.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxics and associated cancer risk during the past few years. For example, at the Fresno monitoring station, cancer risk was 497 in one million based on 1991 data and 314 in one million based on 1995 data.

SITE CONTAMINATION

Site disturbance occurs 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.

A Phase I Environmental Site Assessment (ESA) was conducted by Environmental Resourced Management (ERM), in accordance with methods prescribed by the American Society for Testing and Materials (ASTM). This report is included in Appendix 8.13A of the AFC. Also, limited soil sampling and analysis was conducted at the site in

response to a data request from staff. The results of the ESA and the sampling and analysis are summarized in staff's **Waste Management** section. Based on the results of the sampling and analysis, staff found that a potential risk might exist to workers and/or the off-site public from soils containing arsenic and/or pesticides. Staff recommended that either the applicant conduct more thorough sampling and analysis to demonstrate that the risk is insignificant or implement additional mitigation measures proposed by staff.

IMPACTS

PROJECT SPECIFIC IMPACTS

Potential risks to public health may occur during project construction and operation.

Construction Impacts

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 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.

As described in the **Waste Management** section, a Phase I Environmental Site Assessment (ESA) was performed for the San Joaquin Valley Energy Center site. Based on the results of the Phase I ESA, further investigation was warranted and sampling and analysis was conducted pursuant to a staff data request (see discussion of **Site Contamination**, above).

The operation of construction equipment creates 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. EPA as hazardous air pollutants and by the Air Resources Board (ARB) as toxic air contaminants. Because of the many constituents in diesel exhaust as well as evidence that the particles themselves may have intrinsic toxic and carcinogenic properties, many researchers have used the particles to quantify exposure to whole diesel exhaust.

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 on Toxic Air Contaminants (SRP) 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 did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, the ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of the SJVEC is anticipated to take place over a period of 22-28 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 7 to 70 years.

The applicant's AFC Appendix 8.1D presents emissions from construction activities. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Worst-case daily exhaust emissions of 10.0 lb/day PM_{10} from construction equipment and 54.9 lb/day PM_{10} from fugitive dust are predicted during the first 16 months of onsite construction (AFC Table 8.1D-1). Worst-case daily exhaust emissions of 15.0 lb/day PM_{10} from construction equipment and 19.5 lb/day PM_{10} from fugitive dust are predicted during the rest of onsite construction (AFC Table 8.1D-2). These emission levels were used in the applicant's modeling to determine the construction impacts on short-term ambient standards (24 hours or less).

In order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, **Air Quality** staff recommends the use of ultra low sulfur diesel fuel or the installation of soot filters on stationary 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

Emissions Sources

The emissions sources at the proposed SJVEC project include three natural gas-fired combustion turbines, three heat recovery steam generators equipped with supplementary duct burners, a condensing steam turbine, one auxiliary boiler and a cooling tower. During operation, potential public health risks are related to natural gas combustion emissions from the gas turbines and duct burners, and non-combustion emissions from the cooling tower.

Table 8.6-3 of the AFC lists toxic air contaminants that may be emitted from SJVEC. Anticipated amounts or emission rates emitted from each gas turbine are presented in table 8.1-16 of the AFC. Turbine emission rates, with duct burners and power augmentation, are presented in Table 8.1-17. Table 8.1-18 lists emission rates for auxiliary boiler emissions. Emissions were estimated using emission factors approved by the California Air Resources Board (CARB) and the U.S. Environmental Protection

Agency (USEPA). Table 8.6-4 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include reference exposure levels, which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the CAPCOA Guidelines (CAPCOA 1993).

PUBLIC HEALTH Table 1 lists combustion-related 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) noncancer health effects, but not acute (short-term) effects.

PUBLIC HEALTH Table 1
Types of Health Impacts and Exposure Routes
Attributed to Combustion-Related Toxic Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Acetaldehyde			✓	✓	
Acrolein				✓	✓
Ammonia				✓	✓
Arsenic	✓	✓	✓	✓	
Benzene			✓	✓	✓
1,3-Butadiene			✓	✓	
Cadmium		✓	✓	✓	
Chromium VI			✓	✓	
Copper					✓
Ethylbenzene				✓	
Formaldehyde			✓	✓	✓
Hexane				✓	
Lead	✓	✓	✓		
Mercury		✓		✓	✓
Napthalene				✓	
Nickel			✓	✓	✓
PAHs	✓		✓		
Propylene				✓	
Propylene oxide			✓	✓	✓
Toluene				✓	✓
Xylene				✓	✓
Zinc				✓	

Source: AFC Table 8.6-4 using reference exposure levels and cancer unit risks from CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993

Toxic air contaminant emissions from the cooling tower originate from contaminants in the cooling source water that become entrained in liquid water droplets emitted as cooling tower drift. SJVEC has proposed using reclaimed water from the Fresno-Clovis WWTF as the source for the facility's evaporative cooling tower. AFC Appendix 8.1C Table 8.1C-3 lists constituents potentially emitted from the cooling tower. Emission rates are also presented. **PUBLIC HEALTH Table 2** lists these substances and shows how each contributes to the health risk analysis.

PUBLIC HEALTH Table 2
Types of Health Impacts and Exposure Routes
Attributed to Cooling Tower Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Chronic Noncancer	Acute Noncancer
Ammonia				✓	✓
Aluminum				✓	
Arsenic			✓	✓	✓
Cadmium			✓	✓	
Chromium			✓	✓	
Copper				✓	✓
Cyanide				✓	✓
Lead			✓	✓	
Mercury				✓	✓
Nickel			✓	✓	✓
Silver				✓	
Zinc				✓	

Source: AFC Table 8.1C-3 using reference exposure levels and cancer unit risks from CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993

In addition to the substances identified in **PUBLIC HEALTH Table 2**, there has been public concern that viruses and bacteria could remain in treated wastewater, and that they could be released to the atmosphere in the cooling tower drift at levels that could affect public health.

The California Department of Health Services (DHS) is proposing to regulate the use of recycled water in cooling towers under Title 22 of the California Code of Regulations (proposed section 60306). When recycled water is used in a cooling tower that creates a mist, the regulations would require the following:

- The recycled water used must be disinfected tertiary recycled water (DTRW).
- A drift eliminator shall be used whenever the cooling system is in operation.
- Chlorine, or other biocide, shall be used to treat the recirculating water to minimize the growth of *Legionella* and other micro-organisms.

Cooling Water Treatment

Reclaimed water supplied by the Fresno-Clovis WWTF operated by the City of Fresno and Fresno Irrigation District (FID) would be used as the source for the facility's evaporative cooling tower. The reclaimed water would be hyperchlorinated prior to direct use as cooling tower makeup.

The proposed regulations define DTRW as a filtered and subsequently disinfected wastewater and specify the degree of disinfection required or the final allowable concentrations of pathogens (e.g., 99.999 percent reduction of virus and mean concentration of coliform bacteria not exceeding 2.2 per 100 milliliters) (section 60301.230). Water meeting these standards is also allowed by the proposed regulations to be used for irrigating food crops, parks and playgrounds, school yards, and residential landscaping.

As noted above, the source for SJVEC cooling water would be reclaimed water from the Fresno-Clovis WWTF. Several studies have examined and confirmed the effectiveness of treatment processes conforming to Title 22 requirements in reducing pathogens to safe levels. The Monterey Wastewater Reclamation Study for Agriculture (spanning 11 years from planning and design in 1975 to final project reporting in 1986) examined the safety of irrigating raw-eaten vegetables with recycled water (Sheikh, et al. 1998a). That study found that aerosols generated from sprinkler irrigation did not contain microorganisms of wastewater origin (Sheikh, et al. 1998a, p. 802). Further, during the five-year period of field studies, no in situ viruses were recovered from the treated effluent comprising 114 samples with a volume of over 186,000 liters (Sheikh, et al. 1998a, p. 803).

A follow-up to the Monterey study was conducted in 1997 to determine if additional water-borne pathogens capable of producing gastrointestinal diseases were present in recycled water (Sheikh, et al. 1998b). This more recent study did not detect any of the bacteria *Salmonella*, *Cyclospora*, *E. coli*, or *Legionella*; or the protozoans *Giardia* or *Cryptosporidium* in the recycled water (Sheikh, et al. 1998b, Table 4, p. 6).

As noted above, water from the Fresno-Clovis WWTF is disinfected using chlorine to reduce pathogenic organisms. Additional routine water treatment at SJVEC is required during use to minimize bacterial growth, corrosion, and formation of mineral scale. The SJVEC intends to employ a chemical feed system to supply sodium hypochlorite, a proprietary biocide to reduce virus levels (Calpine 2001, AFC Section 7). Such routine water treatment also serves to minimize the growth of pathogenic organisms such as *Legionella* bacteria

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a "worst case" analysis. Maximum hourly emissions are required to calculate acute (one hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

Maximum fuel use is combined with emission factors for each toxic air contaminant to estimate hourly and maximum annual stack emissions (which come from both the turbines and the HRSGs) (AFC Tables 8.1-17 and 8.1-18). Emission factors are estimated from the amounts of toxic substances released per unit of fuel burned and were obtained using emission factors approved by CARB and USEPA.

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. Turbine and Cooling Tower toxic air contaminant emissions used in dispersion modeling are presented in AFC Appendix 8.1C-1. The screening air dispersion modeling analysis was performed using the USEPA approved ISCST3 dispersion modeling program (please see staff's **Air Quality** section for a detailed discussion of the modeling methodology). Finally, ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects that might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and ingestion of mother's milk.

The above method of assessing health effects is consistent with the CAPCOA Air Toxics "Hot Spot" Program Revised 1992 Risk Assessment Guidelines (October 1993) referred to earlier, and results in the following health risk estimates.

Noncancer Hazard

Construction

AFC Appendix 8.1D presents exhaust emissions from construction activities. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Worst-case daily exhaust emissions of 15.0 lb/day PM_{10} from construction equipment and 54.9 lb/day PM_{10} from fugitive dust are predicted during the first 16 months of onsite construction (AFC Table 8.1D-1). Modeling construction activities, which are assumed to occur for eight hours per day, gives an average 24-hour maximum concentration of 118 $\mu g/m^3$ (AFC Appendix D Table 8.1D-6).

As noted earlier, the air dispersion modeling and assumptions that form the basis of screening risk analysis are designed to overestimate public health impacts, and actual risks are likely to be much lower than those calculated. Staff agrees with the conclusion that the maximum modeled annual average concentration of 4.05 $\mu g/m^3$ at the point of maximum impact is above the 10 in one million level considered to be significant under the San Joaquin Valley APCD's CEQA guidelines (AFC Appendix D.1). Therefore, staff recommends the installation of soot filters on stationary diesel equipment during construction. These 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 in the range of approximately 85-92 percent. Such filters would reduce diesel emissions during construction and further reduce any potential for health impacts.

Operation

The point of maximum offsite impact for cancer risk was located about 0.5 miles south of the project site, and noncancer chronic hazard index was located a few feet south of the project fence-line. Risks and hazards were estimated by the applicant for all four sources of toxic air contaminants:

	Risk (in one million)	Chronic HI
• Turbine (generator) and HRSG stack	0.04	0.007
• Auxiliary boiler	0.0015	0.002
• Cooling tower	0.0091	0.001
• Diesel fire-water pump	0.15	0.0008
• Emergency generator	0.0082	0.003
Maximum from all sources	0.21*	0.009*

*Maximum does not correspond to the sum of the individual risk and hazard from the five sources because the location of the maximum risk and hazard from each source is different.

The screening health risk assessment for the project, including combustion and noncombustion emissions, resulted in a maximum acute hazard index of 0.35 at the maximum impact location.

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.

PUBLIC HEALTH Table 3
Operation Hazard/Risk

Type of Hazard/Risk	Hazard Index/Risk	Significance Level
ACUTE NONCANCER	0.35	1.0
CHRONIC NONCANCER	0.009	1.0
INDIVIDUAL CANCER	0.21 in one million	10.0×10^{-6}

Source: AFC Table 8.1-33.

As shown in **PUBLIC HEALTH Table 3**, total worst-case individual cancer risk is estimated to be 0.21 in one million. As discussed earlier, this is the risk at the location where long-term pollutant concentrations are calculated to be the highest, and is at the same location as the maximum chronic hazard, about 0.5 miles southeast of the proposed site. Total chronic Hazard Index and acute Hazard Index are both well below the level of significance (much less than 1.0).

Staff conducted an independent calculation of the estimated risk and hazard due to emissions from the two major sources: the stack and the cooling towers. Staff used the most recent Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA) toxicity values. The results were essentially the same with only minor differences found due to the recent updating of toxicity values by OEHHA in December 2001 (which was

after the HRA was prepared for the AFC). Therefore, staff has verified that the calculations conducted by the applicant are accurate.

CUMULATIVE IMPACTS

The maximum cancer risk for the SJVEC facility is 0.21 in one million, about 0.5 miles south of the proposed site.

In comparison, the CARB toxic air monitoring station on First Street in Fresno reported a year 2000 background cancer risk of 225 in one million (CARB 2001). And in the Los Angeles area, the SCAQMD estimated the average lifetime cancer risk for inhalation of ambient air to be 1,400 in one million based on 1998-1999 ambient average toxic concentration data (SCAQMD 2000).

The worst-case long-term health impact from SJVEC (0.009 hazard index) is well below the significance level of 1.0 at the location of maximum impact. At this level, staff does not expect any significant cumulative health impacts. As with cancer risk, long-term hazard would be lower at all other locations, and cumulative impacts at other locations would also be less than significant.

Even in the unlikely event that worst-case emissions from an existing facility were to coincide both geographically and temporally with SJVEC emissions at the location of maximum impact, the overall long-term health outlook would not change for anyone. Thus, the SJVEC project will not result in any significant cumulative cancer or chronic noncancer health impacts.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is approximately 63 percent within a six-mile radius of the proposed SJVEC, and Census 1990 information that shows the minority/low income population is approximately 29 percent within the same radius. Since staff has concluded that there would be no significant direct or cumulative public health-related impacts resulting from construction and operation of the proposed facility, there will also be no significant impact to any minority populations that are identified. Therefore, there are no environmental justice issues.

MITIGATION

Excavation at the site could disturb contaminated soil that may require mitigation measures to prevent potential public health impacts. Staff has proposed adoption of a condition of certification in the **Waste Management** section that requires the project owner to have an environmental professional on site to inspect locations where potentially contaminated soil is found, determine the need for future action, and potentially contact appropriate agencies for possible oversight.

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

FACILITY CLOSURE

As noted in the introduction to this section, the scope of staff's public health analysis is limited to routine releases of harmful substances to the environment. During either temporary or permanent facility closure, the major concern would be from accidental or nonroutine releases from either hazardous materials or wastes that may be onsite. These are discussed in the sections on **Hazardous Materials** and **Waste Management**, respectively. During temporary closure (periods greater than those required for normal maintenance), it is unlikely that there would be any routine releases of harmful substances to the environment, since the facility would not be operating. For permanent closure, the only routine emissions would be related to facility dismantling, such as exhaust from heavy equipment or fugitive dust emissions. These would be subject to closure conditions adopted by the Energy Commission once a closure plan is received from the project owner.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

None received.

CONCLUSIONS AND RECOMMENDATIONS

Staff has analyzed potential public health risks associated with construction and operation of the SJVEC project. As noted, staff does not expect there to be any significant adverse cancer, or short- or long-term noncancer health effects from project emissions.

REFERENCES

Calpine 2001a. Application for Certification for San Joaquin Valley Energy Center (01-AFC-22), Dated October, 2001.

Calpine 2002a. Revised Screening Health Risk Assessment Files. March 2002

CAPCOA 1993. California Air Pollution Control Officers Association. CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines. Prepared by the Toxics Committee. October.

Chen et al. 1998. Chen, C., Kuo, J. and Stahl, J.F. The Role of Filtration for Wastewater Reuse. In: Asano, ed. Wastewater Reclamation and Reuse. Lancaster, PA: Technomic Publishing, Inc., 1998: 219-260.

FDA 1985. United States Food and Drug Administration. Federal Register. Vol. 50, No. 243. December 18.

Sheikh et al. 1998a. Sheikh, B., Cort, R., Cooper, R.C., Jaques, R. S. Tertiary-Treated Reclaimed Water for Irrigation of Raw-Eaten Vegetables. In: Asano, ed. Wastewater Reclamation and Reuse. Lancaster, PA: Technomic Publishing, Inc., 1998: 779-823.

Sheikh et al. 1998b. Sheikh, B., Cooper, R.C., Danielson, R. Recycled Water Food Safety Study for Monterey County Water Recycling Projects. Sponsored by Monterey County Water Resources Agency and Monterey Regional Water Pollution Control Agency. August.

SRP. 1998. Scientific Review Panel on Toxic Air Contaminants. Findings of the Scientific Review Panel on The Report On Diesel Exhaust as adopted at the Panel's April 22, 1998 Meeting.

Travis, et al. 1987. Travis, C.C.; Richter, S.A.; Crouch, E.A.C.; Klema, E.D.; Cancer Risk Management. Environ. Sci. Technol. 21:415-420.

ATTACHMENT A - CRITERIA POLLUTANTS

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 that 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 that 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 USEPA's proposed ozone rule lists health effects that result from short-term (one to three hours) and prolonged (six to eight hours) exposure to ozone (61 Fed. Reg. 65719). However, a 1999 federal court ruling blocked implementation of the ozone 8-hour standard. EPA has asked the U.S. Supreme Court to reconsider that decision.

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 population at greatest risk of acute effects from ozone exposures is 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 that is a product of inefficient combustion. It does not persist in the atmosphere because it 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, 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 (Cal. Code Regs., tit. 17, . 70200).

PARTICULATE MATTER (PM)

Particulate matter is a generic term for particles of various substances that occur as either liquid droplets or small solids over a wide range of sizes. Particles having the most potential to adversely affect human health are those less than 10 micrometers (millionths of a meter) in diameter (PM_{10}) that may be inhaled and deposited into the deep portions of the lung. 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 may be the result of physical and chemical transformation of gaseous emissions such as sulfur oxides, nitrogen oxides, and volatile organic compounds. PM_{10} includes elements such as carbon, lead, and nickel; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and soil. The size, chemical composition, and concentration of ambient PM_{10} can vary considerably from area to area and from season to season within the same area.

PM_{10} 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 having a diameter of 2.5 micrometers or less ($PM_{2.5}$), while the coarse-mode fraction of PM consists of particles ranging from 10 micrometers down to 2.5 micrometers in diameter ($PM_{10-2.5}$). $PM_{2.5}$ is derived both from combustion by-products that have volatilized and condensed to form primary $PM_{2.5}$ and from

precursor gases reacting in the atmosphere to form secondary $PM_{2.5}$. Fine particles include nitrates, organic compounds, sulfates, ammonium, and trace elements (including metals) as well as elemental carbon such as soot. Major sources of fine particles 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 and such particles may have long lifetimes in the atmosphere (days to weeks) 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 in raindrops.

Coarse-mode $PM_{10-2.5}$ is formed by crushing, grinding, and abrasion of surfaces, which break large pieces of materials into 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 short distances (less than tens of kilometers). They tend to be unevenly distributed across urban areas and have more localized effects than fine particles.

Because PM_{10} includes many different types of particles with widely divergent chemical characteristics, potential health effects depend upon the constituent make-up of PM_{10} to which persons may be exposed.

The size of the particles inhaled determines where they are deposited in the respiratory system. Coarse particles are deposited most often in the nose and throat. Fine particles are deposited most often in the bronchial tubes and in the air sacs of the lungs, with the greatest percentage being deposited in the air sacs. Particles deposited in the air sacs are removed more slowly by the body than particles in either the nose and throat or the bronchial tubes. Because of the longer residence time, they have a greater opportunity to cause adverse health effects.

Many epidemiological studies have shown that exposure to particulate matter is associated with a variety of health effects, including premature mortality, aggravation of respiratory and cardiovascular disease, changes in lung function and increased respiratory symptoms, changes to lung tissues and structure, and altered respiratory defense mechanisms. Based on their review of a number of epidemiological studies published after 1987 when the federal standards were last revised, the USEPA concluded that then-current standards were not sufficiently stringent to prevent the occurrence of adverse public health effects. Therefore, federal PM standards were revised on July 18, 1997 (62 Fed. Reg. 38652) by adding new annual and 24-hour $PM_{2.5}$ standards to the existing annual and 24-hour PM_{10} standards. (These standards will soon be implemented now that the US Supreme Court has upheld the EPA's authority to enact these tougher standards.) The USEPA's review concluded that fine particles were a better surrogate for those components of PM most likely linked to mortality and morbidity effects at levels below the previous standards, while high concentrations of coarse fraction particles are linked to effects such as aggravation of asthma. Taken together, the new standards are meant to provide increased protection against a wide range of PM-related health effects, including: premature mortality and increased hospital admissions and emergency room visits, primarily in the elderly and individuals with cardiopulmonary disease; increased respiratory symptoms and disease

in children and individuals with cardiopulmonary disease such as asthma; decreased lung function, particularly in children and individuals with asthma; and alterations in lung tissue and structure and in respiratory tract defense mechanisms.

California has 24-hour and annual standards for PM_{10} only, which are based on studies that describe the lowest probable effects levels and represent the lowest pollution levels at which health effects were investigated (CARB 1982, pp. 81,84). The studies included investigations of increased rates of asthma attack, increased mortality, and changes in the health status of bronchitis patients.

California's 24-hour PM_{10} standard is intended to prevent exacerbation of symptoms in sensitive patients with respiratory disease, declines in pulmonary function (especially in children), and excess mortality from short-term exposure (Cal. Code Regs., tit. 17, 70200). The standard is intended to provide a small margin of safety to account for the possibility of effects occurring at lower levels (CARB 1982, p. 84). The state 24-hour PM_{10} standard was set to be more stringent than the national 24 hour PM_{10} standard. At the time of CARB's adoption of the state standard, the USEPA had not set federal 24-hour $PM_{2.5}$ standards, and CARB found that the federal standard did not adequately protect public health (CARB 1991, p. 26).

The annual standard is based on studies showing that long-term exposure to PM_{10} causes decreased breathing capability and increased respiratory illness in susceptible populations such as children (CARB 1991, p. 25). The annual standard is also based on the lifetime risk of cancer from exposure to carcinogenic particles known to be present in this size fraction (CARB 1982, p. 84).

NITROGEN DIOXIDE (NO_2)

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 that 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 that 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 hyperreactivity (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 (SO_2)

Sulfur dioxide is formed when any sulfur-containing fuel is burned. SO_2 is highly soluble and consequently absorbed in the moist passages of the upper respiratory system. Exposure to sulfur dioxide can 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 5 to 10 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 that 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.).

REFERENCES

CARB 1982. California Air Resources Board. California Ambient Air Quality Standard for Particulate Matter (PM_{10}). December.

CARB 1989. California Air Resources Board. Adequacy of the Statewide Carbon Monoxide Ambient Air Quality Standard: The Impact of Recent Health Effects Studies. Staff Report. December.

CARB 1991. California Air Resources Board. Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide. April 11.

CARB 1991a. California Air Resources Board. Amendments to Regulations for the 24-Hour Ambient Air Quality Standard for Sulfur Dioxide. Staff Report. August.

CARB 1992. California Air Resources Board. Review of the One-Hour Ambient Air Quality Standard for Nitrogen Dioxide. Staff Report. December.

CARB 1992a. California Air Resources Board. Review of the One-Hour Ambient Air Quality Standard for Nitrogen Dioxide. Technical Support Document. December.

CARB 1994. California Air Resources Board. Review of the One-Hour Ambient Air Quality Standard for Sulfur Dioxide. Staff Report. December 27.

FDA 1985. United States Food and Drug Administration. Federal Register. Vol. 50, No. 243. December 18.

Kleinman et al. 1989. Effects on Human Health of Pollutants in the South Coast Air Basin. Final Report to the South Coast Air Quality Management District. June.

SOCIOECONOMICS

Testimony of Daniel Gorfain

INTRODUCTION

The purpose of the Socioeconomics impact analysis is to evaluate the effects of potential short-term and long-term project-related population changes on local housing, schools, medical and protective services, as well as the fiscal and physical capability of local governmental agencies to meet the needs of project-related changes in population. Staff analyzed the potential direct, secondary (induced and indirect), and cumulative impacts of the proposed San Joaquin Valley Energy Center (SJVEC) on surrounding communities, community resources, and public services. This section also includes an Environmental Justice screening analysis.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL

Executive Order 12898

Executive Order 12898, "Federal Actions to address Environmental Justice (EJ) in Minority Populations and Low-Income Populations (1994)," focuses federal attention on the environment and human health conditions of minority and low-income communities, and calls on agencies to achieve environmental justice as part of this mission. The order requires the US Environmental Protection Agency (EPA) 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.

Civil Rights Act of 1964

Title VI of the Civil Rights Act of 1964, Public Law 88-352, 78 Stat.241 (Codified as amended in scattered sections of 42 U.S.C.), prohibits discrimination on the basis of race, color, or national origin in all programs or activities receiving federal financial assistance.

STATE

California Government Code, Sections 65996-65997

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.

Title 14, California Code of Regulations, Section 15131

This section states that:

- Economic or social effects of a project shall not be treated as significant effects on the environment.

- Economic or social factors of a project may be used to determine the significance of physical changes caused by the project.
- Economic, social and particularly housing factors shall be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce and or avoid the significant effects on the environment.

LOCAL

County General Plans

- Fresno County General Plan, January 2000

City of San Joaquin

- City of San Joaquin General Plan, 1996; Amended July 2001 for the purpose of annexing the SJVEC site to the City. Annexation approved by the Local Agency Formation Commission (LAFCO) in August 2001.

Golden Plains Unified School District

- School Impact Fees assessed pursuant to the California Education Code Section 17620 and Government Code Section 65995(b)(2).

SETTING

DEMOGRAPHIC CHARACTERISTICS

The proposed project site is located at the southeast corner of the City of San Joaquin in Fresno County in California's Central Valley. It is separated from the residential part of the City by commercial and industrial development and is otherwise surrounded by agricultural lands.

San Joaquin's population is primarily employed in agriculture. As shown in **SOCIOECONOMICS TABLE 1**, the City's population grew by 43 percent between 1990 and 2000. Most of this growth occurred before 1995 due to a large Community Development Block Grant the City received for the construction of low-income housing. At the same time Fresno County grew by 21 percent.

According to the 2000 U.S. Census, Fresno County's population is 39.7 percent white and 60.3 percent minorities. Hispanics or Latinos comprise 44 percent of the population and 73 percent of all minorities. The City of San Joaquin's population consists of 96.5 percent minorities, of which 92 percent are Hispanics or Latino and 3.5 percent are Punjab Indians.

About one-quarter of the County's as well as San Joaquin's population was below-poverty level in 1990. The 2000 Census income figures are expected to be released in the spring of 2002.

SOCIOECONOMICS TABLE 1
Demographic Profile of the City of San Joaquin and Fresno County
1990 & 2000

	1990			2000		
Race/ethnicity	**City of San Joaquin**	**Fresno County**	**6-Mile Radius**	**City of San Joaquin**	**Fresno County**	**6-Mile Radius**
Total population	2,311	667,490	4,266	3,270	799,407	5,990[1]
White (excluding Hispanic)	593 (34.5%)	422,839	1,692[1]	116 (3.5%)	317,522	671[1]
Minority	1,718	244,651	2,574[1]	3,154	481,885	5,319[1]
% Poverty status persons	36%	21.4%	25.4%[2]	Not Available	Not Available	Not Available

Sources: Dept. of Finance Demographic Unit, 2001; 1990 & 2000 Census
[1] U.S. Census Block data.
[3] U.S. Census tracts

EMPLOYMENT AND ECONOMY

Agriculture is a predominant sector of Fresno County's economy. According to the State of California (EDD 2002), 18 percent of the County's 2000 labor force was employed in agriculture, down from 21 percent in 1997. Between 1997 and 2000, employment in Fresno County grew by 19,500 jobs or 5.6 percent. Construction, government and services employment grew the most.

Approximately 16,900 workers, or 5 percent of the County work force, were employed in construction in 2000. The number of construction workers in Fresno County grew by an annual average of 0.7 percent between 1997 and 2000. Despite this growth, the contribution of the construction industry to the County's economy remains small.

The City of San Joaquin's 1999 labor Force stood at 1,170, of whom 780 were employed, but none in construction.

In 1999, unemployment in Fresno County was 13.4 percent, compared to 5.2 percent statewide. The City of San Joaquin's unemployment rate was 33.4 percent. This rate has not changed significantly in the last 2 years (Estrada 2002).

Over the next three years, construction employment in Fresno County is expected to grow at an average annual rate of 3.9 percent. Sectors of the economy expected to see the most growth are service, construction and mining. Construction employment is expected to grow at an average annual rate of 3.8 percent (EDD, 2001b). In the year 2000, the Fresno Metropolitan Statistical Area's (FMSA) construction industry labor force was estimated at over 26,000. It is expected to exceed 27,000 by 2004 (CEDD, 2001).

According to the Economic Development Corporation (EDC) serving Fresno County (Garcia, 2001), work sites in the County draw daily job commuters from a 50-mile

radius. This includes the four-county area of Fresno, Kings, Madera, and Tulare. Construction workers may also be drawn from these Counties.

The Applicant has committed to give preference in hiring SJVEC construction and operation personnel to Fresno County residents. However, some of that workforce, particularly the more specialized trades, is expected to come from surrounding counties and beyond. **SOCIOECONOMICS TABLE 2** shows the total potential construction and operation labor force in the required occupations in Fresno and surrounding counties.

SOCIOECONOMICS TABLE 2
Potential Labor Force in Fresno and Surrounding Counties

	Fresno County		Fresno, Madera and Tulare Counties[1]	
Occupational Titles	**1997**	**2004**	**1997**	**2004**
PLANT CONSTRUCTION				
Carpenters	2,080	2,290	2790	3090
Masons	1,110	1,170	1510	1610
Painters	540	580	780	860
Metal Workers	280	290	320	340
Electricians	1,000	1,070	1350	1480
Welders	690	790	930	1060
Excavators	120	140	180	220
Graders	150	160	290	320
Industrial Truck Operators	3,380	4,180	5400	6620
Operating Engineers	120	120	270	290
Helpers, Laborers	10,190	11,730	16680	19000
Pipefitters	740	780	1040	1120
TOTAL:	**20,400**	**23,300**	**31,540**	**36,010**
PLANT OPERATION				
Administrative Services Managers	800	900	1040	1180
Mechanical Engineers	180	220	210	270
Electrical Engineers	160	190	250	290
Engineering Technicians	1,440	1,640	1990	2240
Plant and System Operators	950	1,000	1190	270
TOTAL:	3,530	3,950	4,680	4,250

Source: CEDD, 2001, 2002.
[1]Labor force figures are not available for Kings County

HOUSING

According to the 2000 Census, there are 273,159 housing units in Fresno County. Of these, 860 are in the City of San Joaquin. About 67 percent are single family, 27 percent are multi-family and 6 percent are mobile homes. Mobile homes are generally fully occupied by year-round residents (Estrada 2002). The housing vacancy rate in 2000 was 6 percent countywide and 2.5 percent in San Joaquin. The City's vacancy rate is lower than the 5 percent federal standard indicating a potential housing shortage.

There are approximately 6,200 hotel and motel rooms within an hour's drive of San Joaquin, mostly in the City of Fresno. The average annual occupancy rate in 2001 was 61.3 percent and the average room price was under $60 per night (Smith Travel Research 2002;Calpine 2002).

More than 300 recreational vehicle (RV) spaces are in Fresno County within an hour's drive of the SJVEC site. The 2001 RV parks vacancy rate ranged from 6 percent to 60 percent (Calpine 2002).

About six farmhouses within the unincorporated areas of Fresno County are located within 2,000 feet of the project site. The closest City of San Joaquin residences to the project site are single-family homes located approximately one-half mile northwest of the proposed project. In total, there are about 870 residences within a 6-mile radius of the SJVEC site (Estrada 2002).

UTILITIES, EMERGENCY, AND OTHER PUBLIC SERVICES

Natural Gas

Natural gas would be delivered to the project site by PG&E from its mainline natural gas transmission system. Staff has concluded that there is adequate capacity in PG&E'S system to meet project needs (see **POWER PLANT RELIABILITY)**.

Electricity

During project construction, electricity would be supplied to the project site from PG&E's electrical distribution system via Helm's substation located one half mile to the south. The Applicant represents that there is adequate capacity in the system to meet project needs.

Sewer

During construction and operation, process wastewater would be reclaimed and re-used through a zero-discharge treatment system. The resulting waste would be disposed of offsite in accordance with federal, State and local laws and regulations. Domestic sanitary sewage service would be provided by the City of San Joaquin (Appendix 7B).

Water

Process, or plant utility water would be supplied from the Fresno-Clovis Wastewater Treatment Facility (WWTF) located 21 miles northeast of the project site via a new 7-inch pipeline.

Potable water would be provided by the City of San Joaquin from groundwater wells. The SJVEC is expected to require 3 acre-feet of potable water per year, compared to the City's overall consumption of 234,000 acre-feet per year (Horne, 2001).

Police Protection

The Fresno County Sheriff would provide law enforcement services to the SJVEC site. The Sheriff's Area 1 Substation is located at 21925 West Manning, less than a mile away, in the City of San Joaquin. The station's staff, which serves several small towns and unincorporated areas in western Fresno County, includes 31 deputies, 5 sergeants, an office assistant, 7 to 8 community service officers, a 4-member detective unit, and the Area Commander. The Substation operates 15 patrol cars.

Emergency and Medical Services

There are no hospitals in the City of San Joaquin. However, the Valley Team Health Clinic in the City is able to treat minor injuries. There are seven hospitals with

emergency rooms in the City of Fresno, approximately 30 miles away. The community medical center operates three acute care facilities: University Medical center (334 beds); Community Medical Center – Fresno (416 beds) and Community Medical Center – Clovis (100 beds). University Medical Center serves as the regional adult trauma center for the Central Valley. Its services include a trauma center (Level I), burn center, rehabilitation, cardiac intensive care, asthma management and critical care. It also has a Sky Life airlift system. Other hospitals in the County include VA Central, St. Agnes and Kaiser. The latter two also have Sky Life services. Sky Life is capable of responding within 20-30 minutes (San Joaquin Health Center, 2002).

Emergency paramedic and ambulance services are provided by American Ambulance, the County's EMS contractor, located in Tranquility 4.5 miles away.

Schools

There are 35 elementary, high school, and unified school districts (USD) in Fresno County. Countywide enrollment is currently over 120,000. The SJVEC site is served by the Golden Plains Unified School District (GPUSD), which operates four K-8 schools, one high school and one continuation school. Current total enrollment is 1,914. Enrollment in 2000-2001 was 2,008. Enrollment in 2002-2003 will not be known until later this spring, but is expected to remain stable or see some decline.

The only GPUSD school in the City of San Joaquin is San Joaquin Elementary, located approximately 2 miles north of the proposed project site. **SOCIOECONOMIC TABLE 3** presents a summary of enrollment in the Golden Plains USD.

SOCIOECONOMICS TABLE 3
Golden Plains Unified School District Enrollment

School	2000-2001	2001-2002	Projected 2002-2003
San Joaquin Elementary	809	772	N/A
Cantua Elementary	264	244	N/A
Helm Elementary	93	108	N/A
Tranquility Elementary	250	241	N/A
Tranquility High School	577	525	N/A
Rio Del Rey Continuation School	15	24	N/A
Source: Golden Plains Unified School District, 2002			

FISCAL

Under current law property taxes are levied and collected annually by Fresno County in accordance with Proposition 13. Therefore, property taxes for the proposed SJVEC would be calculated at 1 percent of assessed value at the time the SJVEC goes into operation and increased by up to 2 percent per year thereafter.

Sales tax rate in Fresno County is 7.625 percent. Of that, 5.75 percent goes to the State, 0.25 percent to the County, 1 percent to the City and 0.625 percent to special districts (BOE 2002).

Based on its projected cost of $600 million, the project's initial property tax revenue contribution to the County under current law would be in the range of $6 million per year. This represents approximately 10.8 percent of the County's projected property tax revenue for Fiscal Year 2001-02. Projected project-related sales and other tax revenue for FY 2002 is projected at $32.2 million, or 36.6 percent of total tax revenue (Fresno County Finance Department).

A breakdown of the distribution of Fresno County's property tax revenue under current law is presented in **SOCIOECONOMICS TABLE 4**. About 14 percent of current property tax revenue goes to the City in which it is generated.

SOCIOECONOMICS TABLE 4
Allocation of Property Tax Revenues in Fresno County, FY 2000-2001

Fund	Percent of Total
County General Fund	17.1%
Cities	13.9%
School Districts	34.9%
Community Colleges	5.2%
County Libraries and Fire Districts	5.4%
ERAF[1]	23.5%

[1]ERAF = Education Revenue Augmentation Fund
Source: Bob Jones, 2001, Principal Accountant, Special Accounting Division, Fresno County Assessor's Office.

A summary of recent County and City tax revenue is presented in **SOCIOECONOMICS TABLE 5.**

SOCIOECONOMICS TABLE 5
Tax Revenue Summary under Current Law

Revenue Source	Fresno County		City of San Joaquin	
	2000-2001 (in millions) Actual	2001-2002 (in millions) Budgeted	2000-2001 Actual	2001-2002 Budgeted
Property Tax	55.8	55.7	33,995	42,000
Sales Tax	30.4	28.3	170,000	160,000
Other	6.1	3.9	16,750	16,815
Total	**92.3**	**87.9**	**220,145**	**218,815**

Source: County of Fresno, Finance Department, 2002

IMPACTS

Staff reviewed the SJVEC Application for Certification (AFC), dated October 31, 2001, as well as its supplement to its AFC, dated December 13, 2001. Additional information and clarification of information presented in the AFC, was received from the Applicant on January 25, February 26, March 11, and March 12, 2002. The supplemental information provided by the Applicant was deemed to be responsive to the information requested.

The following discussion of potential impacts is presented consistent with the Environmental Checklist of the California Environmental Quality Act (CEQA) Guidelines.

ENVIRONMENTAL CHECKLIST

SOCIOECONOMIC: POPULATION AND HOUSING – Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
A) Have substantial non-fiscal effects on employment and economy?				X
B) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
C) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
D) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X
E) Have a Substantial Fiscal Effect on local government expenditures, and property and sales tax?				X
F) Have a significant minority or low-income population within a six-mile radius that may be subject to disproportionate adverse effects of the project?				x
Result in substantial adverse physical impacts associated with the provision of new or physically altered facilities, the construction of which could cause significant environmental impacts in order to maintain acceptable service ratios, response times, or other performance objectives for the following:				
G) Police protection?				X
H) Schools?				X
I) Other public services?				X

DISCUSSION OF IMPACTS

a. Employment and Economy: No Impact

Construction of the SJVEC is scheduled to span 26 months, from the third quarter of 2002 to the fourth quarter of 2004. Construction workforce, including that for the water, gas and electrical transmission lines, would range from the low teens at the start and end of the project to a peak of 605 in month 17. As shown in **SOCIOECONOMICS TABLE 6,** the highest employment months would be the 12th to 21st months, when the total workforce would range between 390 and 605.

The peak construction employment would represent approximately 2.6 percent of the projected total construction labor force of 23,300 in Fresno County in 2004, and 1.7 percent of the potential labor force of more than 36,000 in Fresno and surrounding

counties **(SOCIOECONOMICS TABLE 2)**. The labor pool in most trades needed for project construction is considered to be adequate. While the Applicant has committed to giving hiring preference to workers within Fresno County, its survey of the labor market suggests that some of the specialized work force would come from nearby Madera, Tulare or Kings Counties. Where necessary, workers can also be drawn from Sacramento, the San Francisco Bay Area and Los Angeles.

As shown in **SOCIOECONOMICS TABLE 7**, once in commercial operation, the SJVEC would have a total of 31 full-time skilled employees. Over half of these would be operations and production employees, with the remainder being administrative and maintenance personnel. Peak workweek staff would be 20. The Applicant has committed to give hiring preference to Fresno County residents. However, due to specialized skills required for SJVEC operation, some permanent skilled employees may come from the Applicant's existing staff or be hired from outside Fresno and surrounding counties.

SOCIOECONOMICS TABLE 6
Construction Personnel by Month

	Months After Notice-to-Proceed																										
Discipline	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	Total
Plant																											
Boilermakers								10	20	22	34	36	42	52	58	58	58	57	48	40	15	6					556
Bricklayer/Masons			2	6	6	4	4	4	2	2	2	2	2	2	2	2	2	2	2	1	1						50
Carpenters		6	10	12	10	12	14	16	14	8	8	8	8	8	8	8	6	5	4	4	4	2	2	1			174
Electricians		4	5	6	8	14	20	26	32	35	49	60	64	66	66	66	66	64	62	58	40	24	16	7			858
Insulation Workers												6	10	18	20	20	24	24	24	32	28	18	12				236
Ironworkers		4	5	10	10	18	18	22	25	25	28	30	28	30	30	28	24	22	20	18	16	8					419
Laborers	3	4	11	15	12	10	15	15	13	18	22	22	22	22	22	22	30	28	26	22	15	15	7	4	4		399
Millwrights											13	19	26	40	40	40	38	36	32	28	8	8	1				329
Operating Engineers	3	6	6	6	6	6	10	12	12	12	12	12	12	12	12	12	12	10	8	8	4	4	1	1			199
Painters														4	4	4	8	8	8	8	4	4	2	2			56
Pipefitters			3	6	8	8	17	50	63	68	86	86	78	78	76	75	74	74	63	31	25	10	4	2			985
Sheetmetal Workers										3	6	8	8	9	8	8	8										58
Surveyors	4	4	2	2	2	2	2																				18
Teamsters	2	4	6	10	6	6	3	5	5	5	5	5	4	4	4	3	3	3	3	2	2	1	1	1			93
Total Manual Staff	12	32	50	73	68	80	103	160	186	198	265	294	304	345	350	344	352	332	300	252	162	100	46	18	4		4,430
Total Contractor Staff	3	3	6	14	14	20	20	30	30	35	35	35	35	35	35	35	30	30	30	20	20	15	15	15	7	5	572
Total Plant Construction Staff	**15**	**35**	**56**	**87**	**82**	**100**	**123**	**190**	**216**	**233**	**300**	**329**	**339**	**380**	**385**	**379**	**382**	**362**	**330**	**272**	**182**	**115**	**61**	**33**	**11**	**5**	**5,002**
Water Pipeline																											
Surveyors												2	3	3	2	2	2	2	2	2	2	2	2				26
Foremen/Supervisors												2	2	6	6	6	6	6	6	6	6	6	6				64
Equipment Operators														22	40	40	40	40	40	40	40	40	22				364
Laborers														28	48	48	48	48	48	48	48	48	28				440
Teamsters														8	8	8	8	8	8	8	8	8	4				76
Electrical																	2	3	3	2							10
Mechanical Equipment																1	2	2	1								6
Mechanical, Piping																1	2	2	1								6
Well Drillers															3	3	3										9
Total Water Pipeline Construction Staff												**4**	**5**	**67**	**107**	**109**	**113**	**111**	**109**	**106**	**104**	**104**	**62**				**1,001**

.

SOCIOECONOMICS TABLE 6 (continued)
Construction Personnel by Month

Months After Notice-to-Proceed																											
11	1	2	3	4	5	6	7	8	9	10		12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	Total
Gas Pipeline																											
Surveyors												2	3	3	2	2	2	2	2	2	2	2	2				26
Foremen/Supervisors												2	2	6	6	6	6	6	6	6	6	6	6				64
Equipment Operators														22	40	40	40	40	40	40	40	40	22				364
Laborers														28	48	48	48	48	48	48	48	48	28				440
Teamsters														8	8	8	8	8	8	8	8	8	4				76
Electrical																	2	3	3	2							10
Mechanical, equipment																1	2	2	1								6
Mechanical, piping																1	2	2	1								6
Total Gas Pipeline Construction Staff												**4**	**5**	**67**	**104**	**106**	**110**	**111**	**109**	**106**	**104**	**104**	**62**				**992**
Transmission Lines																											
Civil										6	4																10
Structural										8	8																16
Electrical												6															6
Misc (support labor)									1	2	2	2	1														8
Total Manual Staff							1	18	36	39	58	46	36	2													236
Total Contractor Staff							2	2	6	8	8	6	6	4													42
Total T-line Staff							**3**	**20**	**43**	**63**	**80**	**60**	**43**	**6**													**318**
TOTAL WORKFORCE	**15**	**35**	**56**	**87**	**82**	**100**	**126**	**210**	**259**	**296**	**380**	**397**	**392**	**520**	**596**	**594**	**605**	**584**	**548**	**484**	**390**	**323**	**182**	**33**	**11**	**5**	**7,313**

SOCIOECONOMICS TABLE 7
SJVEC OPERATIONS PERSONNEL

Department	Personnel	Shift	Workdays
Operations	16 Operating Technicians	Rotating 12-hour shifts; 3 operators per shift; 3 relief operators	7 days a week
Maintenance	7 Maintenance Technicians (3 Mechanical; 1 Electrical; and 3 Instrumentation)	Standard 8-hour days	5 days a week (Maintenance technicians will also work unscheduled days and hours as required [weekends])
Administration	7 Administrators (1 Plant Manager; 1 Operations Manager; 1 Maintenance Manager; 1 Office Manager; 1 Plant Administrator; 1 Procurement Specialist; and 1 Plant Engineer)	Standard 8-hour days	5 days a week with additional coverage as required

The Applicant has committed to give preference to City and County businesses in the procurement of construction and operation goods and services. The estimated cost of materials and supplies, excluding major power plant components, is $250 million. The Applicant estimates that, of that amount, $5 million to $10 million dollars would be spent locally. To ensure that local financial benefits are maximized, staff has proposed condition **SOCIO-2** that requires the project owner to hire and procure materials locally, with certain exceptions.

The Applicant is proposing to move affirmatively toward meeting its commitment. It has proposed to facilitate at least one workshop, sponsored by the local trade unions, to inform prospective members about the process of joining their unions, and serving apprenticeships in order to obtain full trade certification. The workshop will be aimed at recruiting City of San Joaquin and Fresno County residents.

The Applicant is also planning to hold informational meetings designed to maximize procurement in Fresno County. In these meetings, the Applicant will explain its procurement needs and procedures in order to assist local vendors to participate effectively in its bidding process. These meetings will include city managers and chambers of commerce throughout the County, including Hispanic chambers, the Fresno County Economic Development Corporation, and organizations such as Workforce Connections and the I-5 Business Development Corridor Association (Argentine 2002).

Both plant construction and operation would result in indirect and induced employment impact in Fresno County.[1] To estimate these impacts, the Applicant applied the IMPLAN Input-Output model. The model estimates that employment impacts during construction would result in 35 indirect and 184 induced jobs. These jobs would be generated by the estimated $5 million in local procurement and $12.8 million spent locally by construction workers. Indirect and induced income impacts, including payroll, materials and supplies, are estimated at $23.3 million.

Indirect and induced employment impacts in Fresno County for plant operations are estimated to be 108 and 49 permanent jobs, respectively. These additional jobs would result from an estimated $19.2 million annual operating budget, including payroll, materials and operations. Annual indirect and induced income impacts are estimated at $3.9 million and $1.23 million.

b. Induced Population Growth: **No Impact**

Little or no permanent relocation of construction workers is expected as a result of this project. Most of the construction workers would commute to the project site on a daily or weekly basis. Approximately 20 percent, including most of the contractor's staff would commute weekly and stay at motels or hotels in Fresno, 30-45 minutes away.

There are 6,200 hotel and motel rooms in Fresno County and over 300 RV park spaces between 30 and 50 miles from the SJVEC site. Fresno's average hotel/motel vacancy rate in the City of Fresno in 2001 was 38.7 percent and varied with room price and time of year. Vacancies at the RV parks ranged from 6 to 60 percent. The San Joaquin City Manager has offered to set up a temporary area for RV users in the City during construction, if there is worker demand (Hami, 2002).

Therefore, an ample supply of hotels, motels and RV accommodations would be available to accommodate construction workers for this project.

The Applicant expects the SJVEC operators and managers to come primarily from the cities of Fresno and Clovis, as well as from Madera and other neighboring counties. Few plant operations personnel, if any, are expected to have to relocate as a result of the project.

Because of the small number of personnel expected to relocate relative to the area's housing supply and expected home construction over the next several years, housing resources would not be significantly affected by this project.

---

[1] **Indirect Employment** is that which increases or decreases in sectors linked to the direct suppliers of goods and services to the project. For example, it includes jobs created in sectors supplying cement bags to the cement suppliers for the project.

Induced Employment is that brought about by increased spending by resident households whose incomes have increased as a result of direct and indirect employment.

It is, therefore, concluded that project construction and operation would not directly or indirectly induce substantial population growth, nor significantly impact the demand for housing in the City of San Joaquin and other communities in Fresno County.

c. Displacement of Housing: **No Impact**

The proposed SJVEC site is located on undeveloped land within the City of San Joaquin in Fresno County, currently in agricultural use. No residences are located on or in close proximity to the proposed project site. No residences would be relocated because of significant adverse environmental impacts resulting from this project. No replacement housing would be needed as a result of the project. Therefore, the proposed project will not necessitate the provision of replacement housing.

d. Displacement of People: **No Impact**

As described in Section C. above, no people or housing would be displaced by the project and, therefore no replacement housing would need to be constructed for displaced residents.

e. Fiscal: **No Impact**

The SJVEC is projected to produce $60.9 million in construction payroll, at an average loaded pay rate of $50 per hour. At least 60 percent of the workforce is expected to come from within Fresno County, resulting in a payroll increment of about $37 million.

The project's operations budget is expected to be approximately $8 million and maintenance budget $9.5 million. Initial operations payroll is projected to be $1.7 million, at an average annual salary of $57,000.

Sales tax revenue expected to be generated during construction is in the range of $381,000 to $763,000, including materials, supplies, gasoline, and food and lodging. A portion of the revenue would be captured in the City of San Joaquin, but none from lodging-related revenue because there are no hotel, motel or RV park accommodations in the City. Therefore, the amount of sales tax generated to local governments by SJVEC construction would be beneficial to both the City and County.

Sales tax revenue during plant operations, generated by payroll and plant operations and maintenance, is expected to be in excess of $400,000. As is the case with construction-related sales tax revenue, its impact on the City and County would be beneficial. As stated previously, the Applicant intends to purchase materials locally to the maximum extent feasible.

Under current law the SJVEC would initially generate $6 million in property tax revenue to Fresno County. (Together with existing bonds and special assessments, this amount could increase to $7.8 million). Assuming a total of $6 million, the Fresno County General Fund would initially receive over $1 million per year, or 0.54 percent of the County's 2001 total property tax revenue.

The City of San Joaquin's property tax revenue for this fiscal year is projected at $42,000, or 7 percent of the City's budget and 19.2 percent of its tax revenue. Under current law (County assessment under Proposition 13), the proposed project would

increase the City's total revenue line by $834,000, or twenty-fold, more than doubling its total projected revenue of $599,000 in this fiscal year's budget. This increase could have a significant beneficial impact on city programs and services.

Under a law recently signed by the Governor, AB 81, the responsibility for property tax assessment of the SJVEC property and other large power plant properties will shift from the County Assessor to the State Board of Equalization (BOE) by making them "state assessed properties." This will require annual reassessment at fair market value, and provide that property tax collected be distributed exclusively to the taxing jurisdictions within the Tax Rate Area in which the facility is located. (A "Tax Rate Area" is a grouping of properties within a county wherein each parcel is subject to the taxing powers of the same combination of taxing agencies). While AB 81 could substantially increase total property tax revenue derived from the SJVEC over its lifespan, local governments, schools and other special districts in the SJVEC Tax Rate Area will continue to receive the property tax revenue from the property at the same percentage of the total that they currently receive from property that is locally assessed by the County Assessor in that same Tax Rate Area.

Also, the BOE has amended its Rule 905 (Assessment of Electric Generation Facilities) to provide that, as of January 1, 2003, and commencing with the lien date for the 2003-04 fiscal year, electric generation facilities over 50 megawatts, owned or used by an electrical corporation, as defined in the Public Utilities Code, will be assessed by the State. Certain small qualifying facilities and qualifying cogeneration facilities are excluded.

f. Minority and Low-Income Populations (Environmental Justice Screening Analysis): **Less Than Significant**

The purpose of the screening analysis is to determine whether there exists a minority and/or low-income population within the potential affected area of the proposed project.

Minority and/or low-income populations, as defined by the U.S. Environmental Protection Agency's April 1998 Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses, are identified where either:

- The minority population of the affected area is greater than 50 percent of the affected area's general population; or

- The minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Energy Commission staff has determined that the potential affected area for this project are those lands within a six-mile radius of the proposed SJVEC site. The six-mile radius is consistent with the radius used for staff's cumulative air quality analysis. When a minority and/or low-income population is identified, staff in the technical areas of air quality, public health, hazardous materials, noise, water, waste, traffic and transportation, visual resources, land use, socioeconomics, and transmission line safety

and nuisance consider possible impacts on the minority/low-income population as part of their analysis. This “environmental justice” (EJ) analysis consists of identification of significant impacts (if any), identification of mitigation, and determination of whether there is a disproportionate impact if an unmitigated significant impact has been identified.

Staff’s environmental justice approach includes providing notice (in appropriate languages) of the proposed project and opportunities for participation in public workshops to minority and/or low-income communities, and providing information on staff’s EJ approach to minority and/or low-income persons who attend staff’s public workshops.

In preparation to filing this AFC, Calpine took several steps to reach out to the San Joaquin community and inform them of this project. Specifically, Calpine hosted a community barbecue attended by more than 350 people. Invitations in English and Spanish, accompanied by a letter from the Mayor, were mailed to over 550 residences, using the City’s water bill mailing list. A fact sheet and a set of frequently asked questions and answers in English, Spanish and Punjab were passed out to those in attendance. Follow-up thank you letters and fact sheets were sent to the entire mailing list. The Energy Commission also took steps to reach out to the San Joaquin community and held several meetings in the community to discuss the potential impacts from the proposed power plant. Please see the Executive Summary of this document for details of the meetings and workshops that the Energy Commission held for this project.

According to the 2000 Census, minorities constituted over 60 percent of Fresno County’s population. Approximately three-quarters of the County’s minorities were Hispanic. In the affected area, based on Census block data, minorities comprised 88.8 percent of a total population of 5,990. **SOCIOECONOMICS FIGURE I** shows the locations of minority populations within the six-mile radius of the SJVEC site. As can be seen, the majority of census blocks in the affected area have minority populations greater than 50 percent. The predominant minorities are Hispanic and Punjabi.

Based on the 1990 Census, the most recently available poverty-level data, low-income persons living below the poverty level comprised approximately 25.4 percent of the population. (Census 2000 poverty numbers should be available by the end of 2002). None of the Census tracts within six miles of the SJVEC site have below-poverty populations in excess of 50 percent.

Based on the screening analysis, staff concludes that although the minority population within the six-mile radius represents 88.8 percent of the total population, staff has determined that the project will not result in significant adverse socioeconomic impacts. Because there are no significant adverse socioeconomic impacts, staff concludes that there are no environmental justice issues in the area of Socioeconomic Resources. For a summary of conclusions, please refer to the Executive Summary.

g. Police Protection: **No Impact**

Law enforcement services for the project area are provided by the Fresno County Sheriff's Department. In personal communications with the Applicant, the Sheriff indicated concern about the Department's ability to provide adequate law enforcement services during project construction, particularly for follow-up investigation and response, security on weekends and helicopter access in case of emergency (Huerta 2002).

The Sheriff's Department did not express concerns about its ability to provide adequate police protection services during plant operation, because of the small number of employees, plant security and 24-hour staffing.

The Sheriff's Area 1 Station is located at the corner of Manning Avenue and Colusa Avenue, approximately one-half mile from the SJVEC. In case of an emergency, its estimated response time is 3-5 minutes.

In order to address security concerns, especially on weekends, the Sheriff has requested that the Applicant designate specific sites for staging security guard operations. The Sheriff has suggested its sub-station as a suitable staging area. In April 2002, Valley Health Team, Inc. located at Colorado Avenue and 12th Street, a short distance from the Sheriff's sub-station, broke ground on its facility expansion which includes a helicopter landing pad. This pad could be used by Life Flight for emergency medical evacuation as well as by the Sheriff, in case on an emergency. This project is expected to be completed by the end of February 2003. The Sheriff

FIGURE 1

also suggested that its sub-station be used as a security service staging area during construction.

With the security service to be provided by Calpine and the new nearby helicopter landing site at the health clinic, the project would not adversely affect the County's ability to maintain acceptable service ratios, response times, or other performance objectives of police protection services.

h. Schools: **No Impact**

Due to the temporary nature of project construction and the commuting habits of construction workers in the labor pool area, few, if any, temporary workers would move and/or bring their families to San Joaquin for the construction period. Furthermore, their children's school attendance would depend on their grade level and on where they reside at the time. At present, schools in the Golden Plains Unified School District have excess capacity. This includes the San Joaquin Elementary School, the only school in the City of San Joaquin (Dabbs, 2001). Therefore, no significant impact is expected on the capacity of the area's schools during construction.

For the SJVEC's operational phase, new students may have to be absorbed by the Golden Plains District. If all operational employees were to newly move into the District, the District estimates that they could generate as many as 93 new students, a 4.3 percent increase in school enrollment. Because these students would enter different grades, the District would be able to accommodate them without adverse effect on classroom capacity (Flores 2002).

As provided for by the State Education and Government Codes, the project owner would be required to pay a one-time School Impact Fee to the Golden Plains Unified School District. Based on the project's principal building area of 10,200 square feet and current assessment charge of $1.91 per square foot, the SJVEC would pay the District $19,482. (See Condition **SOCIO-1**).

The small potential number of new students related to the proposed project will not have a significant adverse effect on the capacity of the area's school districts. Therefore, the proposed project would not result in the need to construct new school facilities.

i. Other Public Services: **No Impact**

Project construction will require minimal consumption of utilities and public services support. This includes water, sewer, natural gas, and health services.

In the event health services are required, minor injuries could be treated at the Valley Team Health Clinic in San Joaquin. Workers who are more seriously injured could be transported to Fresno by ambulance or airlifted by Life-Flight services available from the University Medical Center in Fresno, which also has an adult trauma center. As of March 2003, when an ambulance garage, paramedic services and a helicopter landing pad would be available at the Valley Health Team clinic, response time for emergency paramedics and ambulance service would be 5-10 minutes (Disney 2002). Life-flight's response time is 20-30 minutes. All emergency, ambulance and life-flight services will be provided by American Ambulance.

Because of the number of people involved in project construction and operation, the Applicant's worker safety measures (See **Worker Safety** section of this Staff Assessment), and the number of medical facilities nearby, the project will not have a significant impact on the medical services.

Pacific Gas and Electric would provide natural gas and electricity to the project site during construction and plant operation. Potable water would be supplied by the City. The project's demand, estimated at 3 acre-feet per year is considered insignificant by the City (Central Valley Energy Center, LLC 2001). Plant utility water would be supplied from the Fresno-Clovis Wastewater Treatment Facility. Therefore, the project would not result in adverse construction or operational effects on the City's water supply capabilities. Please refer to the **Water Resources** section of this Staff Assessment for further analysis.

Non-hazardous solid waste would be collected at the site and transported for disposal in a Class III landfill. Recyclable materials would be separated at the site where practical.

The proposed project will not have an adverse effect on the County's or other public service providers' ability to maintain acceptable levels of service, response times, or other performance objectives for law enforcement, emergency medical services, electricity, water supply, natural gas service, and solid waste disposal.

CUMULATIVE IMPACTS

Since the proposed project would not result in any significant adverse socioeconomic impacts on population, housing and public services, and there are no other contemporaneous major construction projects foreseen in the City of San Joaquin, the SJVEC is not expected to contribute to cumulative adverse socioeconomic impacts in Fresno County or the City of San Joaquin. The additional tax revenue the SJVEC would produce, particularly in property tax, could benefit the County, City, other public entities within the project's Tax Rate Area, and the Education Revenue Augmentation Fund (ERAF).

CONCLUSIONS AND RECOMMENDATIONS

The proposed project would not induce significant population growth in the affected area, cause the displacement of housing or people, or have a significant adverse socioeconomic effect on the minority and/or below-poverty-level population. The project would not adversely impact the ability of public agencies to maintain acceptable service ratios or response times for police protection, medical service, schools and other public services.

Staff has determined that the proposed project will not result in significant adverse socioeconomic effects on population, housing, schools, medical service, and other public services.

PROPOSED CONDITIONS OF CERTIFICATION

SOCIO-1 The project owner shall pay the one-time statutory school facility development fee as required at the time of filing for the in-lieu building permit with the City of San Joaquin Building Inspection/Code Enforcement Department.

Verification: The project owner shall provide proof of payment of the statutory development fee in the next Monthly Compliance Report following the payment.

SOCIO-2 The project owner and its contractors and subcontractors shall recruit employees and procure materials and supplies within San Joaquin City first and Fresno County second, unless:

- To do so will violate federal and/or state statutes;
- The materials and/or supplies are not available;
- Qualified employees for specific jobs or positions are not available; or
- There is a reasonable basis to hire someone for a specific position from outside the local area.

Verification: At least 60 days prior to site mobilization, the project owner shall submit to the Compliance Project Manager (CPM) copies of contractor, subcontractor, and vendor solicitations and guidelines stating hiring and procurement requirements and procedures. In addition, the project owner shall notify the CPM by letter of the reasons for any planned procurement of materials or hiring outside Fresno County that will occur during the two months prior to commencing construction and as necessary during construction.

REFERENCES

Calpine Corporation. 2002. San Joaquin Valley Energy Center (Originally Central Valley Energy Center) (01-AFC-22). Data Response Set 1A. February 26, 2002.

Central Valley Energy Center, LLC. 2001. Application for Certification, San Joaquin Valley Energy Center (Originally Central Valley Energy Center) (01-AFC-22), Submitted October 16, 2001.

City of San Joaquin. 1996. General Plan and Final Environmental Impact Report, 1996.

Dabbs, Christine. 2002. Personal communication between Christine Dabbs, Golden Plains Unified School District and Dan Gorfain, Aspen Environmental Group. February 4, 2002.

Disney, Sylvia. 2002. Personal communication between Sylvia Disney, San Joaquin Health Center and Dan Gorfain, Aspen Environmental Group. April 25, 2002.

EDD (California Economic Development Department), 2001. Labor Market Information Division. Employment Projections by Industry, 1997-2004. Website. http://www.calmis.ca.gov/htmlfile/subject/indtable.htm. March 12, 2001.

Estrada, Lupe. 2002. Meeting with Lupe Estrada, Administrative/Grant Coordinator, City of San Joaquin. March 7, 2002.

Flores, Joe. 2002. Personal communication between Joe Flores, Assistant to the Superintendent, Golden Plains Unified School District and Dan Gorfain, Aspen Environmental Group. May 6, 2002.

Garcia, Ralph. 2002. Personal communication between Ralph Garcia, Economic Development Specialist, Economic Development Corporation Serving Fresno County and Dan Gorfain, Aspen Environmental Group. February 1, 2002.

Huerta, David. 2002. Personal communication between David Huerta, Area Commander, Area 1, Fresno County Sheriff Department and Dan Gorfain, Aspen Environmental Group. March 12, 2002.

Kinnee, Rose Marie. 2002. Personal communication between Rose Marie Kinnee, California Board of Equalization and Dan Gorfain, Aspen Environmental Group, March 4, 2002.

U.S. Census 1990. U.S. Census Data, 1990 Census. DP-4. Income and Poverty Status in 1989: 1990. 1990 Summary Tape File 3 (STF 3), Fresno County and San Joaquin City.

U.S. Census 2000. U.S. Census Data, 2000 Census. DP-1. Profile of General Demographic Characteristics: 2000. Summary File 1 (SF 1), Fresno County and San Joaquin City.

Yusuf, Fatima and Carrier, John. 2002. Meeting with Fatima Yusuf and John Carrier, CH2MHill and Dan Gorfain, Aspen Environmental Group. January 25, 2002.

Yusuf, Fatima a. 2002. Personal communications between Fatima Yusuf, CH2MHill and Dan Gorfain, Aspen Environmental Group. February 26, 2002.

Yusuf, Fatima b. 2002. Personal communications between Fatima Yusuf, CH2MHill and Dan Gorfain, Aspen Environmental Group. March 11, 2002.

Yusuf, Fatima c. 2002. Personal communications between Fatima Yusuf, CH2MHill and Dan Gorfain, Aspen Environmental Group. March 12, 2002.

SOIL AND WATER RESOURCES

Joe Crea, Charlie Moore, Jim Thurber, Aurie Patterson and John Kessler

INTRODUCTION

In this assessment staff analyzes potential effects on soil and water resources caused by the San Joaquin Valley Energy Center (SJVEC). The analysis focuses on the following areas:

- Whether construction or operation would lead to accelerated wind or water erosion and sedimentation.
- Whether the project would exacerbate flood conditions in the vicinity of the project.
- Whether the project's demand for water would adversely affect surface or groundwater supplies.
- Whether project construction or operation would lead to degradation of surface or groundwater quality.
- Whether the project would comply with all applicable laws, ordinances, regulations and standards

Where potential impacts are identified, staff has proposed mitigation measures to reduce the significance of the impact and, as appropriate, has recommended conditions of certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

Clean Water Act

The Clean Water Act (33 U.S.C. section 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, and incidental non-stormwater discharges associated with pipeline construction, also fall under this act, and are normally 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 (RWQCBs).

Section 404 Permit to Place or Discharge Dredged or Fill Material

Section 404 of the Clean Water Act regulates the discharge of dredged or fill material into waters of the United States, including rivers, streams and wetlands. The Army Corps of Engineers (ACOE) issues site-specific or general (nationwide) permits for such discharges.

Section 401 Water Quality Certification

Section 401 of the Clean Water Act provides for state certification that federal permits allowing discharge of dredged or fill material into waters of the United States will not violate federal and state water quality standards. These certifications are issued by the RWQCBs. Proposed linear facilities can cross ephemeral drainages that are considered waters of the United States.

STATE

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 SJVEC project area are contained in the Central Valley Region Water Quality Control Plan. These standards are typically applied to the proposed project through the Waste Discharge Requirements (WDRs) permit. 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. These regulations require that the RWQCB issue Waste Discharge Requirements specifying conditions regarding the construction, operation, monitoring and closure of waste disposal sites, including injection wells and evaporation ponds for waste disposal.

California Water Code

Section 13551 of the Water Code prohibits the use of "…water from any source of quality suitable for potable domestic use for non-potable uses, including…industrial…uses, if suitable recycled water is available…" given conditions set forth in Section 13550. These conditions take into account the quality and cost of the water, the potential for public health impacts and the effects on downstream water rights, beneficial uses and biological resources.

Section 13552.6 of the Water Code specifically identifies that the use of potable domestic water for cooling towers, if suitable recycled water is available, is an unreasonable use of water. The availability of recycled water is based upon a number of criteria, that must be taken into account by the SWRCB. These criteria are that: the quality and quantity of the reclaimed water are suitable for the use; the cost is reasonable; and the use is not detrimental to public health, will not impact downstream users or biological resources, and will not degrade water quality.

Section 13552.8 of the Water Code states that any public agency may require the use of recycled water in cooling towers if certain criteria are met. These criteria include that recycled water is available and meets the requirements set forth in section 13550; the use does not adversely affect any existing water right; and if there is public exposure to cooling tower mist using recycled water, appropriate mitigation or control is necessary.

State Water Resources Control Board Policies

The SWRCB has also adopted a number of policies that provide guidelines for water quality protection. The principle policy of the SWRCB, which addresses the specific siting of energy facilities, is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. This SWRCB policy requires that power plant cooling water should come from, in order of priority: 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. This policy also addresses cooling water discharge prohibitions.

Tertiary Wastewater Treatment permit

Under Title 22 of the California Code of Regulations, the California Department of Health Services (DHS) reviews and approves wastewater treatment systems to ensure they meet tertiary treatment standards, allowing use of recycled water for industrial processes such as for steam production and cooling water.

LOCAL

County of Fresno

The County of Fresno has permit requirements associated with Grading and Erosion Control, Encroachment Permits and securing a Franchise Agreement for the proposed natural gas and recycled water lines within County right-or-way, and requirements associated with a Well Drilling Permit.

City of San Joaquin

The City of San Joaquin requires Grading and Erosion Control permits for the SJVEC plant site and the natural gas, recycled water and domestic water pipelines, as well as Encroachment Permits for the proposed natural gas, recycled water and domestic water pipelines within city limits.

City of Fresno

The City of Fresno requires a User Agreement for Reclaimed Water for the cooling water supply from the Fresno-Clovis Wastewater Treatment Facility (WWTF).

ENVIRONMENTAL SETTING

REGIONAL AND SITE VICINITY DESCRIPTION

The Applicant proposes to build the San Joaquin Valley Energy Center, a 1,100 MW combined cycle power plant, in an industrial area in the southeast portion of the City of San Joaquin in Fresno County. The Applicant proposes to construct the SJVEC within 25 acres of an 85-acre parcel being acquired by the Applicant. Existing uses on the SJVEC site include irrigated agriculture for the production of cotton, power lines and a small irrigation canal. Characterized by flat topography, the proposed site is located

within the city limits of the City of San Joaquin, near the intersection of Springfield and Placer Avenues.

Land use in the vicinity of the SJVEC is primarily agriculture, with water and resource management projects in the vicinity. Urbanized areas in the City of San Joaquin are located to the north and west of the site. Rural residential areas are located west of the site. Major landmarks near the proposed project include the Mendota Wildlife Management Area located approximately 10 miles northwest, and the City of Fresno and its Fresno-Clovis WWTF located approximately 20 miles to the northeast. Major infrastructure in the project vicinity includes a railroad line along the northeast border of the triangular-shaped project site, Fresno Slough located approximately 3 miles west of the site, the City of San Joaquin Wastewater Treatment Plant located approximately 2 miles west of the site, PG&E's Helm Substation located approximately 0.25 miles south of the site, and electric transmission lines located immediately south of the project site (SJVEC 2001a, AFC Sections 1.1 & 8.4).

Several new linear facilities would also be required for the proposed SJVEC. Please refer to AFC Project Description Figure 2.1-1 for an illustration of the proposed project. The preferred routes for each are described as follows:

1. The Recycled Water Pipeline, as proposed for supply from the Fresno-Clovis WWTF, would consist of approximately 20.5 miles of 27-inch diameter pipeline. The pipeline would run from the WWTF west along North Avenue, south along Chateau Fresno Avenue, west along Lincoln Avenue, south along Jameson Avenue, west along Manning Avenue, and south along Placer Avenue to the project site.

2. The Sanitary Sewer Pipeline, as proposed to discharge sanitary wastes from the SJVEC to the City of San Joaquin's Wastewater Treatment Plant, would consist of approximately 2.5 miles of pipeline. The pipeline would run from the SJVEC west along Cherry Lane and then north on Pine Avenue. No other SJVEC plant-related wastewater will be discharged, as a result of the proposed Zero Liquid Discharge System

3. The Domestic Water Pipeline, would consist of approximately 1.0 mile of pipeline. The pipeline would run from the point of interconnection with City of San Joaquin's domestic water system to the southeast along W. Colorado Ave., southwest and then south along the west site boundary of the SJVEC, and then southeast in a diagonal direction across the SJVEC property to the power plant.

4. The Natural Gas Pipeline would consist of approximately 20 miles of 24-inch pipeline, with the point of interconnection being a manifold connected to PG&E's Line No. 2 and No. 401 Natural Gas Pipelines located approximately 4 miles east of Interstate 5 adjacent to Manning Avenue. The pipeline would run east along Manning Avenue for about 18 miles, and then south along El Dorado Avenue, and then east on Springfield Avenue before terminating at the SJVEC. The pipeline installation would employ horizontal directional drilling to route under the California Aqueduct, Beta Main Canal and Fresno Slough (SJVEC 2001a, AFC Sections 2.0, 6.1, Figure 6.1-1 and Section 7.1).

SOILS

As stated above, the 85-acre site being acquired by the Applicant was previously used for irrigated agriculture for the production of cotton, power lines and a small irrigation canal. The entire 85 acres, including the 25 acres proposed for use by the SJVEC, is classified as prime farmland. Although 25 acres would clearly no longer be available for agricultural use, the Applicant has indicated that the remaining 55-acre portion of the parcel would be revegetated following construction. Based on the draft Grading Plans, the existing grade for the SJVEC site ranges from 173.5 to 171.0 feet above mean sea level, and the powerplant footprint would be elevated an average of approximately 2 feet above existing elevation, ranging from 175.5 to 173.5 feet. Estimated quantities for cut and fill of soil are 53,940 and 46,650 cubic yards respectively. During construction, approximately 25 acres would be under permanent development, and much of the balance of 60 acres would be used for construction laydown and parking.

Merced Clay/Clay Loam is the primary soil type covering the SJVEC site, as well as for the proposed domestic water and sewer line routes. Similar in character to Merced Clay/Clay Loam, numerous other soil types comprise the other linear facilities for the recycled water and natural gas lines. Because characteristics for these other soil types are similar with respect to drainage and erosion potential, rather than listing the other 25 soil types separately, only the primary soil type comprised of Merced Clay/Clay Loam is listed in Soils and Water Table 1. Additional soil characteristic data can be found in Table 8.9-2 of the AFC. Merced soils have developed on mixed igneous and sedimentary alluvium deposited in the lowest portions of the valley basin. These soils formed in floodplains primarily as overbank flood deposits and were derived chiefly from granitic rocks in the Sierra Nevada. In particular, the fine-grained alluvial sediments upon which Merced-series soils formed were deposited by the Kings River by way of Fresno Slough in flood stage.

SOIL AND WATER Table 1
Soil Types Affected & Characteristics

Primary Soil Name	Slope Class %	Depth Range (ft.)	USDA Texture	Parent Material	Water Erosion Hazard	Permeability (inches/ hour)	Drainage	Revegetation Potential
Merced Clay & Clay Loam (Mk)	0 – 2	>5	Clay, Clay Loam	Alluvial Sediments from Igneous rocks	None / -- -	< .05 to 0.8	Moderately Well	Fair to Excellent

Based on the soil characteristics of the SJVEC site and associated linear facilities, erosion potential from water is very low. Additionally, any construction associated with the project will include implementation of plans for control of soil erosion during construction and operation, slight to none. The revegetation potential is fair to excellent for most of the land along the proposed linear facilities. Although some of the affected soils are considered to be saline and saline-alkali soils, revegetation should be successful provided adequate irrigation is provided while plants are established (SJVEC 2001a, AFC Sections 8.4, 8.9 and 8.16.3.5.2) (SJVEC 2002d, Data Request #82).

SOIL AND WATER CONTAMINATION

A Phase I Environmental Site Assessment (Phase I ESA) was prepared for the SJVEC site. No recognized environmental conditions of potential concern were identified on the SJVEC site itself; however, three potential sites in the vicinity of the proposed SJVEC were reviewed as potential sources of contamination to the SJVEC. These three sites are described as follows:

Suburban Propane, 22125 W. Colorado Avenue, San Joaquin, CA
Based on a review of county files for the Suburban Propane site, which is approximately ¾ miles up-gradient of the proposed SJVEC, releases of petroleum hydrocarbon compounds as gasoline and benzene had contaminated soils up to 55 feet in depth. The contamination was identified in conjunction with an underground tank removal in 1989. An investigation in 1990 concluded that groundwater located at 80 feet below ground surface was not affected.

D's Mini Mart, 22023 W. Colorado Avenue, San Joaquin, CA
Located south of the Suburban Propane site, elevated concentrations of petroleum hydrocarbon compounds as diesel and gasoline were detected in soil samples in conjunction with removal of an underground tank removal in 1997. Potential effects to groundwater are unknown.

Suburban Propane, 22055 W. Colorado Avenue, San Joaquin, CA
Situated between the two sites listed above, a small gas station operated at this address until 1996. Four underground storage tanks are still present at the site, and the county has ordered the property owner to remove them. Current county records provide no evidence that the tanks have leaked, or that there is any contamination to soil or groundwater (SJVEC 2001a, AFC Appendix 8.13A).

Refer to the **Waste Management** section of the Staff Assessment for further discussion.

GROUNDWATER

The SJVEC site is located within the aquifer system of the Central Valley of California. The Central Valley is composed of three main hydrographic sub-basins. The northernmost sub-basin is the Sacramento Valley and is drained by the Sacramento River. The San Joaquin Valley, making up the southern two-thirds of the Central Valley is divided into two sub-basins: the San Joaquin Basin, drained principally by the San Joaquin River, and the Tulare Basin at the southern end with interior drainage into the aquifer system below the now-dry Tulare lake bed. The SJVEC site is located near the boundary between the San Joaquin and Tulare Basins.

The aquifer system of the Central Valley is composed of interlayered gravel, sand, silt, and clay derived from the surrounding mountains. The shallow part of the aquifer has unconfined water table conditions and the deeper part is semiconfined to confined. The thickness of sediments comprising the fresh water aquifer averages about 2900 feet in the San Joaquin Valley. The numerous lenses of fine-grained (silt and clay) sediments are distributed throughout the valley and in most places constitute over 50 percent of the total thickness penetrated by wells (USGS, 1991). Most of these fine-grained lenses are not extensive; however, a notable major one is the Corcoran Clay Member of

the Tulare Formation. This clay unit underlies an area of approximately 5,000 square miles and ranges in thickness from near zero to at least 160 feet. Prior to development of the valley, the Corcoran Clay Member acted as an effective confining unit; however, the drilling of numerous large diameter wells through the Corcoran Clay and the practice of perforating wells above and below it has reduced the effectiveness of the Corcoran Clay as a confining unit (USGS, 1991).

Groundwater has been and is a large portion of the water supply for the San Joaquin Valley for both irrigation and domestic uses. Extensive groundwater pumping in the San Joaquin Valley since the turn of the century has resulted in widespread land subsidence. Subsidence began in the mid-1920's as groundwater was pumped for irrigation and more than 5,000 square miles has subsided by more than one foot, with local areas of subsidence of greater than 20 feet (USGS, 1991). Land subsidence due to groundwater withdrawal is caused by compaction of clay units within the aquifer system as the hydraulic head declines and water is released from the clays into the aquifer system. Subsidence has slowed considerably since the late 1970s; however, significant increases in groundwater pumping and lowering of water levels could cause subsidence to resume (USGS, 1989; USGS, 1991).

Groundwater quality in the San Joaquin Valley is generally good in the deeper semi-confined and confined aquifers. The shallow aquifers, however, generally have poor water quality with high dissolved solids, chloride, and sulfate concentrations (USGS, 1989). Additionally, pesticides and fertilizers that have been applied to the land have leached into the shallow aquifers via irrigation water.

SURFACE WATER HYDROLOGY

The SJVEC site is located within the Central San Joaquin Valley, approximately midway between the Sierra Nevada mountain range to the east, and the Coast Range to the west. The Kings River is the nearest major surface water feature. It begins southeast of Fresno in the High Sierra, after reaching the valley floor west of Fresno, the river is diverted, channelized and mingles with a web of irrigation canals and diversions from the California Aqueduct and other canals. In the project vicinity, there are no natural permanent surface water features, but water supply and irrigation return canals are abundant. A canal that is 10 feet wide by 3 feet deep borders the south side of the proposed project site.

Canals crisscross the fields and parallel the roads, and cross the proposed project linears (gas and recycled water lines) at several points. The applicant intends to use horizontal boring techniques to route the planned pipelines under several of these canals. Of these canals, only three are named waterways: the California Aqueduct, Fresno Slough and James Bypass. The California Aqueduct is a broad, 120 feet wide canal that originates at Clifton Court Forebay in the Sacramento-San Joaquin Delta north of Tracy, and conveys water supply to the San Joaquin Valley and southern California. Fresno Slough is a 20-foot wide channelized canal that carries storm water and collects agricultural return water. James Bypass is a 25-foot wide canal that conveys irrigation supply water; an adjacent dry channel is used to absorb floodwaters. The SJVEC site is outside the 100-year flood boundary. The nearest 100-year flood

zone is located approximately 2 miles south of the SJVEC site. (SJVEC 2001a, AFC Section 8.14 and Figure 8.14-3)

SJVEC WATER SUPPLY

The City of Fresno has indicated it will supply the cooling water for operation of the SJVEC power plant. The source of cooling water would be reclaimed water drawn from a mound of impaired groundwater that has formed under the infiltration ponds of the Fresno-Clovis WWTF. The Fresno-Clovis WWTF is a secondary wastewater plant. The City and the Applicant have entered into an agreement to extract up to 7,000 acre-feet per year (afy) of this reclaimed water for use as cooling water at the SJVEC plant. Under the agreement, new reclamation wells, owned and operated by the City, will be installed in the City's existing wellfield with production dedicated for the SJVEC cooling water.

Domestic water supply for drinking and general sanitary purposes would be provided by the City of San Joaquin. The City of San Joaquin's water supply is provided from two groundwater wells, with plans to construct a third well in 2003. Currently, the closest City well is approximately one-half mile northwest of the project site; however, the planned location of the new City well is approximately one-quarter mile west of the project site. The City of San Joaquin groundwater production for the year 2000 was 629 acre-feet (Cantu, 2002). The water supply needed for domestic use for SJVEC is estimated at about 1.1 gpm, or less than 3 afy, compared to an existing average supply for all of City of San Joaquin's domestic customers of about 320 gpm. The additional amount of domestic water supply needed for serving the SJVEC is not considered significant by the City of San Joaquin (Horn, 2002).

Water supply for construction would be subject to the SJVEC contractor purchasing water from the City of San Joaquin, local irrigation districts or farmers, depending on cost and minimizing transport distances. The project linears are particularly dispersed, with the natural gas line route proposed to run for approximately 20 miles to the west, and the recycled water line proposed to run for approximately 20.5 miles to the east of the SJVEC. In order to minimize trucking time and costs, construction water will probably be purchased from a number of suppliers, which may include the City of San Joaquin for grading and dust suppression at the SJVEC site, and other local irrigation districts such as James Irrigation District and/or Fresno Irrigation District for the project linears.

Cooling Water Supply

Cooling water for the SJVEC would be reclaimed water from beneath the infiltration ponds at the Fresno-Clovis WWTF. The City currently discharges approximately 76,000 acre-feet per year (afy) to the infiltration ponds. The City of Fresno and the Fresno Irrigation District (FID) cooperatively operate a series of water reclamation wells that pump the impaired groundwater mound for the irrigation season. FID uses approximately 32,000 afy of this reclaimed water. The City and the Applicant have entered into a cooperative agreement to extract up to 7,000 afy from the reclaimed groundwater mound to provide cooling water to the SJVEC.

Groundwater in the vicinity of the WWTF occurs in two ”zones,” referred to as the shallow and deep zones. The shallow zone is generally at a depth of 120 feet, and the deep zone is approximately 170 to 250 feet below ground surface (bgs). The regional groundwater flow direction is from the northeast to the southwest. The impaired groundwater mound beneath the infiltration basins is approximately 1.5 miles wide and approximately 30 feet above (elevation 230 feet MSL) the baseline water table. The mound is present in both the shallow and deep zones and is highest in the winter and spring months when irrigation demand is low (SJVEC 2001c).

The City of Fresno operates a series of 21 reclamation wells to recover water from the impaired groundwater mound beneath the infiltration ponds. Reclaimed water is extracted from both the shallow and deep zones by these wells. Three new wells known as “Flowpath” wells were recently installed by the City of Fresno to extract a higher percentage of water from the shallow zone. Cooling water for the SJVEC power plant would come from six new “Flowpath” wells to be constructed at the Fresno-Clovis WWTF to supply up to a maximum of 6,455 gpm of reclaimed water. Each new well is estimated to have a capacity of 2000 gpm (SJVEC 2001c). Consequently, a maximum of four wells would be needed to meet peak demands. The two remaining wells would be used for standby purposes. (SJVEC 2001a, AFC Sections 2.2.7 and 8.14)

WATER USES

The recycled water supply would be primarily used for cooling water, combustion turbine generator (CTG) NO_x suppression injection, power augmentation, and Heat Recovery Steam Generator (HRSG) steam cycle makeup. The SJVEC would require approximately 4.8 million gallons per day (mgd) (3,321 gpm) or 5,342 afy under average conditions, and 9.3 mgd (6,455 gpm) or 7,000 afy under peak demand conditions. The average conditions water use rate of 3,321 gpm is an estimated daily average quantity based on a mixture of operation with and without duct firing at an ambient temperature of 61°F. The peak conditions water use rate of 6,455 gpm is the estimated peak makeup flow with duct firing at an ambient temperature of 118°F. During normal operation, approximately 99 percent of the total water requirement for SJVEC would be for cooling water makeup used to condense steam discharging from the steam turbine. During peak operation, approximately 84 percent of the total water requirements would be for cooling water makeup.

Based on data available from Applicant-provided water balances, **Soils and Water Table 2** summarizes the use of recycled water for two modeled operating conditions that vary slightly from those considered to be the estimated daily average and peak operating conditions. For the modeled Average Day condition, the average flow of 2,650 gpm corresponds to operations without any duct firing at an ambient temperature of 61°F. For the modeled Peak Day condition, the average flow of 6,302 gpm corresponds to operations with duct firing at an ambient temperature of 100°F.

Soils and Water Table 2
SJVEC Facility Water Balance

Component Stream	Average Day (gpm) [2]	Peak Day (gpm) [3]
Turbine Injection	28	112
HRSG's Steam Cycle Makeup	41	730
Cooling Tower Makeup [1]	2650	5,611
Backwash for Microfiltration	0	33
Reverse Osmosis Concentrate	0	164
Distillate recycled from Brine Concentrator (See Note 4)	-176	-349
Distillate Supplied to Cooling Tower	106	0
Plant Service Water	1	1
Total Water Consumption (Net)	**2,650**	**6,302**

Notes:

1) Cooling Tower Makeup water reflects 2.8 cycles of concentration.
2) Average Day represents operation at 821 MW, ambient temperature of 61°F, with 3 CTG's operating at 100 percent load, no HRSG duct firing, no CTG inlet air fogging, and no CTG power augmentation;
3) Peak Day represents operation at 1,060 MW, ambient temperature of 100°F, with 3 CTG's operating at 100 percent load, maximum HRSG duct firing, CTG air inlet fogging, and CTG power augmentation steam injection;
4) The Distillate recycled from the Brine Concentrator is shown as a negative value because it is originally included as part of the Cooling Tower Makeup. After Cooling Tower blowdown, it is treated, and eventually reused for HRSG Steam Cycle Makeup, Turbine Injection and again for Cooling Tower Makeup. In order to delineate the other uses of water and maintain water balance, it is necessary to reflect the reuse of Distillate from the Brine Concentrator as a negative value.

Source: (SJVEC 2001a, AFC Figures 2.2-6a & 2.2-6b, Sections 2.2.7.1 & 7.0) (SJVEC 2002d, Data Request #86)

WATER QUALITY

Water quality in the vicinity of the infiltration basins is monitored at each reclamation well and at on-site and off-site monitoring wells. Evaluation of the water quality data from these wells allows monitoring of the groundwater mound and the influence of the reclaimed water on the surrounding background groundwater. The parameters of chloride and total dissolved solids (TDS) are monitored specifically because there is significant difference in measured values for these parameters in the background groundwater and the WWTF effluent. Based on the chloride and TDS data collected to date from the existing wells, the new "Flowpath" wells are effectively extracting water infiltrated through the basins.

Soils and Water Table 3 summarizes the water quality of the recycled water from the Fresno-Clovis WWTF.

Soils and Water Table 3
Recycled Water Quality from Fresno-Clovis WWTF

Constituent/Parameter	Maximum Concentration (mg/L except as noted)
Alkalinity - Total	258
Aluminum	0.000
Ammonia	0.000
Arsenic	0.020
Barium	0.100
Biological Oxygen Demand	0.000
Boron	0.350
Bromide	0.000
Cadmium	0.000
Chemical Oxygen Demand	0.000
Chloride	74
Chromium	0.000
Copper	0.008
Cyanide	0.000
Fluoride	0.070
Hardness – Calcium	45
Hardness – Magnesium	25
Hardness – Total	70
Hydrogen Sulfide	0.000
Iron	0.065
Lead	0.003
Manganese	1.3
Mercury	0.000
Molybdenum	0.000
Nickel	0.017
Nitrate Nitrogen	2.160
Nitrogen Total	2.280
Phosphate	2.4
Potassium	8.9
Selenium	0.000
Silica	32.7
Silver	0.000
Sodium	70
Specific Conductance	790 (µmhos/cm)
Strontium	0.376
Sulfate	35
Sulfur	0.000
Total Dissolved Solids	475
Total Mineral Solids	0.000
Total Organic Carbon	0.000
Total Suspended Solids	0.000
Turbidity	< 1 (NTU)
Volatile & Organic Matter	0.000
Zinc	0.017

(Source: SJVEC 2001a, AFC Table 8.14-3)

To meet California Code of Regulations Title 22 standards for unrestricted use, the recycled water supply to the project would require chlorination. Sodium Hypochlorite (Chlorine) would be added before the recycled water is conveyed approximately 21 miles to the SJVEC, as well as monitored and reapplied as needed for maintaining a minimum chlorine residual of 0.20 mg/L at the SJVEC. Additional treatment would be needed at the SJVEC to obtain water quality required, particularly for the NO_x control, power augmentation and HRSG's steam supply. Recycled water treatment at the SJVEC would consist of microfiltration, reverse osmosis and demineralization (SJVEC 2001a, AFC Sections 2.2.7 and 8.14).

PROCESS AND SANITARY WASTEWATER

The SJVEC would avoid discharge of process wastewater by utilizing an on-site Zero Liquid Discharge Facility (ZLD). The plant is designed to include the following three primary steps for concentrating all process waste streams:

- First, all process waste streams (oil/water separator effluent, quenched HRSG blowdown, and makeup reverse osmosis reject) are directed to the cooling tower for initial concentration. The cooling tower concentrates these streams near the mineral solubility limit for the constituents of concern (calcium and silica). This concentrated water must be constantly exchanged with water of higher quality to avoid exceeding the solubility limits for calcium and silica in this case. This is done by draining a portion of the concentrated cooling water, in a process called blowdown, and diluting the remaining cooling water with higher quality water, for which the additional water is called makeup water. Cooling tower blowdown is passed through a multimedia filter to remove suspended solids, in order to minimize fouling of downstream ZLD equipment. The filtered effluent is then passed through weak acid cation resin to remove calcium and avoid calcium scale formation in the high TDS reverse osmosis system, and injected with caustic to increase the solubility limit of silica to also minimize the potential for scale formation from silica.

- The high TDS reverse osmosis (R.O.) system represents the second concentrating step for processing waste streams. The high R.O. system recovers approximately 90 percent of the remaining cooling tower impurities. Permeate from the R.O. system contains low levels of calcium and silica, and is returned to the cooling tower. The high TDS reject stream, equivalent to about 10 percent of the influent, is directed to the brine concentrator for final concentration.

- The brine concentrator receives high TDS waste from the weak acid cation vessels and the R.O. reject stream, and evaporates approximately 96 percent of the water contained in this combined stream. Evaporated water is reclaimed using a condenser, and this low-TDS water is then passed through a mixed-bed demineralizer for use in the combustion turbines and HRSG steam cycle. The concentrated brine is sent to a drum dryer where heat is applied to accomplish evaporation, resulting in a dry, non-hazardous solid that is transported to a landfill.

Sanitary wastewater, estimated at 1.1 gpm, would be discharged to the City of San Joaquin's sanitary wastewater system. Discharge to the City's wastewater system is subject to the City achieving an expansion of its wastewater treatment facility before it accepts any new wastewater influent. The City is currently scheduled to accomplish the upgrade in its treatment capacity by summer 2002, whereas the operation of the SJVEC is not scheduled to occur before 2004. In the unlikely event that the City's wastewater treatment is not upgraded in time for SJVEC operation, a septic system could be implemented for disposal of SJVEC's wastewater. (SJVEC 2001a, AFC Sections 2.2.9 and 8.14.3.3)

STORM WATER

Currently, storm water runoff from the project site percolates into groundwater, and may on occasion drain by furrow to the north. The site is currently farmed and consists of moderately well drained soils.

During construction, the Storm Water Retention Basin proposed for plant operations would be developed and used as a Sediment Basin to retain any storm water runoff and to trap sediments during construction. Perimeter ditches would be developed around the power block and switchyard individually, and then routed northwesterly in the ultimate direction of natural drainage into the Sediment Basin to control sediments, facilitate percolation of storm water runoff on-site, and avoid off-site runoff. During wet weather, the site and associated Best Management Practices (BMPs) would be inspected daily, as well as inspecting the day prior to predicted rainfall, to verify integrity of the storm water and erosion control measures. The adequacy of BMPs planned during construction are discussed under **Discussion of Impacts (d)** of this Soils and Water section.

During project operation, approximately 25 acres of the 85-acre site for the SJVEC will be permanently developed and surfaced with primarily paving or covered with roofing. This net increase in impermeability will yield more immediate storm water runoff than the undeveloped site. A comparison of the pre-developed, and developed quantities of storm water runoff for the 24.5 acre paved and/or covered portion of the SJVEC site is summarized in **Soils and Water Table 4**.

Soils and Water Table 4
Summary of Pre-Developed and Developed Storm Water Runoff

Return Period of Storm (Years)	Rainfall Depth for 24-Hour Storm (Inches)	Pre-Developed Runoff (Millions of Gallons)	Developed Runoff (Millions of Gallons)
10	2.0	0.41	0.82
25	2.3	0.46	0.93
50	2.5	0.51	1.02
100	2.75	0.56	1.12

(Source: SJVEC 2001a, AFC Tables 8.14-5 and 8.14-6)

In order to avoid off-site discharge of higher concentrations of surface water originating from precipitation and SJVEC storm water runoff, a storm water retention basin is

planned to temporarily store runoff from non-process areas until it percolates into the ground. Storm water from non-process areas (e.g. driveways and parking lots) would be collected in a system of swales and underground storm drains and conveyed to the storm water retention pond. Storm water and drainage from process areas would be conveyed to the plant process drain system. Chemical storage areas would have sealed containment with the ability to test accumulated rainwater before discharging it into the plant drain system. Storm water from process areas containing oil and oil-filled equipment would first be routed through an oil/water separator and then be reclaimed for use as cooling tower makeup. Storm water would be monitored for quality during the first hour of discharge of the first storm event of the wet season (October 15 through April 30), and during at least one other storm event during the wet season. The adequacy of the storm water retention basin and associated BMPs is discussed under **Discussion of Impacts (d)** of this Soils and Water Section. (SJVEC 2001a, AFC Section 8.14.4), (SJVEC 2002e, Data Request #'s 76 & 94.)

ANALYSIS OF PROJECT RELATED IMPACTS

ENVIRONMENTAL CHECKLIST

	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
SOIL AND WATER RESOURCES -- Would the project:				
a) Violate any water quality standards or waste discharge requirements?		X		
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
c) Substantially deplete or degrade local or regional surface water supplies, particularly fresh water, or fail to implement reasonable alternatives for water conservation?				X
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?		X		

	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
SOIL AND WATER RESOURCES -- Would the project:				
e) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?		X		
f) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?		X		
g) Otherwise substantially degrade water quality?		X		
h) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
i) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
j) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
k) Inundation by seiche, tsunami, or mudflow?				X

DISCUSSION OF IMPACTS

a) Violate water quality standards or waste discharge requirements?

Staff has reviewed the water quality data from the existing City of Fresno extraction wells, and the City of Fresno Engineer's Report for the Production, Distribution, and Use of Reclaimed Groundwater. The extracted reclaimed water proposed to be used for cooling and plant operations will meet CCR Title 22 requirements for use of reclaimed water, though it will be necessary to add a biocide to achieve a 5-log (99.999 percent) reduction in virus levels. The biocide would be sodium hypochlorite (i.e. chlorine bleach) and would be fed into the pipeline for the reclaimed water line in the vicinity of the groundwater wells; the reclaimed water would be monitored and further treated with chlorine as needed at the SJVEC. The application of appropriate levels of biocide would be monitored with continuous chlorine residual analyzers located immediately downstream of the application point, and at the SJVEC on-site holding tanks, in order to assure that a minimum chlorine residual or 0.2 mg/L is maintained prior to use at the SJVEC. Additionally, each new well for SJVEC reclaimed water would be fitted with a

turbidimeter to monitor and record turbidity readings, and assure turbidity does not exceed the maximum Title 22 limit of 10 NTU.

The City of Fresno has submitted the Engineer's Report for the Production, Distribution, and Use of Reclaimed Groundwater dated October 12, 2001; and DHS has provided findings and recommendations for the report. The City of Fresno incorporated DHS comments to its report by its letter dated October 23, 2001 to the Central Valley Regional Water Quality Control Board (CVRWQCB). The CVRWQCB has concurred with DHS' findings and recommendations, and is incorporating these into the Waste Discharge Requirements supporting a Master Recycling Permit for City of Fresno's WWTF. The Master Recycling Permit will enable the City of Fresno to regulate the recycling of its WWTF effluent to supply the SJVEC, as well as other customers.

Condition **Soil and Water 5** specifies that the Applicant, as part of the Energy Commission's certification, must comply with City of Fresno's requirements to secure a User Agreement for Reclaimed Water for its cooling water supply from the Fresno-Clovis WWTF.

b) Deplete groundwater supplies or interfere with groundwater recharge?

The City currently discharges approximately 76,000 afy to the infiltration ponds. The City of Fresno and the Fresno Irrigation District (FID) cooperatively operate a series of water reclamation wells that pump the impaired groundwater mound for the irrigation season. FID uses approximately 32,000 afy of this reclaimed water. The City and the Applicant have entered into a cooperative agreement to extract up to 7,000 afy from the reclaimed groundwater mound to provide cooling water to the SJVEC. Extraction of 7,000 afy of reclaimed water from the groundwater mound would lower the water table an estimated 10 to 20 feet beneath the WWTF infiltration ponds. Extraction and reuse of reclaimed water for the SJVEC would accommodate projected increases of wastewater disposal and partly control migration/expansion of the impaired groundwater mound below the Fresno-Clovis WWTF.

Potential impact of the extraction of reclaimed groundwater for SJVEC was evaluated using an existing transient MODFLOW groundwater flow model developed by the City of Fresno in 1996. The results indicate that the additional groundwater extraction from the reclaimed water mound beneath the WWTF infiltration ponds would have a beneficial effect by reducing the maximum elevation of the groundwater mound approximately 10 to 20 feet and enhance the City's efforts to recover and reuse the infiltrated wastewater.

Using reclaimed water as the power plant cooling supply is consistent with State Water Resources Control Board Policy 75-58 for protection of water quality and quantity. No other appropriate or acceptable source of cooling water supply has been identified for the project. (SJVEC 2001a, AFC Sections 2.2.7 and 8.14)

c) Deplete or degrade local or regional surface water supplies?

The SJVEC's planned use of recycled water for industrial processes would avoid any substantial depletion or degradation of local or regional surface water supplies, particularly fresh water. The SJVEC would require approximately 4.8 mgd (3,321 gpm)

or 5,342 acre-feet/year under average conditions, and 9.3 mgd (6,455 gpm) or 7,000 acre-feet/year under peak demand conditions, from the Fresno-Clovis WWTF. With groundwater recharge exceeding draft in the localized area of the Fresno-Clovis WWTF, even after use of up to 7,000 afy by SJVEC, it is unlikely that recycled water would ever fail to be in adequate supply for the SJVEC. No backup water supply is being developed for the SJVEC. Recycled water conveyed to the SJVEC will be stored in two 1.5 million gallon storage tanks. A 240,000 gallon portion of the storage will be reserved for fire water supply by establishing separate and lower outlets from the tanks for fire water compared to the elevation of the cooling and process outlets, leaving a normal working volume of up to 2.76 million gallons. The working volume will be adequate to serve the cooling and process needs for up to 17 hours under average water demands of 2,650 gpm, and up to 7 hours under peak water demands of 6,302 gpm. Treated fresh water supply from the City of San Joaquin would be used for domestic purposes in the SJVEC facility, and is estimated to average 1-2 gpm, equating to about 1-3 acre-feet/year.

In addition, no degradation to local surface water supplies is expected as a result of Applicant-proposed mitigation for avoiding impacts to water supplies and wetlands. It appears that no Section 404 Permits will be necessary because use of directional boring to cross under the California Aqueduct, James Bypass, Fresno Slough and the Beta Main Canal would avoid disturbance to the waterways, and because it has selected alignments for conventional trench and backfill construction that will avoid potential impacts to wetlands at an unnamed agricultural drainage pond along the natural gas pipeline route about 15 miles west of San Joaquin (SJVEC 2002d, Data Request # 36).

d) Result in substantial erosion or siltation on- or off-site?

During construction, approximately 25 acres would be under permanent development, increasing in elevation an average of 2 feet above existing grade. Though up to 20 acres of the balance of the 85-acre site would be used for construction laydown and parking, its grade and natural drainage pattern is not expected to change. Storm water drainage from the power plant would continue to drain in a northwesterly direction, and erosion and siltation would be avoided as a result of implementing BMP's during construction consistent with the Construction Storm Water Pollution Prevention Plan (SWPPP) and Grading/Erosion Control Plans. The SWPPP is prepared in a coordinated fashion with Grading and Erosion Control Plans, consisting of hydrologic (runoff) calculations for pre- and post-development, and specifies the sequence for construction activities and implementing BMP's for each stage of development. A draft of such plans was prepared by the Applicant and reviewed by staff as part of this assessment.

Construction BMP's include developing and utilizing the future Storm Water Retention Basin for plant operations as a Sediment Basin to retain any storm water runoff and to trap sediments during construction. The applicant intends to develop perimeter ditches around the power block and switchyard individually, and then routed northwesterly in the ultimate direction of natural drainage into the Sediment Basin for control of sediments and to facilitate percolation of storm water runoff on-site, and to avoid off-site runoff. During the rainy season, temporary sediment controls would be implemented at the perimeter of disturbed soil areas, at the toe of slopes, and at any site storm drain

inlets and outfall areas. A silt fence would be installed along the perimeter areas adjacent to open drainage canals, while all other perimeter areas would be protected with fiber rolls. Roadways developed on-site and used for construction would be stabilized with geotextile fabric and a 6-inch deep layer of crushed rock at the entrances to existing roads, as well as within the site as needed. A wheel wash station would be maintained to minimize sediment tracking to public roads. The proposed 26 acre-foot Sediment Basin would have adequate capacity to hold sediment while retaining storm water during construction. If any sediment accumulates within the basin during operation and is not removed, over time the accumulation of sediments would cause some loss of stormwater retention capacity. The retention basin may need to have sediment removed as part of the BMP maintenance program of the storm water facilities in order to maintain usable capacity.

During project operation approximately 25 acres of the 85-acre site for the SJVEC would be permanently developed, with essentially all of that area either paved or covered with roofing, which would yield more immediate storm water runoff than on the undeveloped site. The 60-acre balance of property would likely be revegetated. The capacity of the proposed Storm Water Retention Basin is being designed based on criteria from City of San Joaquin's Storm Drainage Master Plan, which requires retention of storm water resulting from a 100-year, 10-day runoff event. The estimated runoff volume from the entire 85-acre site under this condition is 23.3 acre-feet. Therefore, a storm water pond designed for 26 acre-foot storage capacity, as proposed by the Applicant, would be adequate.

Based on BMP's as proposed for construction and operation of the SJVEC, it does not appear that site drainage patterns would be altered in an adverse manner as a result of construction or operation of the proposed project, nor is it expected that any adverse level of erosion or siltation would result. (SJVEC 2001a, AFC Section 8.14.4), (SJVEC 2002e, Data Request #'s 76 - 81, SWPPP for Construction & Industrial Activity, Erosion & Sediment Control Plans)

In addition to construction being regulated under a Sediment and Erosion Control Plan, a construction-related SWPPP and General NPDES Storm Water Permit for Construction Activity are required from the applicant. Since there will not be any off-site discharge of storm water, no General NPDES Storm Water Permit for Industrial Activity is required for regulation of storm water during SJVEC operations. However, a SWPPP for Industrial Activity is required. These requirements are specified in **Soils and Water Conditions 1, 2, and 3** respectively.

e) Result in flooding on- or off-site?

There are no natural surface water features on or immediately near the proposed SJVEC. An existing irrigation canal bordering along the western property line of the SJVEC site will not be altered to affect its conveyance or drainage pattern. A bridge would be constructed over the approximately 10 foot wide canal for developing site access. As discussed under **d)** above, the increase in storm water runoff resulting from site development would be mitigated and retained on-site in the Storm Water Retention Pond. Therefore, there will be no adverse alterations to drainage, nor any increase in the rate or amount of runoff, which would result in flooding on- or off-site.

f) exceed the capacity of existing or planned stormwater drainage systems?

As discussed under **d)** above, the increase in storm water runoff resulting from site development would be controlled and retained on-site in the Storm Water Retention Pond. The storm water drainage systems and retention pond are being designed in accordance with criteria specified by City of San Joaquin's Storm Drainage Master Plan, which requires retention of storm water resulting from a 100-year, 10-day event. Therefore, the SJVEC will not create or contribute to runoff water that would exceed the capacity of existing or planned storm water drainage systems, or provide substantial additional sources of polluted runoff.

g) Otherwise substantially degrade water quality?

Based on county records and the Phase I Environmental Site Assessment (Phase I ESA) that was prepared for the proposed SJVEC, there are two nearby sites where recognized soil contamination has occurred. Although the potential for additional soil and groundwater contamination has been identified, it appears unlikely that either soil or groundwater has been affected at the proposed SJVEC site. This initial conclusion is reached based on the proximity of the SJVEC to the two sites. They are located approximately 0.75 miles from the proposed SJVEC.

Hazardous materials used during construction would be stored within areas having secondary containment. Hazardous materials used during operation would be stored in covered areas and in uncovered areas outside. These areas would include secondary containment sufficient to contain 100 percent of the volume of the single largest container. Outdoor installations would be sized to also retain rainwater from a 25-year, 24-hour storm. Secondary containment structures would be designed in accordance with Article 80 of the Uniform Fire Code, and would consist of reinforced concrete. The floors of chemical containment areas would be sloped to a low point sump, where the contents can be removed by either a sump pump or by gravity via a drain pipe and normally closed valve. Typically, the contents to be removed from chemical containment areas consist of rainwater or washdown water. These streams would be drained to the plant process drain system. Drains from areas that contain equipment or tanks containing oil would be routed to the plant process drain oil/water separator, from which effluent would be recycled to the cooling tower. (SJVEC 2002d, Data Response #94)

h) Place housing within a 100-year flood hazard area?

The SJVEC development will not increase the risk to housing within a 100-year flood hazard area. The nearest 100-year flood boundary is located approximately 2 miles south of the SJVEC site.

i) Place structures that would impede or redirect flood flows?

The proposed SJVEC is not located either within or near the 100-year FEMA-designated flood boundary. The nearest 100-year flood boundary is located approximately 2 miles south of the SJVEC site.

j) Expose people or structures to a significant risk of loss, injury or death involving flooding?

The SJVEC will not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of failure of a levee or dam. All storage facilities included in the project development are of minimal size, and would be designed according to applicable building codes including resistance to loadings from earthquakes.

k) Inundation by seiche, tsunami, or mudflow?

The SJVEC will not be exposed to inundation by seiche or tsunami, because there are no significant water bodies in the area. The site is not expected to be affected by mudflow, because the site is relatively flat, as is the surrounding vicinity.

FACILITY CLOSURE

If constructed, the SJVEC is expected to operate for a minimum of 30 years. Closure options range from "mothballing," with the intent of a restart at some time, to the removal of all equipment and facilities.

The decommissioning plan would be submitted to the Energy Commission for approval prior to decommissioning. Compliance with all applicable LORS, and any local and/or regional plans will would be required. The plan would address all concerns in regard to potential erosion and impacts on water quality.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

AGENCYCOMMENTS

CVRWQCB-1 – The Central Valley Regional Water Quality Control Board (CVRWQCB) indicated in its November 14, 2001 letter to the Energy Commission that the proposed retention pond appeared to be adequately sized for the 25 acres of developed site. CVRWQCB further stated that if the retention pond is not sized to retain storm water runoff from the balance of the project property, where materials consisting of mist, ash or particulate matter may be present, then coverage under the General Industrial Permit may be necessary.

Response: A General Industrial Permit does not appear necessary, as the proposed Storm Water Retention Basin is being designed to retain the estimated runoff volume from the entire 85-acre site, which is estimated to be 23.3 acre-feet, compared to a proposed capacity of the Retention Basin of 26 acre-feet.

CVRWQCB-2 – The CVRWQCB indicated in its November 14, 2001 letter to the Energy Commission that because construction associated with the project would disturb more than 5 acres, compliance under the General Storm Water Permit for Construction Activity will be necessary, and that a SWPPP must be prepared.

Response: Condition of Certification **Soil and Water 2** requires a SWPPP for construction activity, and **Soil and Water 3** requires a SWPPP for industrial activity.

CVRWQCB-3 – The CVRWQCB indicated in its November 14, 2001 letter to the Energy Commission that if the project involves discharge of dredged or fill material into navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act as well as a Section 401 Water Quality Certification may be necessary.

Response: The Applicant proposes to use directional boring techniques for installation of pipelines that need to cross under waters or wetlands, and to avoid disturbance entirely.

CVRWQCB-4 – The CVRWQCB, in its November 14, 2001 letter to the Energy Commission, expressed concern that the City of San Joaquin's WWTF may not have available capacity to receive the proposed sanitary wastewater from SJVEC, considering the City has not filed a Report of Waste Discharge for its proposed capacity increase.

Response: The Applicant has indicated that the City expects to increase its WWTF disposal capacity by summer 2002, while the SJVEC is not expected to be operational before 2004. **Soil and Water 4** requires the project owner to secure sanitary wastewater service from City of San Joaquin, subject to the City obtaining Waste Discharge Requirements from the CVRWQCB associated with its WWTF expansion.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than 50 percent within a six-mile radius of the proposed San Joaquin Valley Energy Center power plant (please refer to **Socioeconomics Figure 1** in this Staff Assessment), and Census 1990 information that shows the low-income population is less than 50 percent within the same radius. Based on the Soil and Water Resources analysis, staff has not identified significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no soil and water environmental justice issues related to this project.

CUMULATIVE IMPACTS

There are no cumulative impacts associated with either the proposed domestic water supply from the City of San Joaquin, or the proposed recycled water supply from Fresno-Clovis WWTF. Domestic supply to SJVEC is minimal, and within the current capacity of City of San Joaquin's domestic water system. Extraction and reuse of the reclaimed water from the Fresno-Clovis WWTF would have a beneficial effect in aiding the WWTF to control the impaired groundwater mound beneath their infiltration ponds, and in meeting their goals of increased reclaimed water extraction and use.

Construction and operational activities associated with the proposed SJVEC project may cause an increase in cumulative wind and water erosion. However,

implementation of the SWPPP would ensure that SJVEC would not contribute significantly to cumulative erosion and potential sedimentation impacts.

CONCLUSIONS

Staff has determined that construction and operation of the proposed project would result in less than significant impacts to the public or the environment and would comply with all applicable LORS if the following conditions of certification were implemented.

PROPOSED CONDITIONS OF CERTIFICATION

The following conditions have been developed for the project::

SOIL & WATER 1: Prior to beginning any site mobilization activities, the project owner shall obtain Energy Commission Staff approval of an Erosion Control Plan. The Erosion Control Plan shall include and be consistent with the standards normally required in the City of San Joaquin's Grading and Excavation Permit, for all project elements. The plan shall be submitted for the Compliance Project Manager's (CPM's) approval, and for review and comment by the City of San Joaquin. The plan will also include changes, as appropriate, incorporating the final design of the project.

The Erosion Control Plan shall be submitted to the CPM and to the City of San Joaquin for review and comments at least 60 days prior to start of any site mobilization activities. The CPM must approve the final Erosion Control Plan prior to the initiation of any site mobilization activities.

SOIL & WATER 2: Prior to beginning any site mobilization activities, the project owner shall submit a Notice of Intent for construction under the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity to the State Water Resources Control Board (SWRCB), and obtain Energy Commission Staff approval of the related Storm Water Pollution Prevention Plan (SWPPP) for Construction Activity. The SWPPP will include final construction drainage design and specify BMP's for all on and off-site SJVEC project facilities. This includes final site drainage plans and locations of physical BMP facilities/devices.

At least 60 days prior to the start of any site mobilization activities, the SWPPP for Construction Activity and a copy of the Notice of Intent for construction under the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity filed with the SWRCB, shall be submitted to the CPM. Approval of the SWPPP by the CPM must be received prior to initiation of any site mobilization activities.

SOIL & WATER 3: Prior to initiating project operation, the project owner shall submit and obtain CPM approval of the related Storm Water Pollution Prevention Plan (SWPPP) for Industrial Activity. The SWPPP will include final operating drainage design and specify BMP's and monitoring requirements for the SJVEC project

facilities. This includes final site drainage plans and locations of physical BMP's facilities/devices.

Verification: At least 60 days prior to the start of project operation, the SWPPP for Industrial Activity and a copy of the Notice of Intent for operating under the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity filed with the SWRCB, shall be submitted to the CPM. Approval of the final SWPPP plan by the CPM must be received prior to initiation of project operation.

SOIL & WATER 4: Prior to the start of project operation, the project owner shall obtain sanitary wastewater disposal service from the City of San Joaquin.

At least 60 days prior to the start of project operation, the project owner shall submit evidence to the CPM that it has obtained sanitary wastewater disposal service from City of San Joaquin.

SOIL & WATER 5: Prior to project operation, the project owner shall secure a User Agreement for Reclaimed Water for its process and cooling water supply from the Fresno-Clovis Wastewater Treatment Facility. . The project owner shall only use reclaimed groundwater supplied from the City of Fresno-Clovis WWTF as its sole source for cooling and process water supply.

Verification: At least 60 days prior to the start of project operation, the project owner shall submit evidence to the CPM that it has secured a User Agreement for Reclaimed Water for its process and cooling water supply from the Fresno-Clovis Wastewater Treatment Facility.

SOIL & WATER 6: The project owner will install metering devices and record on a monthly basis the total amount of recycled water used by the project. The project owner shall also monitor the water quality of the inflow at the SJVEC monthly. The intent of this monitoring is to make certain the project owner is achieving the objective of using only reclaimed water and that its quality is consistently acceptable for SJVEC use for cooling and process supply. The project owner shall prepare an annual summary, which will include the water quality (constituents to be determined), monthly range and monthly average of daily usage in gallons per day, and total water used by the project on a monthly and annual basis in acre-feet. For subsequent years, the annual summary will also include the yearly range and yearly average water use by the project. This information will be supplied to the CPM.

The project owner will submit as part of its annual compliance report a water quality and use summary to the CPM for the life of the project. Any significant changes in the water supply for the project during construction or operation of the plant shall be noticed in writing and provided to the CPM for approval at least 60 days prior to the effective date of the proposed change.

SOIL & WATER 7: Prior to project operation, the project owner shall obtain an agreement from the City of Fresno to measure and record groundwater production and water quality for each dedicated reclamation well supplying SJVEC and transmit the data to the project owner . Flow meters with totalizers shall be installed at each well. During project operation, pumping rate and total

production shall be recorded monthly. Water quality testing shall comply with the CVRWQCB requirements.

At least 60 days prior to project operation, the project owner shall provide evidence of its ability to obtain groundwater production and water quality data for each of the dedicated reclamation wells supplying SJVEC. The project owner, or by agreement the City of Fresno, shall begin water production and water quality monitoring when the wells are first used to provide project process and cooling water. Monthly water production records and water quality data shall be submitted to the CPM 6 months after the start of operation, and then subsequently on an annual basis for the life of the project.

SOIL & WATER 8: Prior to project operation, the project owner shall arrange with the City of Fresno for the drilling, construction, and testing of the six reclamation wells for supply of cooling and process water to SJVEC, and provide the initial results of production and water quality testing. In the event inadequate yield or high quality groundwater is produced from the wells, the City and SJVEC will construct additional reclamation wells to achieve the project objectives of pumping only reclaimed water for power plant cooling.

At least 90 days prior to project operation, the project owner shall submit results of initial production and water quality testing to the CPM for each of the six reclamation wells for supply of cooling and process water to SJVEC. Wells not meeting the project goals will be identified and recommendations for corrective measures will be provided.

REFERENCES

SJVEC (San Joaquin Valley Energy Center) 2001a. Application for Certification, Volume 1 & Appendices, San Joaquin Valley Energy Center (01-AFC-22). Dated October 16, 2001 and docketed October 31, 2001.
Cited in text as: (SJVEC 2001a, AFC Section #)

SJVEC (San Joaquin Valley Energy Center) 2001b. Data Adequacy Response Set 1. Dated and docketed December 7, 2001.
Cited in text as: (SJVEC 2001b, page #)

SJVEC (San Joaquin Valley Energy Center) 2001c. Engineers Report for the Production, Distribution and Use of Reclaimed Groundwater for the San Joaquin Valley Energy Center. Dated October 12, 2001 and docketed November 30, 2001.
Cited in text as: (SJVEC 2001c, section and page #)

SJVEC (San Joaquin Valley Energy Center) 2002d. Data Request Response Set #1. Dated February 26, 2002 and docketed February 26, 2002.
Cited in text as (SJVEC 2002d, Data Request #)

SJVEC (San Joaquin Valley Energy Center) 2002e. Data Request Response Set #1C. Dated March 20, 2002 and docketed March 20, 2002.
Cited in text as (SJVEC 2002e, Data Request #)

Cantu, Leo, 2002. City Engineer, City of San Joaquin. Conversation with James Thurber, March 18, 2002.
Cited in text as (Cantu, 2002)

Horn, Gary, 2002. Engineer (Yamabe and Horn Engineering) for the City of San Joaquin. Personal communications with James Thurber and Aurie Patterson, March 18 through 20, 2002.
Cited in text as (Horn, 2002)

USGS (United States Geological Survey), 1989. Ground-Water Resources for the Central Valley of California. Open File Report 89-251.
Cited in text as (USGS 1989)

USGS, 1991. Ground Water in the Central Valley, California – A Summary Report. U.S. Geological Survey Professional Paper 1401-A.
Cited in text as (USGS 1991)

TRAFFIC AND TRANSPORTATION

Testimony of David Young

INTRODUCTION

The Traffic and Transportation Section of this staff assessment is an objective analysis of the transportation systems in the vicinity of the project. It addresses the San Joaquin Valley Energy Center's (SJVEC) compatibility with applicable Laws, Ordinances, Regulations, and Standards (LORS). This assessment analyzes and identifies potential impacts related to the construction and operation of the project on the surrounding transportation system and roadways, and proposes mitigation measures to avoid or lessen those impacts.

LAWS, ORDINANCES, REGULATION AND STANDARDS

Federal, state, and local regulations applicable to the area roadways for the project and transportation of hazardous materials are listed below. These regulations ensure public safety, and are implemented to control and mitigate potential impacts arising from the construction, operation and transportation of hazardous materials related to the SJVEC.

FEDERAL

- Title 49, Code of Federal Regulations, Sections 171-177, govern the transportation of hazardous materials, the type of materials defined as hazardous, and the marking of the transportation vehicles.
- Title 49, Code of Federal Regulations, Sections 350-399, and Appendices A-G, Federal Motor Carrier Regulations, address safety considerations for the transport of goods, materials, and substances over public highways.

STATE

- California Vehicle Code, Section 353 defines hazardous materials.
- California Vehicle Code, Sections 31303-31309 regulate the highway transportation of hazardous materials, the routes used, and restrictions thereon.
- California Vehicle Code, Sections 31600-31620 regulate the transportation of explosive materials.
- California Vehicle Code, Sections 32000-32053 regulate the licensing of carriers of hazardous materials and include noticing requirements.
- California Vehicle Code, Sections 32100-32109 establish special requirements for the transportation of inhalation hazards and poisonous gases.
- California Vehicle Code, Sections 34000-34121 establish special requirements for the transportation of flammable and combustible liquids over public roads and highways.
- California Vehicle Code, Sections 34500 et seq. regulate the safe operation of vehicles, including those used for the transportation of hazardous materials.

- California Vehicle Code, Sections 2500-2505 authorize the issuance of licenses by the Commissioner of the California Highway Patrol for the transportation of hazardous materials, including explosives.
- California Vehicle Code, Sections 13369, 15275, and 15278 address the licensing of drivers and the classifications of licenses required for the operation of particular types of vehicles. In addition, these sections require the possession of certificates permitting the operation of vehicles transporting hazardous materials.
- California Streets and Highways Code, Sections 117 and 660-72, and California Vehicle Code 35780 et seq., require permits for the transportation of oversized loads on county roads.
- California Streets and Highways Code, Sections 660, 670, 1450, 1460 et seq., and 1480 et seq., regulate right-of-way encroachment and the granting of permits for encroachment on state and county roads.
- California Health and Safety Code, Section 25160 et seq., addresses the safe transport of hazardous materials.

LOCAL

- Council of Fresno County Governments Regional Transportation Plan – addresses several issues and establishes goals, policies, and objectives of regional importance, including air quality, highways, streets and roads, aviation, rail, goods movement, and transportation demand efforts.
- County of Fresno, General Plan-Transportation and Circulation Element- provides the framework for Fresno County decisions concerning the countywide transportation system, including various transportation modes and related facilities.
- City of San Joaquin, Comprehensive General Plan and Environmental Impact Report (EIR)- presents goals and policies to coordinate the transportation and circulation system with planned land uses and to promote the efficient movement of people, goods and services within the Urban Management Planning Area.

SETTING

REGIONAL SETTING

The proposed SJVEC project site is located at the southern edge of the incorporated community of San Joaquin in Fresno County. The site is approximately 40 miles southwest of the City of Fresno, in the southwestern portion of the San Joaquin Valley. The City of Hanford is located approximately 40 miles to the southeast of the project site. Interstate 5 (I – 5) is a four-lane freeway running from north to south through the San Joaquin Valley and is located 22 miles west of the project site. State Route (SR) 99 runs parallel to I – 5 and is approximately 30 miles east of the SJVEC site. SR 33 runs north to south and is located 12 miles west of the project site. SR 145 and SR 180 are located 7.5 miles east and 9 miles north of the proposed SJVEC, respectively. **Figure 1** displays the regional transportation network in the vicinity of the SJVEC. The closest major airport to the project site is the Fresno-Yosemite International Airport,

located in the city of Fresno, nearly 43 miles from the site. Railroad service for the area is provided by the San Joaquin Valley Railroad (SJVR), which operates the line that is adjacent to the project site's northern and eastern boundaries. The line runs north to south through the San Joaquin Valley.

LOCAL SETTING

The SJVEC project site lies within the boundaries of the City of San Joaquin. The site is located in the southwestern portion of the city on a parcel that has predominantly been used for agricultural production. The project site is approximately 5 miles southeast of the town of Tranquillity and 7 miles northwest of the town of Helm. Manning Avenue, a two-lane expressway adjacent to the site's northern boundary, is a major arterial that connects with I – 5 approximately 22 miles to the west of the project site. West Colorado Avenue is a major arterial, two-lane expressway that runs from northwest to southeast along the proposed SJVEC's northeastern boundary. West Springfield Avenue is a two-lane local road running east to west along the site's southern boundary. West Cherry Lane is a private two-lane road west of the project site. West Cherry Lane would be improved to Fresno County standards and would serve as the primary access road to the SJVEC site. **Figure 2** displays the local roadways in the immediate vicinity of the project site. There are no major air facilities in the immediate vicinity of the project site. As stated above in the **REGIONAL SETTING**, SJVR operates the railway adjacent to the project site's northern and eastern boundaries.

Insert Figure 1

Insert Figure 2

ANALYSIS AND IMPACTS

PROJECT SPECIFIC IMPACTS

The California Environmental Quality Act (CEQA) indicates that a project could have a significant effect on traffic and transportation if the project will result in any impacts listed in the checklist below.

ENVIRONMENTAL CHECKLIST

	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
TRANSPORTATION/TRAFFIC – Would the project:				
a) 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)?			**x**	
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?			**x**	
c) 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?				**x**
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				**x**
e) Result in inadequate emergency access?				**x**
f) Result in inadequate parking capacity?				**x**
g) Create a significant hazard to the public or the environment through the routine transportation of hazardous material?			**x**	

a. Traffic Increases

Construction Impacts

Construction Workforce Traffic

Construction of the SJVEC would take place from the third quarter of 2002 through the third quarter of 2004. The average daily work force for the power plant and the transmission line would be 205 workers. Based on the applicant's assumptions of a 1.3 average vehicle occupancy rate for carpooling purposes the average daily workforce for the power plant and transmission line would generate 315 daily vehicle trips over the area's roadways

The peak construction period is expected to take place between Month 11 and Month 17 of the overall construction period. During the peak construction period of the SJVEC, excluding the construction of gas and water pipeline linear facilities, the average daily workforce would increase to 386 workers and generate 594 daily vehicle trips.

The construction of linear facilities, including gas and water pipelines, would begin during the first year of construction and be completed over a 12-month period. The construction of the gas pipeline would require 111 workers, adding an additional 170 daily vehicle trips to area roadways. The water pipeline would have a workforce of 113 workers, generating an additional 175 daily vehicle trips. The same carpooling assumption of 1.3 persons per vehicle was used to calculate the number of daily vehicle trips resulting from linear facility construction.

The overall peak construction workforce, including associated linear facilities, would add an estimated 938 daily vehicle construction trips to area roadways. The daily construction schedule would start at 7:00 a.m. and end at 3:30 p.m.; thereby, avoiding potential effects on traffic volumes during the peak hours. **TRANS-7** would ensure that all construction related activities take place outside of the peak commute hours. The actual workforce travel routes were not provided; however the applicant assumes that the majority of the workforce would originate from the cities of Fresno and Clovis in Fresno County and parts of Madera County. Staff concurs with this assumption.

The addition of 938 daily vehicles trips would cause traffic increases in relation to existing traffic volumes on the area's roadways. However, the increases would be temporary and would not cause any roadway to exceed its capacity or decrease to an unacceptable Level of Service (LOS). Staff concludes that the SJVEC construction workforce would have a less than significant impact on traffic volumes in the vicinity of the project.

Truck Traffic

The truck traffic generated during the construction phase of the SJVEC would consist mostly of deliveries of construction materials and supplies. Based on the applicant's estimates, the SJVEC would generate an average of 10 truck deliveries per day during the normal construction period and reach a high of 20 truck deliveries per day during the

peak construction period between Month 11 and Month 17 of the overall 24-month construction period. The local and state roadways in the vicinity of the SJVEC have truck percentages ranging from 20 percent on West Colorado Avenue to 29 percent on SR 33. Given the existing percentages of truck traffic on these area roadways, the additional truck traffic generated by the construction phase of the SJVEC is expected to be less than significant.

The project would increase the amount of truck traffic in the area and cause additional wear on the area's roadways; however, the increase would be temporary and not significant. The greatest impacts would be during the construction phase, with little or no impacts expected from truck traffic during the operational phase of the project (see ***Operations Impacts: Truck Traffic***). The project would not result in substantial increases of truck traffic in the project's vicinity; therefore, the impacts from this perspective would be less than significant.

Linears

Major local roads are shown in **TRANS Figure 2**. The proposed water pipeline would be 20.5 miles long, and would be routed east from the project site along Manning Avenue, north along Jameson, east along Lincoln, north along Chateau Fresno and east along North Avenue to the tie-in facility. Currently, these roadways are operating at LOS A with the exception Chateau Fresno. Although Chateau Fresno is a county maintained roadway, portions of it are fenced off and closed to traffic; therefore, a LOS A designation is not applicable to this roadway. Jameson, Lincoln, Chateau Fresno, and North Avenues are all considered local streets and are not depicted in **Figure 2**. The water pipeline would be constructed over a 12-month period with a workforce of 113 people. Based on the applicant's estimates of a 1.3 average vehicle occupancy rate, the water pipeline workforce would add 175 daily vehicle trips to the area's roadways. The above roadways are all operating and are expected to operate at or above an acceptable LOS during the construction of this linear facility. Therefore, less than significant impacts are expected from the water pipeline construction and associated activities.

The project's electric transmission line would be looped from the Helm Substation through two overhead lines approximately 1,300 to 1,500 feet long to either the Panoche-McCall or the Panoche-Kearney 230-kV transmission lines and into the SJVEC facility. The construction of the transmission line would require work being done in the right-of-way on W. Springfield Avenue, adjacent to the site's southern boundary. According to the Fresno County Public Works Department, W. Springfield Avenue has an approximate daily traffic volume of 200 vehicles and a LOS A. The construction work force for the plant would also perform the transmission line work. Therefore, no additional daily vehicle trips would result from the transmission line work. All other local roadways in the vicinity of the SJVEC are currently operating at a LOS A. The transmission line construction activities would have a temporary and negligible effect on traffic traveling on W. Springfield Avenue and other local roadways, because of its short distance and the lack of existing road congestion. Therefore, less than significant impacts are expected.

The gas line route is proposed to be approximately 20 miles long and would tie into PG&E's main pipeline, which is adjacent to Manning Avenue and approximately 4 miles east of I- 5. The proposed route would run east along Manning Avenue for approximately 18 miles, then south on El Dorado Avenue, then east on Springfield Avenue for 1.5 miles and tie into the plant site. The gas pipeline route would be shorter than other alternative routes proposed by the applicant, and would require less construction being done in the public right-of-way. However, the proposed construction route for the gas pipeline would occur in Manning Avenue's right-of-way, which is a major arterial running east to west. Construction of the natural gas pipeline would take 3 to 4 months and is expected to take place during the summer of 2003. The gas line construction workforce would be 111 people and would generate 170 daily vehicle trips during the construction period. The portions of Manning Avenue affected by the gas pipeline construction activities would be along rural roadway segments with low traffic volumes and a current LOS A. No significant increases in traffic or decreases in LOS would result from the construction of this linear facility; therefore, less than significant impacts are expected.

Table 1 provides estimates of the daily truck traffic that would be generated by the construction of each linear facility.

Table 1
Estimated Truck Traffic for Linear Facilities Construction

Linear Facility	**Months After Notice-to-Proceed**													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Water Pipeline								**4**	**40**	**80**	**80**	**40**	**4**	**2**
Gas Pipeline								**4**	**40**	**80**	**80**	**40**	**4**	**2**
Transmission Line	**1**	**2**	**3**	**4**	**5**	**4**	**3**	**1**						

When the construction of the linear facilities takes place within or adjacent to public rights-of-way, the traffic control plan (TCP) should include provisions that require at least one lane of traffic flow be maintained , traffic flow be alternated by direction using flagmen, and access for emergency vehicles be maintained at all times. Staff concurs with the applicant's estimates that the maximum daily truck traffic during linear construction would be seven trucks for the water and gas pipelines, and five for the transmission line. Implementation of **TRANS-4,** which requires a TCP, would ensure that the construction of linear facilities would not affect or contribute substantially to traffic increases in the vicinity of the SJVEC.

Operation Impacts

Operation Workforce Traffic

The operations phase of the SJVEC would have minimal affects on local roadways and the transportation network in the vicinity of the project site. The SJVEC is expected to have 30 full-time employees, working various shifts over a 24-hour period. The applicant has indicated that maintenance technicians and administrative personnel would work from 8:00 a.m. to 5:00 p.m., which would require 27 employees traveling to

and from the site during peak commuting hours. This would add an additional 54 daily vehicle trips being made during peak commute hours (assuming each worker drove to and from the site alone and was not involved in any type of car-pooling activity). These increases would not have a significant effect on any of the roadways in the vicinity of the SJVEC.

Although the operations workforce would add to peak hour volumes on the area's roadways, the increases would be minimal and would not cause any significant changes in LOS or effect roadway capacities; therefore, the impacts from this perspective would be less than significant.

Truck Traffic

The amount of truck traffic associated with the operation phase of the SJVEC would be minimal. Based on the applicant's estimates, the SJVEC would require up to 5 truck related deliveries per day during the operational phase. The trucks would deliver supplies and replacement parts, in addition to delivering and disposing of hazardous materials and waste. The applicant has indicated that an aqueous ammonia solution would be used for plant operations. A 28 percent aqueous ammonia solution would require approximately four times the amount of truck trips than pure anhydrous ammonia. However, the aqueous ammonia deliveries to the project site would result in a maximum of 10 additional trips to the areas' roadways per week or approximately two per day. It is staff's belief that the additional trucks trips associated with the aqueous ammonia deliveries would insignificantly increase truck traffic over the existing truck volumes in the area. Therefore, the truck traffic associated with the SJVEC operations would result in slight increases in truck traffic on roadways in the vicinity of the project site. However, these additions would not be substantial in relation to existing truck traffic patterns in the area; therefore, the impacts are expected to be less than significant.

b. Levels of Service

Currently, all the state highways in the vicinity of the project are operating at or above a LOS[1] C. Some segments of I – 5 and SR 99 will decrease to a LOS D during the construction period between the third quarter of 2002 and the third quarter of 2004. However, this decrease would still be within acceptable limits for LOS established by Caltrans and all relevant jurisdictions; therefore this decrease in LOS would not result in a significant impact to state highways in the vicinity of the SJVEC.

The Fresno County General Plan, Transportation and Circulation Element Policy TR-A.2 states: In no case should the County plan for traffic conditions that are worse than LOS D on rural county roadways. Portions of the SJVEC linear facilities would be

[1] Level of Service (LOS) is a measure of roadway performance that assigns a letter grade A-F describing various ranges of operating conditions. A LOS A represents free flow and an uninterrupted traffic stream. A LOS F is characterized by stop-and-go waves and traffic saturation with delays. LOS is determined by using a Volume to Capacity (V/C) Ratio to calculate roadway efficiency. V/C is indicative of traffic conditions, speeds and driver maneuverability on given roadway segments. LOS A, B, and C are represented by V/C ratios below 0.80. LOS D is between 0.80 and 0.90, LOS E has a V/C between 0.90 and 1.00 and LOS F is represented by a V/C ratio greater than 1.00. The criteria for LOS on state highways are established by Caltrans policies. A LOS D is considered as a minimum acceptable level for planning purposes.

constructed on roadways under Fresno County's jurisdiction and are thus subject to the LOS D standard. All the local roadways potentially affected by the construction of the SJVEC are currently and projected to operate at or above a LOS D; therefore, less than significant impacts are expected on county roadways.

The City of San Joaquin Comprehensive General Plan and Environmental Impact Report (EIR), establishes goals and policies for the city to maintain a minimum LOS C on all arterials and collectors. West Colorado and West Manning Avenues are both major arterials and would be used for a majority of the SJVEC activities. West Cherry Lane and West Springfield Avenue are local roadways that would also be used extensively during the construction and operational phases of the SJVEC. Jameson, Lincoln, Chateau Fresno, and North Avenues would be temporarily affected by the construction of the water pipeline linear. All the above local roadways are currently operating at a LOS A. The addition of an estimated 938 daily vehicle trips during the construction phase would cause a temporary decrease in LOS on West Colorado and West Manning Avenues. However, the decrease from a LOS A to a LOS C for these roadways would still be within acceptable limits set by the City of San Joaquin's General Plan and EIR; therefore, the effects to LOS from this perspective would be less than significant. **Table 2** displays the estimated roadway characteristics for selected roadway segments proposed for use during the construction phase of the SJVEC.

Table 2
Estimated Roadway Characteristics During Construction (2002-2004)

Roadway	Class	Number of Lanes	Existing Average Daily Volume	SJVEC Daily Vehicle Trips	Existing p.m. Peak Hour LOS	Combined Daily Traffic w/Existing, SJVEC, and projected Growth[1]	Estimated p.m. Peak Hour LOS with SJVEC Project
West Colorado Avenue (east of El Dorado)	Major Arterial	2	2,295	938	A	3,523	C
West Manning Avenue (east of South Placer Avenue)	Major Arterial	2	1,935	938	A	3,118	C
West Cherry Lane (west of Colusa Avenue)	Private Road	2	N/A	938	N/A	938	N/A
State Route 99 (at MP 9.16, Manning Avenue)	State Route	6	71,000	938	C	80,938	D
State Route 33 (at MP 39.85, North Junction I – 5)	State Route	2	2,150	938	A	3,338	C
Interstate 5 (at MP 29.96, Junction SR 33, north)	Inter-State	4	28,000	938	C	32,938	D
Interstate 5 (at MP 38.36, Kamm Avenue)	Inter-state	4	29,000	938	C	33,938	D

Notes for Table 2
1. Combined refers to existing conditions plus estimated traffic volumes generated by the construction related activities of the SJVEC and Caltrans' projected growth rates for the above roadways.

The SJVEC project would not cause a decrease in LOS to an unacceptable level, nor would it cause any roadway to exceed its maximum V/C ratio, established by Caltrans or relevant local jurisdictions. Adoption of **TRANS-7** will ensure that LOS levels will not deteriorate to an unacceptable level. Furthermore, the SJVEC would not conflict with

applicable transportation plan policies; therefore, the effects to LOS in the project's vicinity are expected to be less than significant.

c. Change in Air Traffic Patterns

There are no major commercial aviation centers in the area of the SJVEC as discussed above in the **REGIONAL** and **LOCAL SETTING** of this section. The City of San Joaquin does not have airport facilities. All public airports in the project's vicinity are greater than 10 miles from the project site. The Fresno-Yosemite International Airport is located in Fresno, nearly 43 miles from the project site. One active airstrip (apparently used for crop dusting activities) is in the immediate vicinity of the SJVEC. The landing strip is approximately 3.47 nautical miles from the project site's western boundary and is located on the north side of Manning Avenue, just east of the Fresno Slough. The activities associated with the construction and operational phases of the SJVEC would not cause any changes in air traffic patterns. Additionally, the facility and related structures would not pose or result in any substantial safety risks to air traffic in the vicinity of the SJVEC; therefore staff concludes that there is no impact.

d. Hazards Posed by Design Feature or Incompatible Use

There are no identified hazardous roadway features (e.g., sharp curves), dangerous intersections or incompatible uses in the project's vicinity. The San Joaquin Valley Railroad operates the line adjacent to the project site, which has an average of 24 trains per month. According to SJVR, the trains run twice on Mondays, Wednesdays, and Fridays, once in the morning and once in the evening. The railroad crossing at West Colorado and West Springfield Avenues is not signalized and could create potential safety hazards. However, the applicant has indicated that all SJVEC related traffic would be directed to the project site using only the railroad crossing at West Colorado and Manning Avenues, which is striped, marked and signalized. Therefore, there are no design features or incompatible uses in the vicinity of the SJVEC that would pose roadway or transportation safety hazards.

f. Parking

The project laydown area and construction workforce parking lot would be on a 20-acre portion of the project site. The average daily workforce would be 205 workers and reach a high of 386 workers during the peak construction period. Therefore, the applicant would need to provide adequate parking for the entire peak workforce of 386 workers. Even at the worst-case scenario of 386 workers using a typical 9' X 18' parking space, staff believes that the 85-acre project site would provide adequate parking facilities for the construction workforce and related equipment.

If the SJVEC is certified, **TRANS-5** would ensure that all construction and operational parking take place in designated parking areas only. In addition, staff concludes that the SJVEC would not affect parking capacities or result in inadequate parking in the vicinity of the project; therefore, no impact is expected.

e. Emergency Access

The main entrance and access to the SJVEC site would be via W. Cherry Lane, which would be used exclusively for SJVEC related activities. Currently, W. Cherry Lane is a private road; however, it would be improved to meet Fresno County roadway standards. There are no current traffic volumes available for W. Cherry Lane because of its private

designation. The project's construction workforce and related truck traffic would add 938 daily vehicle trips to this roadway over the proposed two-year construction period. Given the expected traffic volumes from construction related activities and the proposed roadway improvements, the project would not exceed W. Cherry Lane's volume capacity or LOS. Therefore, the construction and operational phases of the SJVEC project would not result in inadequate emergency access.

The City of San Joaquin's volunteer fire department is less than 1 mile from the site. The nearest fire station is located in the town of Tranquillity, 6 miles to the northwest of the SJVEC site. The closest emergency care facility is the San Joaquin Medical Center, approximately 0.5 miles north of the site. The nearest hospitals to the SJVEC are both approximately 43 miles from the project site. The Coalinga Regional Medical Center is located at 1191 Phelps Avenue in the City of Coalinga and the Saint Agnes Medical Center is located at 1303 East Herndon in the City of Fresno.

The applicant has indicated that it will consult with the City of San Joaquin, Fresno County and Caltrans to prepare a traffic control plan (TCP) that addresses emergency access. **TRANS-4** will ensure that an acceptable TCP has been submitted prior to the start of any construction activities.

The surrounding roadways are all operating at or above an allowable LOS and no significant decreases are expected from the construction or operation of the SJVEC facility. Staff has concluded that the SJVEC would not impede or affect emergency access; therefore, no impact is expected.

g. Transportation Of Hazardous Materials

The construction and operation of the power plant would require the transportation of various hazardous materials, as indicated in the **HAZARDOUS MATERIALS** section of this staff assessment. Staff concurs with the applicant's proposed routes for the delivery and transportation of hazardous materials and waste, as all would take place on roadways designated and approved for hazardous material transportation. There are no hospitals or schools along the proposed routes. The nearest schools are the Golden Plains School and the San Joaquin Elementary Head Start located approximately 2500 feet to the northeast of the project site. Improvements to Colusa Avenue, W. Springfield Avenue, and W. Cherry Lane would be made in compliance with all applicable standards and regulations.

There are two possible disposal facilities proposed for use for the SJVEC project: All Valley Disposal located at 3415 West Belmont Avenue in Fresno and Hazardous Waste Disposal located at 35521 Old Skyline Road in Kettleman City. Traveling to the All Valley Disposal site, vehicles would proceed to S. Colusa Avenue, turn right onto W. Manning Avenue, left onto McMullen Grade, left on S. Dickerson Avenue, right onto SR 180, left onto N. Cornelia Avenue, and right on W. Belmont Avenue, proceeding to the facility. Vehicles traveling to the Hazardous Waste Disposal site would proceed on W. Cherry Lane, to Colusa Avenue to Springfield Avenue; proceed SE on Colorado Avenue, right on SR 145 via S Lassen Avenue, left on SR 145 via Fresno-Coalinga Road, and onto I – 5 at the SR 33 ramp. On I – 5, exit at SR 269 bearing right and back onto SR 269 via S. Lassen Avenue. Finally, left on SR 269 via N. Skyline Boulevard and then left on Old Skyline Road to the waste facility.

Condition of Certification **TRANS-3** requires the applicant to follow all federal and state LORS for the handling and transportation of hazardous materials. Therefore, no impact is expected.

CUMULATIVE IMPACTS

According to the City of San Joaquin's Planning Department only one planned, proposed, or approved project would have a construction schedule that is concurrent with that of the proposed SJVEC. Colorado Gardens is a 50-unit, multi-family housing project that will be located on Colorado Avenue between 3rd and 5th streets in the city of San Joaquin. The construction schedule of the Colorado Gardens project is expected to take place between May 2002 and May 2003. The City's Planning Department had no information regarding the expected amount of construction traffic that would be generated as a result of the Colorado Gardens project. However, it is the Planning staff's opinion that even with overlapping construction schedules, the cumulative affects from the two projects would not cause significant impacts to the roadway or transportation system in the vicinity of the SJVEC.

The traffic generated by the SJVEC would be greatest during the construction phase of the project. However, **TRANS-7** would ensure that the traffic associated with the SJVEC project occurs during off-peak commute hours; thus, not conflicting with the traffic generated by the approved Colorado Gardens housing project.

The surrounding roadway system is operating and expected to operate at or above acceptable LOS over the construction phase of the SJVEC and has adequate capacity to accommodate the additional traffic that would be generated. Therefore, staff concludes that there would be no significant cumulative traffic and transportation impacts as a result of the SJVEC project.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than 50 percent within a six-mile radius of the proposed SJVEC. Census 1990 information shows the minority/low income population is also greater than 50 percent within the same radius. Based on the Traffic and Transportation analysis, staff has not identified significant direct or cumulative transportation related impacts resulting from the construction or operation of the SJVEC project. Therefore, there are no Traffic and Transportation environmental justice issues related to this project.

COMPLIANCE WITH LORS

The applicant has stated its intention to comply with all LORS. Conditions to ensure compliance are included below. Staff believes such compliance would not present any unusual difficulties. Therefore, the project is considered to be consistent with identified federal, state, and local LORS.

FACILITY CLOSURE

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. The applicant would prepare a Facility Closure Plan for submittal to the Energy Commission for review and approval, at least 12 months prior to the proposed closure. At the time of closure, all then-applicable LORS would be identified and the closure plan would address how these LORS will be complied with.

Unexpected 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. In the event of temporary closure, the effects on traffic and transportation would be similar to those for normal operation of the power plant facility, and the applicant would have to comply with all applicable LORS section with respect to transportation permits for hazardous materials and equipment deliveries and removal.

Unexpected permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. Staff assumes that the facility will either remain idle until such time that new ownership is established, or dismantling of the facility would occur.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The Fresno County Department of Public Works, Road Maintenance Division provided comments on the SJVEC project. Staff believes the Road Maintenance Division's concerns regarding transportation permits are adequately addressed in the Conditions of Certification included in this section.

CONCLUSIONS

The proposed SJVEC project would have minimal affects on area roadways and intersections. The construction and operational phases would cause increases in roadway demand and traffic, but would not result in any decreases in LOS or exceed any volume/capacity ratio thresholds established by local or regional authorities. The applicant would be required to develop and implement a traffic control plan that is acceptable to Caltrans, Fresno County and the City of San Joaquin. Therefore, the project would result in less than significant impacts to the transportation system in the project's vicinity.

If the Energy Commission certifies the San Joaquin Valley Energy Center facility, staff recommends that the Commission adopt staff's proposed conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1: The project owner shall comply with Caltrans, Fresno County, and the City of San Joaquin requirements for 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, Fresno County, and the City of San Joaquin and the affected municipalities' limitations for encroachment into public rights-of-way, and shall obtain necessary encroachment permits from 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. The project owner shall maintain copies of these permits at the project site for inspection by the Compliance Project Manager (CPM).

TRANS-4: Prior to site mobilization activity for development of the SJVEC, the project owner shall consult with the City of San Joaquin and affected municipalities, and prepare and submit to the CPM for approval a construction traffic control plan and implementation program that addresses the following issues:

- Use of carpools, vanpooling or other ride share programs;
- Timing of heavy equipment and building materials deliveries;
- Lane closures during construction;
- Signing, lighting, and traffic control device placement if required;
- Establishing work hours outside of peak traffic periods;
- Insure that construction does not interfere with emergency access to the construction sites;
- Redirecting construction traffic with a flag person;
- Insure that adequate construction worker parking is provided on site;

- Maintaining access to adjacent residential and commercial properties;
- Maintaining utility services to adjacent residential and commercial properties.

Verification: At least 30 days prior to site mobilization activity, the project owner shall provide to the CPM for review and approval a copy of its construction traffic control plan and implementation program.

TRANS-5: Based on the determined state of primary roadways to be used in the traffic control plan and implementation program, and following construction of the power plant and all related facilities, the licensee shall repair those primary roadways to original or as near original condition as possible.

Verification: Thirty days prior to construction, the licensee shall photograph the primary roadways. The licensee shall provide the CPM and the City of San Joaquin and Fresno County with a copy of these photographs. Within 30 days of the completion of project construction, the licensee will meet with the CPM and the City of San Joaquin's Public Works Department to determine and receive approval for the actions necessary and scheduled to complete the repair of those roadways to original condition as possible.

TRANS-6: Designated truck routes shall be established to ensure that trucks do not go through residential areas, in front of schools, etc.

Verification: The project owner shall include this specific route in its contracts for truck deliveries and maintain copies onsite for inspection by the CPM.

TRANS-7: The Owner shall schedule construction work hours in potentially affected areas avoiding morning (7 a.m. to 9 a.m.) and evening (4 p.m. to 6 p.m.) peak hour traffic periods (includes heavy truck traffic).

Verification: The project owner shall maintain a construction log that specifies, in part, the time and date of construction activities related to the gas pipeline, transmission line and water interconnect in the on-site compliance file.

TRANS-8 During construction of the power plant and all related facilities, the project owner shall enforce a policy that all project-related parking occurs in designated parking areas.

Verification: At least 30 days prior to start of site mobilization activities, the project owner shall submit a parking and staging plan for all phases of project construction to the City of San Joaquin and the CPM for concurrent review and comment.

REFERENCES

City of San Joaquin. Comprehensive General Plan and EIR. 1996.

City of San Joaquin. Personal communication with Lupe Estrada, Planning and Development Department. Telephone conversation December 4, 2002.

City of San Joaquin. Personal communication with Lupe Estrada, Planning and Development Department. Telephone conversation February 6, 2002.

City of San Joaquin. Personal communication with Gary Horn, City Engineer. November 2001.

County of Fresno. Planning and Resource Department-Road Maintenance Division. Bernard Jimenez, comments. March 8, 2001.

County of Fresno, Personal Communication with Stan Nakagawa, Public Works Department. Telephone conversation March 18, 2002.

County of Fresno, Personal Communication with Theresa Acosta'mena, Planning Department. Telephone conversation March 4, 2002.

County of Fresno, Personal Communication with Tony Boren, Senior Transportation Planner. Telephone conversation January 2002.

County of Fresno. The 2001 Regional Transportation Plan. August 2001.

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

INTRODUCTION

The project Applicant (San Joaquin Valley Energy Center, LLC) proposed to deliver the electricity generated from the San Joaquin Valley Energy Center (SJVEC) to the Pacific Gas and Electric (PG&E) power grid through two new double-circuit overhead 230 kV transmission lines. Building SJVEC at the proposed location would necessitate the re-routing of the existing 70 kV Helm-Kerman, single-circuit transmission line, whose route bisects the proposed site. These new and re-routed lines are to be designed and built according to PG&E practices reflecting compliance with applicable laws, ordinances, regulations and standards, or LORS (SJVEC 2001a, pages 5-8 through 5-19).

The purpose of this analysis is to assess the proposed SJVEC transmission line construction and operational plan for incorporation of the measures necessary for compliance with the noted PG&E design and operational guidelines for transmission lines in the project area. Staff's analysis will focus on the following issues, which relate primarily to the physical presence of the lines, or secondarily to the physical interactions of line 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.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following federal and state laws and industry practices are intended to ensure implementation of the measures necessary to prevent occurrence of each of the impacts noted.

AVIATION SAFETY

The concern over aviation safety derives from the obstruction hazard to area aircraft from the proposed line's intrusion into the area's air space. The potential for such a hazard is addressed through the following LORS and related requirements.

- Title 14, Part 77 of the Federal Code of Regulations (CFR), "Objects Affecting the Navigation Space." Provisions of these regulations specify the criteria used by the Federal Aviation Administration (FAA) for determining whether a "Notice of Proposed Construction or Alteration" is required for potential obstruction hazards. The need for such a notice depends on factors related to the height of the structure, the slope of an imaginary surface from the end of nearby runways to the top of the structure,

and the length of the runway involved. Such notification allows the FAA to ensure that the structure is located to avoid any significant hazards to area aviation.

- FAA Advisory Circular (AC) No. 70/460-2H, "Proposed Construction and or Alteration of Objects that may Affect the Navigation Space." This circular informs each proponent of a project that could pose an aviation hazard of the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA.
- FAA AC No. 70/460-1G, "Obstruction Marking and Lighting." This circular 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.

AUDIBLE NOISE AND RADIO INTERFERENCE

Radio-frequency interference and audible noise are produced from the physical interactions of the line electric fields and the air around the conductor. These impacts are produced through well understood physical mechanisms and are prevented or mitigated through compliance with the following regulations and industry practices:

- Federal Communications Commission (FCC) regulations in Title 47 CFR, Section 15.25, which prohibits operation of devices or facilities with fields capable of interference with radio-frequency communication in the fields' impact area. These regulations require all such interference to be mitigated by the operator. The potential for such interference would depend on the distance from the source in question.
- General Order 52 (GO-52), California Public Utilities Commission (CPUC), which specifies the measures necessary to prevent communication interference as related to power and communication line construction, operation and maintenance.
- Regular maintenance, which eliminates the protrusions that enhance the noise-producing impacts of electric field interactions at the conductor surface.

FIRE HAZARDS

Fire hazards from overhead transmission line operation are mostly related to sparks from conductors of overhead lines, or direct contact between the line and nearby trees and other combustible objects. Such fires are prevented through compliance with the following regulations:

- General Order 95 (GO-95), CPUC, "Rules for Overhead Electric Line Construction," which specifies tree-trimming criteria to minimize the potential for power line-related fires.
- Title 14 Section 1250 of the California Code of Regulations, "Fire Prevention Standards for Electric Utilities," which specifies utility-related measures for fire prevention.

SHOCK HAZARDS

All transmission and subtransmission line operations pose a risk of hazardous or nuisance shocks to humans. Hazardous shocks are those from direct or indirect

contact between an individual and the energized line. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines. Nuisance shocks by contrast, are caused by current flow at levels generally incapable of physiological harm. They result most commonly from contact with a charged metallic object in the transmission line environment. The following regulations are intended to prevent such shocks:

- GO-95, CPUC. "Rules for Overhead Line Construction," which specify uniform statewide requirements for overhead line construction regarding ground clearance, grounding, maintenance and inspection. Implementing these requirements ensures the safety of the general public and workers working on or around the line.
- Title 8, CCR, Section 2700 et seq., "High Voltage Electric Safety Orders," which establish essential requirements and minimum standards for safely installing, operating, and maintaining electrical installations and equipment.
- National Electrical Safety Code, Part 2: Safety Rules for Overhead Lines, which has provisions intended to minimize the potential for direct or indirect contact with the energized line.
- The National Electrical Safety Code and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE), which provide for effective grounding and other safety-related practices.

ELECTRIC AND MAGNETIC FIELD (EMF) EXPOSURE

Exposure to power-frequency electric and magnetic fields is considered capable of biological impacts at levels that are orders of magnitude higher than encountered in the power line environment. The issue of continuing concern is the possibility of significant health impacts among humans exposed in their homes at these normally low levels related to power lines and other common sources. Although the potential for such health impacts has not been established, as noted by the applicant (SJVEC 2001a, page 5-9), the CPUC (which regulates the design and operation of high-voltage lines in the state) has established specific field-reducing designs for incorporation into the general design for all new or modified lines in the state. This is the CPUC's method for dealing with the EMF/health issue in light of the present uncertainty. Staff considers incorporation of these field srength-specific design measures as constituting compliance with present CPUC policy. The effectiveness of these field-reducing measures would in each case be reflected in the operational-phase field intensities measured during operation of the line in question. These field intensities could be estimated using established methods and later compared with the actual fields around the operating line. The electric fields are most commonly measured in units of kilovolt/meter (kV/m) while the magnetic fields are measured in units of milliGauss or mG. Measured field strengths could be used to assess each operating line for incorporation of the applicable field-reducing measures.

SETTING

As discussed in the submittal from the applicant (SJVEC 2001a, pages 1.5-2, 2-1, 2-2,5-, 8.4-2 through 8.4-7, and 8.6-3), the proposed SJVEC site is an 85-acre land parcel located approximately 1,500 feet north of PG&E's Helm Substation in the City of San Joaquin in central Fresno County. The site is in an area zoned for industrial uses with relatively few residences. The surrounding land is mainly agricultural land through which the routes of the new 230 kV lines and the re-routed 70 kV lines would pass as they extend from the project site to the proposed points of interconnection with the area's electrical grid. The relative lack of residences along the identified routes means that the residential power line field exposure at the root of the present health concern would be relatively insignificant for this project. The only exposure of potential significance would be to workers on site, as well as visitors to the site. Such exposures are short term and are not a significant part of the present health concern.

According to information from the applicant (SJVEC 2001a, page 5-1), the proposed site was chosen in part for its proximity to existing grid lines and the PG&E 230 kV Helm Substation. The applicant has provided a list of these area power lines (consisting of two double-circuit 230 kV lines and four single-circuit 70 kV lines) in terms of conductor type, structure of support towers, and current-carrying capacity (SJVEC 2001a, pages 5-2, 5-3, and 5-12).

In the proposed routing scheme, SJVEC's 230 kV lines would exit from the project's switchyard and extend southwards towards Springfield Avenue where they would proceed for a little over 1,200 feet to their respective points of connection to the existing Panoche-McCall (Helm) and Panoche-Kearney 230 kV lines. The specific lengths from the project's switchyard to the respective interconnection points would be 1,300 feet and 1,500 feet as they travel within a right-of-way of approximately 100 feet in width. The applicant has provided the details of this interconnection scheme (SJVEC 2001a, pages 5-3, through 5-6). The re-routing of the existing 70 kV lines would be along a 2,900-foot path in close alignment with the project's property lines (SJVEC 2001a, page 5-4).

ANALYSIS OF IMPACTS

ENVIRONMENTAL CHECKLIST

	Potentially Significant	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
TRANSMISSION LINE SAFETY AND NUISANCE -- Would project operation:				
a) Pose an aviation hazard to area aircraft?			X	
b) Lead to interference with radio-frequency communication?		X		
c) Pose a hazardous or nuisance shock hazard?		X		
d) Pose a fire hazard?		X		
e) Expose humans to higher electric and magnetic field levels than justified by existing knowledge?		X		

DISCUSSION OF IMPACTS

a) Aviation Hazard: Less Than Significant Impact

As noted by the applicant (SJVEC 2001a, pages 5-15 and 5-16) the nearest airports to the project site are the Du Bois Ranch Airport 6.2 miles to the northeast and the San Joaquin Airport, approximately 1.7 miles northwest of the proposed site. At such distances, the project's line towers, which would have a maximum height of 125 feet (and, therefore, much less than the FAA danger threshold of 200 feet), would not pose a significant hazard to any utilizing area aircraft.

b) Audible Noise and Radio Frequency Interference: Less than Significant Impact with Mitigation Incorporated

As presented in the submittal from the Applicant (SJVEC 2001a, pages 5-14) the proposed interconnection and re-routed transmission lines would be designed, built, and maintained to minimize the features responsible for line-related audible noise and interference with radio or television reception around their rights-of-way. The potential for such electric field-related impacts (and related complaints) is further minimized by the general lack of residences in the line's field impact area. FCC regulations require the applicant to mitigate all interference-related complaints for which staff recommends a specific condition of certification (TLSN-2) in the unlikely event of occurrence.

c) Fire Hazard: Less Than Significant with Mitigation Incorporated

The applicant (SJVEC 2001a, page 5-8 and 5-16) intends to comply with the GO-95 requirements, which would ensure that the proposed line is adequately located away from trees and other combustible objects to prevent contact-related fires or minimize such fires when they occur. The potential for such fires is further minimized by the general absence of trees, brush or other large combustible objects within the line's route over mostly agricultural land. Staff recommends two conditions of certification (TLSN-1 and TLSN-4) to ensure implementation of the necessary preventive measures.

d) Shock Hazards: Less Than Significant with Mitigation Incorporated
The applicant (SJVEC 2001a pages 5-14 and 5-15) intends to comply with the requirements of applicable regulations and standards intended to prevent hazardous or nuisance shocks to workers or the general public. Staff's recommended conditions of certification, TLSN-1 and TLSN-2 will ensure such compliance.

e) Electric and Magnetic Exposure: Less Than Significant Impact
The applicant has presented the line design and operational plan necessary for compliance with CPUC requirements on line field intensities (SJVEC 2001a, pages 5-10, and 5-14). The necessary techniques include measures to (a) decrease the spacing between conductors thereby ensuring maximum field cancellation, (b) measures to minimize line current thereby reducing field strengths, and (c) measures to utilize current flow patterns as necessary for maximum field cancellation. Staff finds this plan to be acceptable.

To demonstrate the effectiveness of these proposed field-reducing measures, the applicant (SJVEC 2001a, pages5-13, and Appendices 5D through 5F) presented exposure estimates for specific points along the proposed routes as appropriate to (1) characterize the contribution of the project-related lines to area electric and magnetic field exposures, (2) assess the impacts of re-routing on the contribution of the Helm-Kerman 70 kV line on area field exposures, and (3) assess the potential impacts of the new 230 kV SJVEC lines on existing PG&E lines to which they would be connected.

Since the existing 70 kV and 230 kV lines will continue to be operated at their current voltage ratings without conductor reconfiguration, their existing electric field effects would remain the same (given that line electric fields depends directly on line voltage and conductor configuration). This relative lack of change is reflected in the applicant's calculations showing the maximum project-related electric field strength of 2.455 kV/m as only 0.066 kV/m lower than the maximum value for the existing 230 kV lines.

This means that the previously noted electric field effects would remain the same around the existing and proposed 230 kV lines of similar field-reducing designs. The potential impacts around the lower-voltage 70 kV lines would be much lower as potentially related to its electric field of less than 0.4 kV/m .

Since the magnetic field is the only field that directly depends on current levels, only the line magnetic field would increase over existing area levels from operation of SJVEC. Staff used the magnetic field values calculated by the applicant (SJVEC 2001a, page 5-13, and Appendices 5D through 5F) to assess the relative effectiveness of the applied field-reduction measures. These measures are similar in effectiveness to the measures enacted for area PG&E lines, which constitutes compliance with present CPUC requirements on magnetic field levels. The applicant's field strength values were calculated for specific locations (identified as Points A, B, C, and D) in terms of maximum values within the line routes at issue (before and during SJVEC operations). Staff is in agreement with the applicant's field strength calculations as related to field interactions and intensity diminution.

SJVEC-related area magnetic field increases are reflected in the calculated values, which show potential increases at the edges of the rights-of-way of the existing 230 kV

lines of from 18.83 mG to 65.18 mG, and from 7.71 mG to 68.83 mG. The maximum field intensities within these rights-of-way were calculated as potentially increasing from 27.42 mG to 95.90 mG. The maximum intensity within the right-of-way of the new SJVEC 230 kV line was calculated, for comparison, as 107.15 mG, diminishing to between 1.9 mG to 6.8 mG at approximately 200 feet from the centerline. The maximum value within the route of the relocated 70 kV line would be much less at 11.96 mG within the right-of-way, diminishing to 0.24 mG approximately 200 feet away.

These field strength values were calculated in all cases to reflect the interactive effects of all nearby conductors. The resultant human exposures would be similar to those associated with PG&E lines of similar voltage and current-carrying capacities. These values and are much lower than those of between 150 mG and 250 mG established by the relatively few states that regulate magnetic fields. Staff's recommended condition of certification (TLSN-3) is intended to verify achievement of the field strength reduction assumed by the applicant. The need for further mitigation will be assessed from the results of those measurements.

CONCLUSIONS

Staff has established that the proposed double-circuit 230 kV SJVEC lines and the relocated single-circuit 70 kV Helm-Kerman line will be designed and operated in compliance with all applicable health and safety-based LORS. The following conditions of certification are recommended to ensure incorporation of the design and operational measures necessary.

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed transmission line according to the requirements of CPUC's GO-95, GO-52, applicable sections of Title 8, Section 2700 et seq. of the California Code of Regulations, and PG&E's EMF-reduction guidelines arising from CPUC Decision 93-11-013.

Verification: At least 30 days before starting construction of the transmission line or related structures and facilities, the project owner shall submit to the CPM a letter signed by a California registered electrical engineer affirming compliance with this requirement.

TLSN-2 The project owner shall ensure that every reasonable effort will be made during project operations to identify and correct, on a case-specific basis, any complaints of interference with radio or television reception or the functioning of any electrical devices or equipment.

The project owner shall maintain written records for a period of five years of all such complaints, together with the corrective action taken in response to each complaint.

Verification: All reports of line-related complaints shall be summarized for the project-related lines and included during the first five years of plant operation in the Annual Compliance Report.

TLSN-3 The project owner shall engage a qualified consultant to measure the strengths of the line electric and magnetic fields from the SJVEC and existing 230 kV lines and the re-routed Helm-Kerman lines before and after they are energized, with the project running at near maximum generating capacity. Measurements should be made at representative points identified as Points A,B,C, and D within and along the edges of the rights-of-way for which field strength estimates were provided.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements.

TLSN-4 The project owner shall ensure that the right-of-way of the project-related lines are kept free of combustible material, as required under the provisions of Section 4292 of the Public Resources Code and Section 1250 of Title 14 of the California Code of Regulations.

Verification: During the first five years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way, and provide such summaries in the Annual Compliance Report.

TLSN-5 The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards.

Verification: At least 30 days before the line is energized, or an alternate time frame mutually agreed upon by the CPM and the project owner, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

REFERENCES

San Joaquin Valley Energy Center (SJVEC) 2001a. Application for Certification (01-AFC-25). Submitted to the California Energy Commission on October 31, 2001.

Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and Above

Electric Power Research Institute (EPRI 1995). Magnetic field Management for overhead Lines: Potential Options for Low Field Design. EPRI TR-104413

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.

VISUAL RESOURCES

Testimony of Ken Peterson, Dale Edwards, and William Walters

INTRODUCTION

Visual resources are the natural and cultural features of the environment that can be viewed. This analysis focuses on whether the San Joaquin Valley Energy Center (SJVEC) would cause visual impacts and whether the project would be in compliance with applicable laws, ordinances, regulations, and standards (LORS). The determination of the potential for visual impacts resulting from the proposed project is required by the California Environmental Quality Act (CEQA).

ORGANIZATION OF ANALYSIS

This analysis includes the following:

- Description of applicable laws, ordinances, regulations and standards;
- Assessment of the visual resources setting of the proposed power plant site and linear facility routes;
- Evaluation of the visual impacts of the proposed project on the existing setting;
- Evaluation of compliance of the project with applicable laws, ordinances, regulations, and standards;
- Identification of measures needed to mitigate any potential significant impacts and to achieve compliance with applicable laws, ordinances, regulations, and standards.
- Conclusions and Recommendations;
- Proposed Conditions of Certification

A summary of the visual resources analysis is presented in table form in Appendix VR-1. A lighting complaint resolution form is provided in Appendix VR-2. Appendix VR-3 presents the visual resources figures.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

The proposed project, including the linear facilities, is not located on federally administered public lands and is not subject to federal regulations pertaining to visual resources.

STATE

None of the roadways in the project viewshed are eligible or designated State Scenic Highways, and no State scenic properties are nearby. Therefore, there are no State regulations pertaining to scenic resources applicable to the project.

LOCAL

The proposed power plant site is located within the City of San Joaquin. The linear facilities associated with the project would be located within the City and the unincorporated area of the County of Fresno. Therefore, the project would be subject to local LORS pertaining to the protection and maintenance of visual resources. LORS applicable to the proposed project are found in the General Plans and Zoning Ordinances of the City of San Joaquin and Fresno County.

Applicable LORS in the City of San Joaquin Comprehensive General Plan regarding visual resources are found in Major Goals, Objectives and Policies and the Land Use Element. The City of San Joaquin Zoning Ordinance contains pertinent LORS related to visual resources in the sections on Manufacturing Zones and Landscaping. These sections limit height of structures, and establish landscaping requirements. The Fresno County General Plan contains pertinent LORS related to visual resources in the sections on public facilities and services, and open space and conservation. The Fresno County Zoning Ordinance contains an agricultural zone that is pertinent to the project's linear facilities.

PROJECT DESCRIPTION

The following section describes the aspects of the proposed project that may have the potential to cause adverse impacts to visual resources. Please refer to the **PROJECT DESCRIPTON** section of the Staff Assessment (SA) for a more complete discussion. The major visible components of the power plant include the 120 foot tall auxiliary boiler exhaust stack and the three 145 foot-tall HRSG exhaust stacks. The highest relief valves and vents on the HRSG units would extend to a height of 92 feet. The plant would be located at the southernmost edge of the City, and would be the focal point for southerly entrance to and exit from the City. The plant would be located in the southern portion of its 85 acre site to allow for a buffer between residential areas to the north that are separated from the plant site now by vacant land. To minimize visual impact of the plant Calpine has committed to a landscaping plan, which is also a zoning requirement. The proposed 0.25-mile 230-kV double-circuit overhead transmission lines (supported by parallel steel pole structures ranging from 110 to 125 feet tall) (SJVEC 2001a, p. 8.11-15) would connect the project with PG&E's electric transmission system at the existing Helm Substation south of the project site (SJVEC 2001a, p. 8.11-7).
The proposed approximately 20-mile long buried natural gas pipeline would begin at the existing PG&E gas line located near Interstate 5 and run within the public rights-of-way of West Manning, South El Dorado, and West Springfield Avenues to the project site (SJVEC 2001a, p. 8.11-7). Except for the occasional aboveground warning signs, the underground gas pipeline would not be visible during operation. The water supply pipeline would also be buried, with occasional air release valves either flush with the

ground or in two feet by three feet rectangular surface vaults two feet in height (SJVEC 2001a, p. 8.11-18). The Applicant also plans to construct the underground water supply pipeline from the project site approximately 21 miles northeast to the water source, also along existing public rights-of-way along roads (SJVEC 2001a, pp. 8.11-7-8).

Surface conditions would be restored after gas and water pipeline construction (SJVEC 2001a, p. 8.11-26). Pipeline construction activities, materials, and personnel would be visible to travelers along all the roads noted above.
The area for construction worker parking and the laydown of equipment would be located on a 20-acre portion of the project property located to the north of the area where the project facilities would be built. (SJVEC 2001a, p. 8.11-16) The proposed construction laydown area would be primarily visible to motorists along Colorado Avenue.

SETTING

REGIONAL SETTING

The proposed project would be located in the City of San Joaquin, Fresno County, a community located in a rural, sparsely populated portion of the Central Valley. The regional setting is primarily flat agricultural land, with small communities in the vicinity. The project would be 25 miles from the City of Fresno and Route 99, and 20 miles from Interstate 5 (I-5). There are no visually prominent natural features within the vicinity of the site except for the Coast Range hills to the west, which can be seen indistinctly on clear days. Due to the flat, agricultural nature of the region, visual quality is generally moderate.

PROJECT SITE AND VICINITY

The vacant and partially vacant City parcels adjacent to the project site to the northeast and northwest of the project are zoned for manufacturing, as is the project site. Other lands adjacent to the project site are zoned for agricultural use. The site is generally level. The project site is presently used for agriculture. The Helms substation, 0.25 miles to the south of the project site, is the most prominent development in the area. There are several largely vacant commercial and industrial buildings in the vicinity of the site. The positive visual elements of the Coast Range hills and the agricultural use combined with the negative elements of the substation, transmission poles and wires, commercial and industrial buildings and streets, along with the flat nature of the land, cause the visual quality of the site and surrounding area to range from moderate to low-to-moderate.

VIEW AREAS AND KEY OBSERVATION POINTS

VISUAL RESOURCES Figure 1 generally identifies the areas from which the project would be visible, also called the project viewshed. The power plant structures would be most visible in views from the agricultural lands to the southeast and southwest of the project site. Unobstructed views of the SJVEC would be available to travelers in both directions on Colorado and Springfield Avenues, which are adjacent to the site. There would also be unobstructed or partially obstructed views of the project from several City

residences on the southern edge of the City, and a small number of rural residences in unincorporated areas to the south of the City. Most views of the proposed project from the City's residential areas and streets to the north of the edge of the City would be screened by existing buildings and trees, except for the tallest project structures such as the 145 foot-tall HRSG stacks.

The Applicant selected four key observation points (KOPs) to characterize the existing visual setting within which the proposed project would be evaluated. **VISUAL RESOURCES Figure 2** shows the location and view direction of the four KOPs selected for the proposed project. For each KOP, a visual analysis was conducted (a summary is presented in Appendix VR-1). The following discussion provides an assessment of the overall visual sensitivity at each KOP. Overall visual sensitivity takes into account existing landscape visual quality, viewer concern, and overall viewer exposure, which considers visibility, distance zone, number of viewers, and duration of view. **VISUAL RESOURCES Figures 3** through **6** depict the views of the project site from the four KOPs.

KOP 1: Colorado Avenue at Springfield Avenue

KOP I was established to represent views toward the SJVEC site from the northbound lane of Colorado Avenue and the westbound lane of Springfield Avenue. **VISUAL RESOURCES Figure 3** depicts the existing view of the SJVEC site, which is approximately 0.19 miles from KOP 1.

Visual Quality

The view in the direction of the site is fairly open in character. The flat, open agricultural field of the project site occupies the foreground and middle ground area. A railroad berm and track are in the foreground. Wood transmission poles cross the site, and in the far middleground lie the low industrial buildings, houses, and trees that define the southern edge of the City of San Joaquin. On clear days, the ridgeline of the Coast Range hills can be seen low on the horizon in the far background. This low ridgeline is a positive visual element, but its intermittent visibility and the view's dissonant foreground and middle ground provide limited visual interest. Visual quality from this KOP is rated low to moderate.

Visual Concern

Neither Colorado nor Springfield Avenue is designated as a scenic route. However, all new development, including industrial development, is subject to minimum City landscape design requirements, indicating an increased level of viewer concern. The viewers from this KOP are travelers expected to be comprised of commuters and local residents whose sensitivity to visual change is moderate. For these reasons viewer concern is rated moderate.

Viewer Exposure

Northbound travelers on Colorado Avenue and westbound travelers on Springfield Avenue east of Colorado would have an unobstructed view within the cone of vision. Therefore this view's visibility is rated high. The project site is in the foreground of this view, causing a rating of high for the viewers' proximity to the site.

Based on field observations, the traffic level on Springfield Avenue in the vicinity of the project site is low. However, the traffic level on Colorado Avenue in the vicinity of Springfield Avenue is estimated at approximately 3,000 vehicles per day (SJVEC 2001a, p. 8.11-10). Therefore the number of viewers for this KOP is rated as moderate. The traffic speeds on Colorado Avenue appear to be high, but the project would be in view for a considerable distance, so duration of view is rated as moderate. Because of the high rating for site visibility and the viewers' short distance from the site, combined with the moderate number of viewers and the moderate duration of view, the overall viewer exposure is rated as moderate to high.

Overall Visual Sensitivity

The overall visual sensitivity of the setting viewed from the area of KOP 1 is moderate based on the low to moderate rating for visual quality, moderate rating for viewer concern, and moderate to high viewer exposure.

KOP 2: Colusa Avenue North of Springfield Avenue

KOP 2 was established to represent views toward the project site for travelers on Colusa and Springfield Avenues in this area, and for the residents of the two rural homes located on the west side of Colusa Avenue north of Springfield Avenue. Other residents farther to the west would also have views of the plant as explained in the section on other observation viewpoints. **VISUAL RESOURCES Figure 4** depicts the existing view of the SJVEC site on the other side of Colusa Avenue from one of the rural homes, at a distance of approximately 0.5 miles from the project site.

Visual Quality

The most important aspect of the existing view from this location is the open, flat agricultural field in the foreground that continues to the horizon. Other less important elements in the background are indistinct views of transmission towers and clusters of trees on the horizon that surround scattered rural residences. Because this KOP has the advantage of an extensive view of green crops when in season, but includes the distant transmission towers, it is rated as having moderate visual quality.

Viewer Concern

Springfield Avenue is not designated as a scenic route, but all new development, including industrial development, is subject to minimum landscape design requirements, indicating an increased level of viewer concern. The residents of the two houses at this KOP have high viewer concern, while the travelers, expected to be primarily commuters and local residents, have moderate concern.

Viewer Exposure

The view from KOP 2 is unobstructed, and the project is located in the far foreground distance from KOP 2, so visibility of the site is high and the proximity of the viewpoint to the project site is moderate to high. Because the project site is viewed only by eastbound travelers on Springfield Avenue east of Colusa Avenue and from the front of the two rural residences, a low number of residential viewers and a low to moderate number of travelers would view the project site from the view area represented by this KOP. The duration of view from the affected residences is extended and the duration of

view by travelers is very short. Based on the above ratings, the overall view exposure is moderate for travelers and moderate to high for residents.

Overall Visual Sensitivity

The overall visual sensitivity of the setting viewed from KOP 2 is moderate for travelers as a result of the moderate visual quality, visual concern, and viewer exposure. The overall visual sensitivity of this setting for residents is moderate to high due to the moderate visual quality, high concern, and moderate to high exposure.

KOP 3: Colorado Avenue at Manning Avenue

KOP 3 was established to represent views toward the project site seen by southbound travelers on Colorado Avenue in the vicinity of Manning Avenue, views of westbound travelers on Manning Avenue turning southbound onto Colorado Avenue, and public views at the San Joaquin shopping center located at the northeast corner of Manning and Colorado Avenues. **VISUAL RESOURCES Figure 5** depicts the existing view of the SJVEC site at a distance of approximately 0.34 miles from the corner of Colorado and Manning Avenues.

Visual Quality

The major elements in the existing view include the paved roadways and intersection in the foreground; the railroad berm and the disturbed area lying between it and the roadway; the flat, open agricultural fields that extend to the horizon; the PG&E Helm Substation in the middleground; and the lines and towers that are spread across the middleground area. Because of the open view and the visual interest provided by the agricultural fields, combined with the lack of topographic variation and other elements of potential visual interest, the visual prominence of the roadway, the disturbed area between it and the railroad berm, and the substation and transmission towers, the visual quality from this viewpoint is rated as low to moderate.

Visual Concern

Neither Colorado nor Manning Avenue is designated as a scenic route. However, all new development, including industrial development, is subject to minimum landscape design requirements, indicating an increased level of viewer concern. Combined with the moderate concern of travelers and shoppers, this causes visual concern for this view to be rated moderate.

Viewer Exposure

The view from KOP 3 towards the site from the intersection of Manning and Colorado Avenues is unobstructed, so visibility is high. The portion of the site on which the project would be built is in the foreground and to the left of the viewpoint, so proximity is high. Travelers going south on Colorado Avenue cannot see this view of the project site until just before they reach the intersection of Manning, because of warehouse and commercial buildings obstructing the view. The project site would be seen on the left by travelers going west on Manning Avenue. West Colorado Avenue is a major arterial roadway/expressway with an estimated average daily traffic volume of 2,295 vehicles in the vicinity of this viewpoint (SJVEC 2001a, Table 8.10.3). Manning Avenue is also a major arterial roadway/expressway with an estimated average daily traffic volume of

1,935 vehicles (SJVEC 2001a, Table 8.10.3). The project site from this viewpoint is visible from the shopping center's parking lot and from the parking lot's exit onto Manning Avenue. The number of viewers is moderate greater than at the other KOPs, but the duration of view is moderate due to the lack of residences and outside assembly areas. Therefore, overall viewer exposure is rated as moderate to high.

Overall Visual Sensitivity

The overall visual sensitivity of the setting viewed from KOP 3 is moderate as a result of the low to moderate visual quality, moderate viewer concern, and moderate to high viewer exposure.

KOP 4: Idaho Street at 9th Street

KOP 4 was established to represent views toward the CVEC site from the center of Idaho Street at 9th Street in a residential area with low level auto traffic. **VISUAL RESOURCES Figure 6** depicts the existing view of the SJVEC site from the center of Idaho Street at 9th Street at approximately 0.7 miles from the SJVEC site.

Visual Quality

A low industrial building obstructs the lower portion of the view at the end of the street; trees and houses block the view on the left and right. The industrial building is low and in the background so although it is of low visual quality it has little effect from this viewpoint. The dominant visual aspects, trees, residences, the street, and parked cars, are of mixed visual value, causing the visual quality of this view to be moderate.

Viewer Concern

Residents in this area and travelers going south on Idaho Street can appreciate the older residential nature and the mature trees of this neighborhood, so viewer concern is high.

Viewer Exposure

The industrial building, the trees, and the residences block the view of the project site except for the airspace above the industrial building where a small portion of the HRSG stacks and one HRSG would be seen. Because of the dense canopy of deciduous trees the residential views would be minimal during the spring, summer, and fall but more visible during the winter. Visibility for the residents and occasional traveler would be low to moderate because only a small portion of the project would be visible in the view down Idaho Street. The proximity of viewers is moderate at this KOP. Idaho Street is a little-traveled residential street, so the number of viewers would be limited to occupants of the occasional car and residents using the front portions of some of the front yards. Therefore, the number of viewers would be rated low to moderate. The duration of view for travelers and the number of travelers are low. For the residents, the number of viewers is low but the duration of view would be long, so duration of view would be rated as high. Overall viewer exposure is moderate because of the partially obstructed view and low numbers of viewers, the project site's location in the near background, and the long duration of view of the residents.

Overall Visual Sensitivity

Overall Visual Sensitivity is moderate to high given the moderate visual quality, high viewer concern, and moderate viewer exposure.

Other Observation Viewpoints

Energy Commission staff identified two other important view points from which some residents would have partial or full views of the power plant. **VISUAL RESOURCES Figure 7** shows sight lines to the project from these two locations noted as observation view point D (view from 12th Street) and observation view point E2 (view from Sutter Avenue):

- View from the Residences on the Southeast Side of 12th Street between Colorado and Arizona Avenues

VISUAL RESOURCES Figure 8 shows the back sides of several residences located along the southeast side of 12th Street east of Colorado Avenue. The project site is visible from the open agricultural field behind these residences, and although the back yards have high fences and the homes are oriented towards the southeast of the site, residents might still have views of the higher project elements such as the HRSG stacks from their back windows and back yards. **VISUAL RESOURCES Figure 9** depicts the view from this area at California Avenue, about one-half mile from the project site. This view is seen from the side yard of the residence that lies on the southeast corner of 12th Street and California Avenue, and is partially visible from the front yard of the residence on the northeast corner of this intersection.

- View from the Residences on Sutter Avenue South of Manning Avenue

The homes on Sutter Avenue south of Manning Avenue, consisting of four-plex structures that are oriented around an internal circulation system, are 0.9 miles from the project site. Eight of these units have entrances facing Sutter Avenue and have views towards the project. From some of these eight residences views of the project site are substantially visible (see **VISUAL RESOURCES Figure 7**, viewpoint E2).

IMPACTS ANALYSIS

METHODOLOGY

Visual resources analysis has an inherently subjective aspect. However, the use of generally accepted criteria for determining impact significance and a clearly described analytical approach aid in developing an analysis that can be readily understood.

Significance Criteria

Commission staff considered the following criteria in determining whether a visual impact would be significant.

STATE

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" (Cal. Code Regs. tit.14, § 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?

LOCAL

Energy Commission staff considers any local goals, policies, or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts. See the section on Laws, Ordinances, Regulations, and Standards.

Professional Standards

Professionals in visual impact analysis have developed a number of questions as a means of evaluating the potential significance of visual impacts (see Smardon 1986). The questions listed below address issues commonly raised in visual analyses for energy facilities. Staff considers these questions in assessing whether a project would cause a significant impact in regard to any of the four CEQA criteria listed above.

- Will the project substantially alter the existing viewshed, including any changes in natural terrain?

- Will the project deviate substantially from the form, line, color, and texture of existing elements of the viewshed that contribute to visual quality?

- Will the project eliminate or block views of valuable visual resources?

- Will the project result in significant amounts of backscatter light into the nighttime sky?

- Will the project be in conflict with directly identified public preferences regarding visual resources?

- Will the project result in a significant reduction of sunlight, or the introduction of shadows, in areas used extensively by the community?

- Will the project result in a substantial and persistent visible exhaust plume?

Impact Duration

The visual analysis typically distinguishes three different impact durations. **Temporary impacts** typically last no longer than two years. **Short-term impacts** generally last no longer than five years. **Long-term impacts** are impacts with a duration greater than five years.

View Areas and Key Observation Points

The proposed project would be visible from a number of areas in the project region. Energy Commission staff evaluated the visual impact of the project from each of these areas. Staff used Key Observation Points[1], or KOPs, as representative locations from which to conduct detailed analyses of the proposed project and to obtain existing conditions 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.

Evaluation Process

For each view area, staff considered the existing visual setting and the visual changes that the project would cause to determine impact significance. Staff conducted a site visit and concluded that the KOPs presented in the Application were appropriate for this analysis. The results of staff's analysis are summarized in **VISUAL RESOURCES Appendix VR-1**. Existing conditions photographs and photosimulations from each KOP are presented with all other figures in **VISUAL RESOURCES Appendix VR-3**.

Elements of the Visual Setting

To assess the existing visual setting, staff considered the following elements:

Visual Quality

Visual quality is an expression of the visual impression or appeal of a given landscape and the associated public value attributed to the visual resource. This analysis used an approach that considers visual quality as ranging from outstanding to low. Outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as "picture postcard" landscapes. Low visual quality describes landscapes that are often dominated by visually discordant human alterations, and do not provide views that people would find inviting or interesting (Buhyoff et al., 1994).

Viewer Concern

Viewer concern is a measurement of the level of viewer interest regarding the visual resources in an area. Official statements of public values and goals reflect viewers' expectations regarding a visual setting. This analysis also employed land use as an indicator of viewer concern. Uses associated with 1) designated parks, monuments, and wilderness areas, 2) scenic highways and corridors, 3) recreational areas, and 4) residential areas are generally considered to have high viewer concern. However, existing landscape character may temper viewer concern on some State and locally

designated scenic highways and corridors. Similarly, travelers on other highways and roads, including those in agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features. Commercial uses, including business parks, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements related to visual quality, with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, that indicate high viewer concern. Industrial uses typically have the lowest viewer concern because workers are focused on their work, and generally are working in surroundings with relatively low visual value.

Viewer Exposure

The visibility of a landscape feature, the viewing distance to the landscape feature, the number of viewers, and the duration of the view all affect the exposure of viewers to a given landscape feature. Visibility is highly dependent on screening and angle of view. The smaller the degree of screening and/or the closer the feature is to the center of the view area, the greater its visibility is. Increasing distance reduces visibility. Viewer exposure can range from low values for all factors, such as a partially obscured and brief background view for a few motorists, to high values for all factors, such as an unobstructed foreground view from a large number of residences.

Overall Visual Sensitivity

The overall level of visual sensitivity assesses a view area by considering visual quality, viewer concern, and viewer exposure. The value of overall visual sensitivity ranges from low to high.

Types of Visual Change

To assess the visual changes that the project would cause, staff considered the following factors:

Contrast

Visual contrast describes the degree to which a project's visual characteristics or elements (consisting of form, line, color, and texture) differ from the same visual elements established in the existing landscape. The degree of contrast can range from low to high. The presence of forms, lines, colors, and textures in the landscape similar to those of a proposed project indicates a landscape more capable of accepting those project characteristics than a landscape where those elements are absent. This ability to accept alteration is often referred to as visual absorption capability, which typically is inversely proportional to visual contrast.

Dominance

Another measure of visual change is project dominance. Dominance is a measure of a feature's apparent size relative to other visible landscape features and the total field of view. A feature's dominance is affected by its relative location in the field of view and the distance between the viewer and the feature. The level of dominance can range from subordinate to dominant.

View Blockage

View blockage describes the extent to which any previously visible landscape features are blocked from view by the project. Blockage of higher quality landscape features by lower quality project features causes adverse visual impacts. The degree of view blockage can range from none to high.

Overall Visual Change

Staff assesses the overall level of visual change by considering the above visual change factors, with the factors of highest impact generally defining the level of change.

Significance without Mitigation

Staff assesses whether the project's visual impact would be significant by considering overall visual sensitivity and overall visual change.

Significance with Mitigation

The last step in Staff's analysis is to assess whether the project's visual impact with recommended mitigation would remain significant.

ENVIRONMENTAL CHECKLIST

VISUAL RESOURCES	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect on a scenic vista?				X
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?		X		
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?		X		

DIRECT IMPACTS

A summary of the impact analysis is presented in a table in Appendix VR-1. The impact assessment methodology and significance criteria utilized in this study are described above. The following discussion explains the responses to the questions in the environmental checklist above.

A. Scenic Vistas

As explained earlier, the only scenic feature in the area of the City of San Joaquin is the Coast Range hills, which can be seen indistinctly in the far distance to the west of the site on a clear day. Other elements in the area (streets, railroad, transmission lines, industrial buildings) prevent a description of the vista as scenic. In views toward the west, from the east of the project, the project would substantially block the view of the Coast Range hills.

B. Scenic Resources

As indicated in the previous discussion of LORS, there are no state-designated scenic highways or other State-dedicated scenic resources within the proposed project viewshed. Furthermore, the project would not substantially damage scenic resources such as trees, rock outcroppings, and historic buildings. Thus, the project would not have a substantial adverse effect on scenic resources.

C. Visual Character or Quality

Project aspects that were evaluated in the assessment of visual character or quality included effects associated with project construction, the power plant structures, electric transmission lines, natural gas and water supply pipelines, and visible water vapor plumes.

Project Construction

Construction of the proposed power plant and linear facilities would cause temporary visual impacts due to the presence of equipment, materials, excavated piles of dirt, and work force. Construction activities would include site clearing and grading, trenching, construction of actual facilities, and cleanup and restoration of the site and rights-of-way. Project construction (including the transmission line) would occur over a 24 to 27 month period. Construction of the gas and water supply pipelines would last about 12 months.

Mitigation Measures

The Applicant proposes to restore surface conditions after completing construction of the underground pipelines. The laydown area would be set back 200 feet from Colorado Avenue. The Applicant also proposes to surround the construction laydown sites with chain link security fences. Staff has proposed a condition of certification (**VIS-1**) incorporating these measures; **VIS-1** also requires that opaque, solid slats or other screening material be used with the fences. Through the above measures the proper implementation of **VIS-1** would ensure that potential visual impacts associated with project construction remain less than significant.

Project Operation - Power Plant

VISUAL RESOURCES Figures 10 through **13** present visual simulations of the proposed power plant at the start of operation viewed from KOPs 1 through 4 respectively. **VISUAL RESOURCES Figure 14** depicts a visual simulation from KOP I of the project at 20 years.

KOP I: Colorado Avenue at Springfield Avenue

Contrast with Landforms and Existing Structures

VISUAL RESURCES Figure 10 depicts the simulation of the power plant from KOP 1 at the start of operation. The major existing structures in the view from KOP I are, in the background, low lying commercial buildings and, indistinctly, a few residences; and in the mid-ground, several transmission towers cross the site. The Coast Range hills can be seen indistinctly in the distant background. The power plant structures would be in the foreground. The plant's air intake units, HRSG units, HRSG stacks, steam turbine generator, cooling tower, and transmission towers would all be highly visible from this KOP, and therefore for the most part block the above background views. The project's complex, geometric form would contrast strongly with the landscape, but the plant's effect would be tempered somewhat by existing signs, poles, and buildings, so form contrast would be moderate to high. Scale contrast would be high in relation to the existing landscape features and structures due to the substantially smaller apparent size of the existing transmission lines and low-level industrial buildings. The juxtaposition of the project's tall, narrow stacks and transmission towers with the irregular form of the agricultural landscape and Coast Range hills would cause substantial line contrast, but this would be moderated by the low line contrast with existing poles, signs, and background transmission towers, so line contrast would be moderate. The light gray color of the proposed power plant and transmission lines would cause low contrast with the existing light gray transmission towers and low to moderate contrast with the light blue color of the sky. In summary, the power plant would cause moderate to high form contrast, high scale contrast, moderate line contrast, and low to moderate color contrast with existing land and background forms, resulting in overall high contrast.

Project Dominance

The view from KOP 1 is panoramic and open and the project would be skylined and near the center of the view, so spatial dominance would be moderate to high. The plant, would be in the foreground, skylined, would be the major object in the view, and would occupy the field of view almost completely, so scale dominance would be high. Spatial dominance would be moderate to high. Overall dominance from this KOP would be high.

View Blockage

In the existing view from KOP I the Coast Range hills are distantly visible and have a low profile. The project would substantially block the hills visible in the view from KOP I. However, because existing visual quality is low to moderate, the severity of view blockage would be moderate.

Overall Visual Change and Visual Impact Significance

The power plant would cause moderate view blockage but high visual contrast and high project dominance. Thus, the overall visual change due to the power plant would be high. Combined with the moderate overall visual sensitivity of the setting, the resulting visual impact would be significant.

Mitigation Measures

To screen views towards the project site from the area of KOP 1, the Applicant proposes to implement a landscaping plan that would substantially screen the view of the project and compensate for the loss of the Coast Range hill view after 20 years of operation. Plan details have not yet been submitted. There is insufficient information to conclude that the proposed landscaping would provide adequate mitigation, within five years after start of operation, of long-term visual impacts to the view in the vicinity of this KOP. The conceptual landscaping plan includes faster-growing eucalyptus trees along Colorado Avenue, but in insufficient numbers to provide the necessary mitigation. Staff recommends condition **VIS-2** requiring the proposed landscaping plan to include information on the size, species, number of plantings and location that demonstrates sufficient mitigation by five years after start of operation. This proposed condition of certification would reduce the adverse visual impacts of the project from this KOP to a less than significant level because the required landscaping would sufficiently screen the power plant facilities and would provide a positive visual element to the view.

The Applicant proposes elements of site design that would assist in mitigating the project's impacts on visual resources: placement of the power plant as far to the south on the site as is feasible to maximize its distance from potential viewers; placement of the water tanks, administration building, and other smaller structures on the northern edge of the site to create a transition in scale in views; and creation of a 100-foot setback area between the edge of the Union Pacific Railroad right-of-way and the closest project feature (the cooling tower) to create setback and provide room for landscape screening (SJVEC 2001a, p. 8.11-25). In consultation with the City, the Applicant proposes color tones for project structures that reduce contrast (SJVEC 2001a, p. 8.11-25). Staff recommends Conditions **VIS-3** requiring approval of a treatment plan.

KOP 2: Colusa Avenue North of Springfield Avenue

Contrast with Landscape and Existing Structures

VISUAL RESOURCES Figure 11 depicts a simulation of the power plant as seen from KOP 2 at the start of operation. The predominant view from KOP 2 is the open, flat agricultural field that extends to the horizon. Tall lattice steel transmission towers can be seen across the distant background. The bulky and tall elements of the power plant, extending through about half of the horizon line in the view's near middle ground, would cause high form contrast with the agricultural fields. Line contrast would be moderate to high due to the juxtaposition of the project's tall, narrow stacks with the irregular form of the surrounding agricultural vegetation, moderated somewhat by existing electric line poles in the background. Scale contrast would be high because the power plant would appear much larger than the few indistinct built elements in the background. The light gray color of the power plant would provide low to moderate contrast with the light blue sky background and moderate to high contrast with the agricultural field when in season. In summary, the power plant would cause high form contrast, moderate to high line contrast, high scale contrast, and moderate color contrast at this viewpoint, so overall contrast would be high.

Project Dominance

Because of the power plant's position in the middle ground, the plant would appear moderate in size from this KOP, and would be an imposing addition to a relatively flat setting, so scale dominance would be moderate to high. Although the plant would be situated in a panoramic landscape, it would be in the center of the view and back dropped by sky, so spatial dominance would be moderate to high. Overall dominance would be moderate to high.

View Blockage

View blockage would be low to moderate, since the project would block a moderate portion of a moderate quality view.

Overall Visual Change and Visual Impact Significance

Considering the project's high contrast, moderate to high dominance, and low to moderate view blockage, the degree of overall visual change would be moderate to high, and in combination with the overall visual sensitivity of the site of moderate for travelers and moderate to high for residents, the resulting impact would be significant.

Mitigation Measures

To screen views toward the project site from the area of KOP 2, the Applicant proposes to implement a landscaping plan that would substantially screen the view of the project after 20 years of operation. Plan details have not been submitted. The plan proposes eucalyptus trees along Colusa Boulevard, which would adequately mitigate the power plant's impact on the view from the vicinity of this KOP within five years after start of operation, if there are a sufficient number of trees and their spacing is appropriate. Staff's proposed condition **VIS 2** requires that the landscaping plan include information that demonstrates the adequacy of the planting of eucalyptus trees along Colusa Boulevard. This proposed condition of certification would reduce the adverse visual impacts of the project from this KOP to a less than significant level because the required landscaping would sufficiently screen the power plant facilities and would provide a positive visual element to the view.

See the previous discussion of mitigation measures for KOP 1 for an explanation of the use of color and site design, and recommended condition **VIS-3**.

KOP 3: Colorado Avenue at Manning Avenue

Contrast with Landscape and Existing Structures

VISUAL RESOURCES FIGURE 12 depicts a simulation of the power plant from KOP 3 at the start of operation. The predominant elements in the landscape from this view are the street surface, phone pole, and railroad berm in the foreground; the substation and transmission towers in the near background; and the agricultural fields. The complex, geometric project elements, in the middle ground, would cause moderate to high form contrast with the existing built environment, which contains the flat streets and low-level railroad berm, moderated somewhat by the substation and vertical structures of various sizes. Scale contrast would be moderate to high in comparison to the various smaller vertical structures and the agricultural vegetation. Line contrast would be moderate

given the combination of the irregular lines of the agricultural landscape and straight lines of existing streets, railroad, poles, signs, and background transmission towers in juxtaposition to the project's primarily straight lines along with the rounded portions of some portions of the plant. Because this is a view from the northeast, the project's gray color would appear shaded and darker than from other views because it would generally be back-lit by the sun, so the color would provide low contrast to the dark green agricultural field and higher contrast the light blue sky, for overall low to moderate color contrast. In summary, the power plant would cause moderate to high form and scale contrast, moderate line contrast, and low to moderate color contrast in comparison to the existing environment at this viewpoint, for an overall contrast rating of moderate to high.

Project Dominance

From the vicinity of this KOP the project would occupy a moderate to large portion of the view, so scale dominance would be moderate to high. The plant would be centrally located in the panoramic landscape, and would be back-dropped by sky, so spatial dominance would be moderate to high. Overall dominance would be moderate to high.

View Blockage

Since the project would block a portion of a view with low to moderate visual quality, the severity of view blockage would be low to moderate.

Overall Visual Change and Visual Impact Significance

The power plant would cause moderate to high contrast and dominance, and low to moderate view blockage, for an overall visual change rating of moderate to high.… Combined with the moderate rating of this KOP's visual sensitivity, the power plant would cause a significant visual impact.

Mitigation Measures

To screen views toward the project site from the area of KOP 3, the Applicant proposes to implement a landscaping plan that would substantially screen the view of the project and compensate for the loss of the Coast Range hills view after 20 years of operation. Plan details have not been submitted. There is insufficient information to conclude that the proposed landscaping would provide adequate mitigation for the long-term impacts on the view in the vicinity of this KOP (within five years after start of operation). The conceptual landscaping plan includes faster-growing eucalyptus trees along Colorado Avenue**,** but in insufficient quantity to provide the necessary mitigation to reduce the visual impact to less than significant. Staff recommends Condition of Certification **VIS-2** requiring the proposed landscaping plan to include information that demonstrates sufficient mitigation by five years after start of operation. This proposed condition would reduce the adverse visual impacts of the project from this KOP to a less than significant level because the required landscaping would sufficiently screen the power plant facilities and would provide a positive visual element to the view.

See the previous discussion of mitigation measures for KOP 1 for an explanation of the use of color and site design to minimize visual impacts, and recommended condition **VIS-3.**

KOP 4: Idaho Street at 9th Street

Contrast with Landscape and Existing Structures

VISUAL RESOURCES Figure 13 depicts a simulation of the power plant from KOP 4 at the start of operation. The dominant views from this KOP are of the residential elements: trees, houses, front yards, the street, parked cars, telephone/electric lines, street signs, and lamp posts. The low-rise industrial building at the end of the street and the trees would block the view of the project except for the top portions of two of the plant's HRSG stacks and the top portion of one of its HRSG units in the far middle ground. The predominantly vertical form of these visible parts of the power plant would cause low to moderate form contrast, depending on how close the viewer is to the power plant in the vicinity of this KOP, because of the bushy but tall trees and the smaller apparent size of the stacks. Scale contrast would also be low to moderate for these reasons. Also, the lamp pole and the one tall narrow tree in the foreground lower the form and scale contrast for viewers farther away from the power plant. The straight lines of the stacks would cause moderate to high line contrast, given the numerous large, bushy, irregularly shaped trees in the foreground and middleground. The shadow-darkened gray of the visible plant elements as seen from this northerly view would cause low to moderate contrast to the dark green trees in the foreground and middleground, but moderate contrast with the light blue-sky background, for overall color contrast of low to moderate. With low to moderate form, scale, and color contrast, and moderate to high line contrast, overall contrast for this KOP would be moderate..

Project Dominance

The visible portion of the power plant occupies a small portion of the view, so scale dominance would be low. The visible stacks would be central in view and sky-lined in an enclosed view, so spatial dominance would be high. Overall dominance would be moderate.

View Blockage

Blockage by the plant from this KOP would be low, since the stacks and HRSG units would block only a small portion of sky.

Overall Visual Change and Visual Impact Significance

From this KOP, the power plant would cause moderate contrast and dominance, and low view blockage. Therefore, the overall visual change that would be experienced at KOP 4 would be moderate. Combined with the overall visual sensitivity of moderate to high, the resulting impact would be adverse but less than significant.

Mitigation Measures

No mitigation measures are necessary from this KOP.

Other Observation Points

- View from the residences on the Southeast side of 12th Street between Colorado and Arizona Avenues: residents might have views of the higher project elements such as the HRSG stacks from their back windows and yards.

- View from the residences on Sutter Avenue south of Manning Avenue: some of these eight residents would have substantial views of the power plant.

These locations are not KOPs with simulations developed by the Applicant, but Energy Commission staff worked with the Applicant to provide mitigation for possible visual impacts at these locations. Visual impacts of the power plant structures at these locations may not be sufficiently mitigated by the Applicant's proposed landscape plan. However, **Condition VIS-2** would sufficiently mitigate the impact of the project at these observation points by requiring the use of various varieties of trees along Manning Avenue that would adequately screen the project within five years after start of operation.

D. Light and Glare

Any nighttime construction would require lighting for operational safety and security. To reduce the potential for offsite light impact at night and glare impacts during the day, the Applicant has proposed the following mitigation measures (SJVEC 2001a, p. 8.11-25):

- Minimal signage and construction of project signs using non-glare materials and unobtrusive colors.
- Lighting only the areas required for safety, security, or operations, and shielding of lighting from public view to the extent possible. Timers and sensors would be used to minimize the time that lights are on in areas where lighting is not normally needed for safety, security, or operation.
- Direction and shielding of lighting to reduce light scatter and glare. Highly directional light fixtures would be used.

During construction, the Applicant proposed that nighttime lighting be directed towards the center of the construction site and shielded, and that task-specific lighting be used when practical (SJVEC 2001a, p. 11-16).

To reduce potential glare from project structures that could affect daytime views, the Applicant has proposed the following mitigation measures (SJVEC 2001a, p. 8.11-26):

- Insulators would be non-reflective and non-refractive.
- Non-specular conductors would be used.
- Insulators would be non-reflective and non-refractive.

Staff has incorporated these and other measures as conditions of certification **VIS-3**, **4, 5, and 6**. Proper implementation these conditions would keep visible nighttime lighting and daytime glare impacts to less than significant levels.

E. PLUME ANALYSIS

Staff analyzed potential visible plumes from the SJVEC cooling tower, heat recovery steam generator (HRSG) stacks, and auxiliary boiler exhaust stack. The Applicant has

not proposed any visible plume abatement for the cooling tower, HRSG or auxiliary boiler exhausts.

Visible plumes generally occur during periods of cold and wet weather. The actual frequency of occurrence is dependent on the plant operation and weather conditions, which will vary from year to year. Visible plume formation can occur during the daytime or nighttime; however, the meteorological data reviewed indicates that conditions for visible plume formation are more prevalent during nighttime and early morning hours.

Cooling Tower Visible Plumes

Staff modeled unabated conditions under a variety of operating scenarios for the cooling towers using exhaust data provided by the Applicant (SJVEC 2001a, AFC Section 8.11.4.3.5; SJVEC 2002a, Attachment VIS-138, Data Response 138-139; Harrison 2002). The visible plume frequency results from the Combustion Stack Visible Plume (CSVP) modeling are presented in **Visual Resources Table 1**.

VISUAL RESOURCES Table 1
Staff Predicted Hours with Cooling Tower Steam Plumes
Lemoore 1992-1995 and 1997 Meteorological Data
(CSVP Model)

		Peaking (All Hours)		Limited Peaking (Noon to 8 p.m.)		Baseload (All Hours)	
	Available (hr)	Plume (hr)	Percent	Plume (hr)	Percent	Plume (hr)	Percent
All	43,824	16,366	37.34%	11,303	25.79%	9,914	22.62%
Daylight	22,177	5,334	24.05%	3,714	16.75%	2,895	13.05%
Nighttime	21,647	11,032	50.96%	7,589	35.06%	7,019	32.42%
Daylight No Rain/Fog	19,384	2,904	14.98%	1,522	7.85%	1,012	5.22%
Seasonal Daylight No Rain/Fog*	7,371	2,327	31.57%	1,420	19.26%	919	12.47%

*Seasonal conditions occur anytime from November through April.

Staff's SACTI and CSVP modeling analysis visible plume dimension results are presented in **Visual Resources Table 2**.

The cooling tower operating data provided by the Applicant is inconsistent. The SACTI model input parameters are heat rejection rate and inlet flow rate, while the CSVP model's inputs are exhaust temperature and exhaust flow rate. Staff performed a simple energy balance that appears to show that the exhaust temperature and flow rate data provided by the Applicant would estimate higher heat rejection rates than those given by the Applicant for duct firing or non-duct firing operations. Staff believes that this inconsistency is one reason for the differing SACTI and CSVP plume size results, as indicated in **Table 2** below. Additionally, SACTI does not model calm hours, which represent approximately 12 percent of all hours, 8 percent of daytime no rain/fog hours, and 11 percent of seasonal daytime no rain/fog hours. Therefore, SACTI may underestimate the plume sizes since calm conditions tend to have some of the largest plumes.

A plume frequency of 10 percent of seasonal (November through April) daylight no rain/fog hours has been used as a plume impact study threshold. The normal operating condition is expected to be baseload operations with limited duct firing (see Limited Peaking column in **Table 1** and **Table 2**). Under these operating conditions, the frequency of seasonal daylight no rain/no fog (SDNRNF) plume visibility is estimated at 19.26 percent (see **Table 1** above). As noted below, the plume analysis for the SJVEC has been augmented to account for plumes going away from fixed viewers (City residents) and for cloudy weather conditions. For this analysis, two 10th percentile plumes were used for the impacts analysis, one for viewers in the City of San Joaquin, and one for travelers along area roadways. The dimensions of these two plumes are described in the text below.

VISUAL RESOURCES Table 2
Staff Results of Cooling Tower Visible Plume Dimensions
Lemoore 1992-1995 and 1997 Meteorological Data

		SACTI Model		CSVP Model		
All Hours	**Percentile**	**Peaking**	**Baseload**	**Peaking**	**Limited Peaking**	**Baseload**
Length (ft)	50%	98-131	66-98	No Plume	No Plume	No Plume
	10%	164-197	98-131	9,993	7,257	6,893
	Maximum	2,625-2,953	2,625-2,953	16,404	16,404	16,404
Height (ft)*	50%	98-131	66-98	No Plume	No Plume	No Plume
	10%	131-164	98-131	499	456	436
	Maximum	295-328	1,969-2,297	3,087	2,887	2,743
Width (ft)	50%	66-131	66-131	No Plume	No Plume	No Plume
	10%	131-197	131-197	518	433	410
	Maximum	525-591	1,312-1,969	1,050	879	879
Daytime No Rain/Fog Hours		**Peaking**	**Baseload**	**Peaking**	**Limited Peaking**	**Baseload**
Length (ft)	50%	66-98	33-66	No Plume	No Plume	No Plume
	10%	98-131	98-131	1,447	No Plume	No Plume
	Maximum	13,123-16,404	13,123-16,404	16,404	16,404	16,404
Height (ft)*	50%	66-98	33-66	No Plume	No Plume	No Plume
	10%	98-131	66-98	404	No Plume	No Plume
	Maximum	1,640-1,969	2,297-2,625	2,910	2,818	2,549
Width (ft)	50%	66-131	66-131	No Plume	No Plume	No Plume
	10%	131-197	66-131	233	No Plume	No Plume
	Maximum	1,312-1,969	984-1,312	919	781	781
Seasonal Daytime No Rain/Fog Hours		**Peaking**	**Baseload**	**Peaking**	**Limited Peaking**	**Baseload**
Length (ft)	50%	66-98	33-66	No Plume	No Plume	No Plume
	10%	164-197	98-131	2,740	1,877	1,230
	Maximum	13,123-16,404	13,123-16,404	16,404	16,404	16,404
Height (ft)*	50%	66-98	33-66	No Plume	No Plume	No Plume
	10%	98-131	66-98	804	479	338
	Maximum	1,640-1,969	2,297-2,625	2,910	2,818	2,549
Width (ft)	50%	66-131	66-131	No Plume	No Plume	No Plume
	10%	131-197	66-131	404	272	200
	Maximum	1,312-1,969	1,969-2,625	919	781	781

Values are rounded to the nearest 5 feet from the SACTI model results (converted from meters to feet).
Seasonal = November through April (day 120-304).
*SACTI Plume height does not include the height (59 feet) of the cooling tower (release point).
Notes:
1. Due to meteorological data grouping and averaging by SACTI, generally the maximums for annual conditions appears lower than for daytime no rain/fog cases.

For views from the City of San Joaquin, staff distinguished between plumes predicted to travel away from the City (86 through 174 degrees compass direction) and other plumes, because those traveling away from the City would be less visible from the City. Of the 1420 hours or 19.256 percent of SDNRNF hours during which plumes are predicted, approximately 429 hours or 5.82 percent of SDNRNF hours are predicted to have plumes that would travel away from the City. Approximately 991 hours or 13.44 percent of the SDNRNF hours are predicted to have plumes that would not travel in a direction away, and therefore be most visible, from the City. Of those 991 hours, approximately 288 hours or 3.91 percent of SDNRNF hours are predicted to be calm hours, during which the plume would essentially go straight up. For approximately 703 hours or 9.54 percent of SDNRNF hours the plume is predicted to travel either toward the City or at an angle to the City. For some of the 429 hours during which plumes are predicted to travel away from the City, the plumes would be close to vertical, so they would also be visible from the City. Therefore, the total frequency of plumes that would be substantially visible from the City under SDNRNF conditions would be somewhat greater than 13.44 percent of SDNRNF hours.

Staff also considered cloud conditions in its evaluation of visible plumes. Of the 1,420 or 19.26 percent of SDNRNF hours predicted to have plumes, 561 hours or 7.6 percent of SDNRNF hours are predicted to have less than 50 percent cloud cover, and 859 hours or 11.66 percent of SDNRNF hours are predicted to have 50 percent or more cloud cover. The CSVP model predicts that the 10th percentile plume under SDNRNF conditions would be approximately 1,877 feet long, 479 feet high, and 272 feet wide (see **Table 2**).

Of the 991 hours or 13.44 percent of SDNRNF hours predicted to have visible plumes that would not travel away from the City, the predicted number of hours with less than 50 percent cloud cover is 358 hours, or 4.86 percent of SDNRNF hours, and the predicted number of hours with 50 percent or greater cloud cover is 633 hours or 8.59 percent of SDNFNR hours.

It is likely that the CSVP results are more accurate than the SACTI results, so staff used the CSVP results in its plume impact analysis. The CSVP model predicted greater plume lengths and heights than those predicted by the SACTI model. For the 991 hours of SDNRNF hours with visible plumes not in a direction away from the City, the 10th percentile plume sorted by length is predicted to have a length, height and width of 1,322 feet, 511 feet, and 234 feet, respectively.

There are no large frequent existing plumes in the project region.

Visual Impacts of Vapor Plumes

The area surrounding the project site is generally open space (farmland), except for the City of San Joaquin. The large sizes of visible plumes that would originate at the project site would cause a noticeable but intermittent change in the landscape character when viewed from several local roadways, including Manning Avenue, Colorado Avenue, Springfield Avenue, and Colusa Avenue, as well as from residences in the southern portion of the City of San Joaquin and scattered around the plant site. When present on clear to mostly clear (less than 50 percent clouds) SDNRNF hours (4.86 percent of the

time for views from the City, and 7.6 percent of the time for views from the roadways), vapor plumes would appear as prominent, billowing linear-to-irregular forms with irregular and changing outlines. The plumes would be unique moving forms, originating near ground level and rising vertically to diagonally. The background for views from local roadways is agricultural fields and sky, with the Coast Range visible in the distance in views from Colorado Avenue. The background for views from residences is agricultural fields and sky for the nearest residences, and residential structures and sky for other residences.

Visual Impacts to Travelers on Nearby Roadways

As seen from a new KOP located approximately one mile east on Manning Avenue, during mostly cloudy weather conditions (50 percent or more cloudiness), plumes would blend somewhat with the background of clouds due to their similar color and form resulting in a moderate degree of contrast. Plumes would appear co-dominant with the background of clouds. View blockage is not an appropriate factor for plumes against clouds because they generally appear to be the same. Therefore, plumes would cause a moderate overall visual change. Visual quality is moderate from this location with extensive views of green crops when in season and the City of San Joaquin directly in front of the viewer. Viewer concern is moderate for travelers. Overall viewer exposure is moderate, therefore overall visual sensitivity for travelers is moderate. Considering the moderate overall visual sensitivity for travelers and moderate overall visual change, plumes viewed from this new KOP would be adverse but less than significant.

As stated above, plumes visible to travelers are predicted to occur 7.6 percent of the time during clear or mostly clear daylight hours from late Fall through early Spring. Considering that on days with mostly cloudy conditions plumes will be substantially less noticeable, and that the majority of the SDNRNF hours when plumes will be present will be on mostly cloudy days, visible plumes will result in adverse but less than significant impact to travelers on nearby roadways. In other words, considering the available data on cloud conditions, the frequency of SJVEC plumes occurring during clear or mostly clear weather conditions is well below the 10 percent significance threshold.

Staff is in the process of producing a visual simulation of the 10th percentile plume from this new KOP along Manning Avenue. This simulation is expected to be included in staff's Addendum to the Staff Assessment.
As seen from KOP 2, during mostly cloudy weather conditions (50 percent or more cloudiness) plumes would blend somewhat with the background of clouds due to their similar color and form resulting in a moderate degree of contrast. Plumes would appear co-dominant with the background of clouds. View blockage is not an appropriate factor for plumes against clouds because they generally appear to be the same. Therefore, plumes would cause a moderate overall visual change. Considering the moderate overall visual sensitivity and moderate overall visual change, plumes viewed from this KOP would be adverse but less than significant.

As stated above, plumes primarily visible to City residents are predicted to occur 4.86 percent of the time during clear or mostly clear daylight hours from late Fall through early Spring. Considering that on days with mostly cloudy conditions plumes will be substantially less noticeable, and that the majority of the SDNRNF hours when plumes

will be present will be on mostly cloudy days, visible plumes will result in adverse but less than significant impact to residents of the City of San Joaquin. In other words, considering the available data on cloud conditions, the frequency of SJVEC plumes occurring during clear or mostly clear weather conditions is well below the 10 percent significance threshold.

Staff is in the process of producing a visual simulation of the 10th percentile plume from KOP 2. This simulation is expected to be included in staff's Addendum to the Staff Assessment.

Visual Impacts to the City of San Joaquin

As seen from KOP 3, a location representative of views of the proposed project site from viewers in the City of San Joaquin, during mostly cloudy weather conditions (50 percent or more cloudiness) plumes would blend somewhat with the background of clouds due to their similar color and form resulting in a moderate degree of contrast. Plumes would appear co-dominant with the background of clouds. View blockage is not an appropriate factor for plumes against clouds because they generally appear to be the same. Therefore, plumes would cause a moderate overall visual change. Considering the moderate to high overall visual sensitivity and moderate overall visual change, plumes viewed from this KOP would be adverse but less than significant.

As stated above, plumes primarily visible to City residents are predicted to occur 4.86 percent of the time during clear or mostly clear daylight hours from late Fall through early Spring. Considering that on days with mostly cloudy conditions plumes will be substantially less noticeable, and that the majority of the SDNRNF hours when plumes will be present will be on mostly cloudy days, visible plumes will result in adverse but less than significant impact to residents of the City of San Joaquin. In other words, considering the available data on cloud conditions, the frequency of SJVEC plumes occurring during clear or mostly clear weather conditions is well below the 10 percent significance threshold.

Staff is in the process of producing a visual simulation of the 10th percentile plume from KOP 3. This simulation is expected to be included in staff's Addendum to the Staff Assessment.

The cooling tower plume impact analysis is based on the cooling tower design information provided by the Applicant. If the cooling tower design or operating principles change, then this analysis would need to be redone to determine the effect on plume frequency, plume dimensions, and ground level fogging.

HRSG Visible Plumes

Staff modeled unabated conditions under a variety of operating scenarios for the HRSG plume, using exhaust data provided by the Applicant (SJVEC 2001a, AFC Section 8.11.4.3.5; SJVEC 2002a, Attachment VIS-138, Data Response 140-141). The visible plume frequency modeling results are presented in **Visual Resources Table 3**.

VISUAL RESOURCES Table 3
Staff Predicted Hours with HRSG Steam Plumes
Lemoore 1992-1995 and 1997 Meteorological Data

		Baseload (With Limited Duct Firing)	
	Available (hr)	**Plume (hr)**	**Percent**
All	43,824	4,683	10.69%
Daylight	22,177	1,634	7.37%
Nighttime	21,647	3,049	14.09%
Daylight No Rain/Fog	19,384	482	2.49%
Seasonal Daylight No Rain/Fog*	7,371	477	6.47%

*Seasonal conditions occur anytime from November through April.

As can be seen in **Table 3**, the unabated plumes resulting from the HRSG operations are highly dependent on whether the duct burners are operating. The normal operating condition is expected to be baseload operations with limited duct firing. Under these operating conditions, the seasonal daylight no rain/fog plume visibility decreases to 6 percent, which is below the significance threshold of 10 percent.

Auxiliary Boiler Visible Plumes

Staff modeled normal operations for the auxiliary boiler using exhaust data provided by the Applicant (SJVEC 2001a, AFC Section 8.11.4.3.5; SJVEC 2002a, Attachment VIS-138, Data Response 142). The visible plume frequency modeling results are presented in **Visual Resources Table 4**.

VISUAL RESOURCES Table 4
Staff Predicted Hours with Auxiliary Boiler Steam Plumes
Lemoore 1992-1995 and 1997 Meteorological Data

	Available (hr)	**Plume (hr)**	**Percent**
All	43,824	4,858	11.1%
Daylight	22,177	1,225	5.52%
Daylight No Rain/Fog	19,384	248	1.28%
Seasonal Daylight No Rain/Fog*	7,371	236	3.20%

*Seasonal conditions occur anytime from November through April.

As can be seen in **Table 4**, the frequency of plumes resulting from the auxiliary boiler under normal operating conditions during seasonal daylight no rain/fog hours is 3.20 percent, well below the significance threshold of 10 percent.

CUMULATIVE IMPACTS

No reasonably foreseeable planned projects that would contribute to cumulative visual impacts were identified.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than 50 percent within a six-mile radius of the proposed SJVEC power plant, (please refer to **SOCIOECONOMICS Figure 1**), and Census 1990 information that

shows the low-income population is less than 50 percent within the same radius. Views from KOPs 1 and 3 affect only viewers who are travelers or shoppers, for whom information on percentage of minority and low-income identity is not available. KOP 4 is located in a residential area, but as explained above the power plant would not cause a significant impact from this KOP. KOP 2 primarily represents the views of travelers; however, it also represents two residences, and the staff-identified observation points affect several residences. It appears that visual impact at KOP 2 and the two observation viewpoints identified by staff would not be sufficiently mitigated by the Applicant's proposed landscape plan, but would be by staff's proposed conditions of certification. Therefore, there are no visual resources environmental justice issues related to this project.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

LOCAL

VISUAL RESOURCES Table 5 provides a listing of the applicable City of San Joaquin and Fresno County LORS. Ten relevant policies and standards were found to pertain to the enhancement and/or maintenance of visual quality. **Table 5** includes a determination of the project's consistency with these goals, policies and standards. The project as proposed would be consistent with all County General Plans and zoning goals, policies, and standards. The project as proposed would not be consistent with the City General Plan goals and policies, but with implementation of staff's proposed conditions, the project would be consistent. The project would not comply with the City's height requirement zoning standard related to visual resources. Compliance with this standard through the City's zoning variance process is possible, and staff has obtained an advisory resolution from the City regarding the requirements for this variance, indicating that the City would grant the variance if requested, conditioned on installation of a landscaping plan appropriate for the zoning designation.

VISUAL RESOURCES Table 5
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

LORS		Consistency Determination Before Mitigation / Conditions	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
City of San Joaquin Comprehensive General Plan	Policy 1.B.5. Industrial development should be compatible with the surrounding area. This shall include adequate environmental mitigation, for noise, orders (sic), potential releases of hazardous materials, and public vistas.	NO	The project would be compatible with the surrounding area because the City parcels adjacent to the project site are zoned for manufacturing, and the adjacent County parcels are zoned for agricultural use. The project would be compatible with the City's overall land use and urban design strategy. The project's landscaping would assist in blocking views into the site and protecting public vistas. However, further landscaping information and plan review is necessary; further mitigation may be required.
City of San Joaquin Comprehensive General Plan	Goal No. 6: New public and private development shall take into account community image and appearance. Development regulations shall express appropriate concern for visual quality. Efforts in this endeavor will be reflected in site planning and engineering, architectural design, landscaping, street and open space improvements, business functions and cultural activities.	NO	The project would have adequate setbacks from surrounding roads and adjacent properties, and would be heavily landscaped. However, the landscape plan does not appear to adequately mitigate impact.
City of San Joaquin Comprehens ive General Plan	Policy 6.A.1: The City shall take into consideration as one factor in urban development the aesthetics of development.	YES	The City has reviewed and approved the preliminary landscape plan and the site plan.

VISUAL RESOURCES Table 5
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

LORS		Consistency Determination Before Mitigation / Conditions	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
City of San Joaquin Comprehensive General Plan	Industrial Land Use Policies and Proposals Industrial sites should be subject to the same standards for visual screening with ornamental walls, screen fencing and landscaping and street trees, frontage landscaping and parking lot landscaping as provided for commercial areas. Screening of outdoor storage should be required.	YES	The project would be generally consistent with this policy because it would include extensive landscape screening.
City of San Joaquin Zoning Ordinance	**Section 17.60 M; Manufacturing Zones (M1)** **17.60.030 Height of Structures** The maximum height of any building shall be 75 feet; provided, however, additional height may be permitted if a height variance is first secured.	YES	Because the 145-foot high HRSG stacks, the tops of the HRSG units and 120-foot high auxiliary boiler stack would exceed the 75-foot height limit specified. Staff has received a resolution from the City Council stating that the City would grant a height variance, and that the only condition applied would be the landscaping that would be required for any project in the industrial area.

VISUAL RESOURCES Table 5
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

LORS		Consistency Determination Before Mitigation / Conditions	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
City of San Joaquin Zoning Ordinance	**17.96.010 Landscaping** The following standards shall apply to all new development occurring in the City: Native tree plantings or vegetation consistent with zone 7 of the Western Garden Sunset Book shall be the recommended species type in all landscape designs. The minimum tree size shall be a fifteen-gallon planting. The number and spacing of trees for each landscaping plan will vary; however, as a general standard one fifteen-gallon tree shall be planted for every twenty-five feet of frontage along a street. All landscapes shall be provided with an appropriate irrigation system and maintained to an acceptable community level. Prior to final occupancy, the developer of a new building or use that requires a site plan shall provide the City a one-year landscaping maintenance agreement that is applicable to the new building or use. Landscape planters shall be surrounded with a six-inch high concrete curb or similar type barrier to protect the landscaping from foot and automobile traffic.	YES	The conceptual landscape plan that has been developed for the project is consistent with the objectives of these guidelines, but varies in some details from the zoning ordinance's standards for commercial areas because the project site is much larger than the typical industrial site, and is at the City's interface with the surrounding agricultural landscape, where some of these requirements are not necessarily appropriate. Along Springfield Avenue trees will be planted in clusters rather than 25 feet on center, but the total number of trees would be greater than required by the ordinance. Condition of Certification **VIS-2** would ensure the irrigation and landscaping maintenance agreement requirements. Any use of landscape planters will be part of the final landscape plan and required to conform to this policy.

VISUAL RESOURCES Table 5
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

LORS		Consistency Determination Before Mitigation / Conditions	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
Fresno County General Plan	**Public facilities and Services** PF-J.2: The County shall work with local gas and electric utility companies to design and locate appropriate expansion of gas and electric systems, while minimizing impacts to agriculture and minimizing noise, electromagnetic, visual, and other impacts on existing and future residents.	YES	Due to the underground placement of the gas line and the restoration of the surface ground to its original condition, there would be no lasting visual effects. The gas metering station would be low to the ground, and would be given color treatment and landscaping that would cause it to blend into its setting. The two new transmission lines would be very short, .5 mile long, their dark gray color would not contrast highly with the blue sky background, and they would be located in an area where the landscape is already dominated visually by a transmission line and substation.
Fresno County General Plan	Open Space and Conservation Goal OS-K: To conserve, protect, and maintain the scenic quality of Fresno County and discourage development that degrades areas of scenic quality.	YES	The project elements in the County, described above, would not have a lasting visual effect.
Fresno County General Plan	OS-K.1: The County shall encourage the preservation of outstanding scenic views, panoramas, and vistas wherever possible. Methods to achieve this may include encouraging private property owners to enter into open space easements for designated scenic areas.	YES	The project elements in the County, described above, would not have a lasting visual effect.
Fresno County Zoning Ordinance	Exclusive Agriculture (AE) zone	YES	The project's linear facilities and gas metering station would fall within the AE zone. There are no specific aesthetic guidelines that would apply to pipelines or the gas metering station. The gas metering station would meet all height and setback requirements for this zone.

RESPONSES TO AGENCY AND PUBLIC COMMENTS

There have been no written comments from other agencies or the public regarding the impact of this project on visual resources. At the March 7, 2002 public workshop, City representatives requested that a City-appointed committee be involved in the development of the project's landscaping plan. Condition **VIS-2** provides for this request.

CONCLUSIONS AND RECOMMENDATION

CONCLUSIONS

The project as proposed has the potential to cause significant adverse visual impacts. The project structures would cause significant visual impacts in the view areas represented by KOPS 1, 2, and 3, as well as to some residents in the vicinity of two view points identified by Commission staff. The onsite and offsite landscaping, site design, and treatment plan components offered by the Applicant, along with the staff's proposed conditions of certification would reduce these impacts to less than significant levels. Construction and operational night lighting has the potential to cause significant visual impacts. The Applicant has proposed several mitigation measures for lighting and glare. Staff's proposed conditions of certification would ensure that lighting and glare impacts would be less than significant.

Visible plumes from the cooling tower are predicted to occur at a frequency of less than 10 percent of the seasonal daylight hours from November through April when there is no fog or rain, and less than 50 percent cloudiness. Therefore, there would not be a significant visual impact to travelers on nearby roads or to City of San Joaquin residents.

RECOMMENDATION

If the Energy Commission decides to approve the project, staff recommends that the Commission adopt the following conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

VIS-1 To mitigate adequately visual impacts of project construction, the construction laydown area shall be set back 200 feet from Colorado Avenue. Chain link fencing with opaque, solid slats or other screening material shall be installed on the Colorado Avenue and Manning Avenue sides of the laydown area. All staging, material, and equipment storage areas, where visible from public rights-of-way, shall be visually screened by fencing with opaque slats. All evidence of construction activities, including ground disturbance due to staging and storage areas, shall be removed and remediated upon completion of construction.

The project owner shall submit a plan for screening construction activities at the site and staging, material, and equipment storage areas, and restoring the surface conditions of any rights-of-way disturbed during construction of the transmission line and underground pipelines. The plan shall describe the gas and water supply route. The plan shall include grading to the original grade and contouring and re-vegetation of the rights-of-way.

The project owner shall not implement the plan until receiving written approval of the submittal from the California Energy Commission Compliance Project Manager (CPM).

Verification: At least 60 days prior to the start of site mobilization or ground disturbance, whichever occurs first, the project owner shall submit the plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the plan are needed, the project owner shall submit to the CPM a revised plan within 30 days of receiving that notification.

The project owner shall notify the CPM within seven days after installing the screening that the screening is ready for inspection.

The project owner shall notify the CPM within seven days after completing the surface restoration that the areas disturbed during construction are ready for inspection.

VIS-2 The project owner shall prepare and implement a perimeter and offsite landscape plan to substantially screen views of the power plant. Landscaping shall consist of a mix of trees, shrubs, and groundcovers. Landscaping shall include various varieties of trees along Colorado Avenue, along Colusa Avenue on the City-owned property between Springfield Avenue and Cherry Lane, and along Manning Avenue East from Colorado Avenue to Placer Avenue, providing view screening that adequately mitigates project impact within five years after start of operation. Fast growing evergreen species shall be used to ensure that maximum screening is achieved as quickly as possible and year-round. The gas metering station shall be given landscaping that will cause it to blend into its setting. Suitable irrigation shall be installed to ensure survival of the plantings. Landscaping shall be installed consistent with the City of San Joaquin zoning ordinance.

Prior to start of site mobilization or ground disturbance, whichever occurs first, the project owner shall submit the landscape plan to the City of San Joaquin for review and comment, and to the CPM for review and approval. The submittal to the CPM shall include the City's comments. The plan shall include, but not be limited to:

a) A detailed landscape, grading, and irrigation plan, at a reasonable scale, which includes a list of proposed tree and shrub species and installation sizes, and a discussion of the suitability of the plants for the site conditions and mitigation objectives. A list of potential tree species that would be viable in this location shall be prepared by a qualified professional arborist familiar with local growing conditions, with the objective of providing the widest possible range of species from which to choose. The plan shall demonstrate how the screening conditions called for above shall be met, including evidence provided by a qualified professional arborist that the species selected are both viable and available. The plan shall specify a detailed installation schedule demonstrating installation of as much of the landscaping as early in the construction process as is feasible in coordination with project construction.

b) Maintenance procedures, including any needed irrigation and a plan for routine annual or semi-annual debris removal for the life of the project; and

c) A procedure for monitoring for and replacement of unsuccessful plantings for the life of the project.

d) The project owner shall not implement the plan until the project owner receives approval of the plan from the CPM.

Verification: At least 60 days prior to start of site mobilization or ground disturbance, whichever occurs first,, , the project owner shall submit the landscape plan to the CPM for review and approval.

If the CPM notifies the project owner that revisions of the submittal are needed, within 30 days of receiving that notification the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within seven days after completing installation of the landscape screening that the planting and irrigation system are ready for inspection.

The project owner shall report landscape maintenance activities, including replacement of dead vegetation, for the previous year of operation in each Annual Compliance Report.

The fifth Annual Compliance Report shall demonstrate that the landscaping mitigates project impact to less than significant levels. If impacts are still significant, within 30 days of the Commission request the Project Owner shall submit a revised landscaping plan demonstrating sufficient mitigation to the City for review, and to the Commission with City comments for review and approval. Upon approval the Owner will implement the plan within 90 days.

VIS-3 Prior to first turbine roll, the project owner shall treat the surfaces of all project structures and buildings visible to the public such that their colors minimize visual intrusion and contrast by blending with the landscape; their surfaces do not create glare; and they are consistent with local laws, ordinances, regulations, and standards. The project owner shall submit for CPM review and approval, a specific treatment plan whose proper implementation will satisfy these requirements. The treatment plan shall include:

a) Specification, and 11” x 17” color simulations at life size scale, of the treatment proposed for use on project structures, including structures treated during manufacture;

b) A list of each major project structure, building, tank, transmission line tower and/or pole, and fencing/walls specifying the color(s) and finish proposed for each (colors must be identified by name and by vendor brand or a universal designation);

c) Two sets of brochures and/or color chips for each proposed color;

d) Samples of each proposed treatment and color on each material to which they would be applied that would be visible to the public;

e) A detailed schedule for completion of the treatment; and

f) A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated on site, until the project owner receives notification of approval of the treatment plan by the CPM.

Verification: The project owner shall submit its proposed treatment plan at least 90 days prior to ordering the first structures that are color treated during manufacture.

If a revision is required, the project owner shall provide the CPM with a revised plan within 30 days of receiving notification that revisions are needed.

Prior to first turbine roll, the project owner shall notify the CPM that all buildings and structures are ready for inspection.

The project owner shall provide a status report regarding treatment maintenance in the Annual Compliance Report.

VIS-4 The project owner shall design and install all permanent lighting such that light bulbs and reflectors are not visible from public viewing areas; lighting does not cause reflected glare; and illumination of the project, the vicinity, and the nighttime sky is minimized. To meet these requirements the project owner shall ensure that:

a) Lighting shall be designed so 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 the lighting shall be such that the luminescence or light source is shielded to prevent light trespass outside the project boundary;
b) All lighting shall be of minimum necessary brightness consistent with worker safety;
c) High illumination areas not occupied on a continuous basis (such as maintenance platforms) shall have switches or motion detectors to light the area only when occupied;
d) A lighting complaint resolution form (following the general format of that in Attachment 1) shall be used by plant operations to record all lighting complaints received and document the resolution of those complaints. All records of lighting complaints shall be kept in the on-site compliance file.

Verification: At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to the CPM for review and comment written documentation describing the lighting control measures and fixtures, hoods, shields proposed for use, and incorporate the CPM's comments in lighting equipment orders.

Prior to first turbine roll, the project owner shall notify the CPM that the lighting has been completed and is ready for inspection. If the CPM notifies the project owner that modifications to the lighting are needed, within 30 days of receiving that notification the

project owner shall implement the modifications and notify the CPM that the modifications have been completed.

The project owner shall report any complaints about permanent lighting and provide documentation of resolution in the Annual Compliance Report, accompanied by any lighting complaint resolution forms for that year.

VIS-5 The project owner shall ensure that lighting for construction of the power plant is used in a manner that minimizes potential night lighting impacts, as follows:

a) All lighting shall be of minimum necessary brightness consistent with worker safety.

b) All fixed position lighting shall be shielded, hooded, and directed downward to minimize backscatter to the night sky and direct light trespass (direct lighting extending outside the boundaries of the construction area).

c) Wherever feasible and safe, lighting shall be kept off when not in use and motion detectors shall be employed.

d) A lighting complaint resolution form (following the general format of that in Attachment 1) shall be maintained by plant construction management, to record all lighting complaints received and to document the resolution of that complaint.

Verification: Within seven days after the first use of construction lighting, the project owner shall notify the CPM that the lighting is ready for inspection.

If the CPM notifies the project owner that modifications to the lighting are needed to minimize impacts, within 15 days of receiving that notification the project owner shall implement the necessary modifications and notify the CPM that the modifications have been completed.

The project owner shall report any lighting complaints and documentation of resolution in the Monthly Compliance Report, accompanied by any lighting complaint resolution forms for that month.

VIS-6 The project owner shall design project signs using non-reflective materials and unobtrusive colors. The project owner shall ensure that signs comply with the applicable City of San Joaquin zoning requirements that relate to visual resources. The design of any signs required by safety regulations shall conform to the criteria established by those regulations.

The project owner shall submit a signage plan for the project to the City of San Joaquin for review and comment, and to the CPM for review and approval. The submittal to the CPM shall include the City's comments.
The project owner shall not implement the plan until the project owner receives approval of the submittal from the CPM.

Verification: At least 60 days prior to installing signage, the project owner shall submit the plan to the CPM for review and approval.

If the CPM notifies the project owner that revisions of the plan are needed, within 30 days of receiving that notification the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within seven days after completing installation of the signage that they are ready for **INSPECTION.**

REFERENCES

Buhyoff, G.J., P. A. Miller, J. W. Roach, D. Zhou, and L. G. Fuller. 1994. An AI Methodology for Landscape Visual Assessments. AI Applications. Vol. 8, No 1., pp. 1-13.

City of San Joaquin. 1996. Comprehensive General Plan

City of San Joaquin. 2000. Zoning Ordinance

Fresno County. 2000. General Plan

Fresno County. 2001 a Zoning Ordinance

Hami, Shahid, City Manager, City of San Joaquin, meeting, Dec. 4, 2001

Harrison 2002. Record of e-mail and telephone conversations between William Harrison, Calpine Corporation, and William Walters, Aspen Environmental Group. March 2000.

SJVEC (San Joaquin Valley Energy, LLC). 2001a. Application for Certification, San Joaquin Valley Energy Center LLC (01-AFC-22). Submitted to the California Energy Commission, October 31, 2001.

SJVEC (San Joaquin Valley Energy LLC). 2001b. Application for Certification Supplement in Response to CEC Data Adequacy recommendation, Application for Certification, San Joaquin Valley Energy Center LLC (01-AFC-22). Submitted to the California Energy Commission, December 20, 2001.

SJVEC (San Joaquin Valley Energy LLC). 2002a. Application for Certification Data Request Response, Set 1A, Central Valley Energy Center LLC (01-AFC-22). Submitted to the California Energy Commission, February 26, 2002.

SJVEC (San Joaquin Valley Energy, LLC). 2002b. San Joaquin Valley Energy Center Data Request Response, Set 1D (Nos. 128-142). March 29, 2002

Smardon, Richard C., James E. Palmer, and John P. Felleman. 1986. *Foundations for Visual Project Analysis.* John Wiley & Sons. New York.

Walters, William, First Draft Plume Analysis, April 2, 2002

Walters, William and Blewitt, Lisa, 2002. San Joaquin Valley Energy Center Cooling Tower, HRSG, and Auxiliary Boiler Exhaust Visible Plume Analysis. May 2, 2002.

APPENDIX VR - 1: SUMMARY OF ANALYSIS

APPENDIX VR-2: LIGHTING COMPLAINT RESOLUTION FORM

San Joaquin Valley Energy Center City of Hayward, Alameda County, California
Complainant's name and address: Phone number:
Date complaint received: Time complaint received:
Nature of lighting complaint:
Definition of problem after investigation by plant personnel: Date complainant first contacted:
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.)

APPENDIX APPENDIX VR-3: VISUAL RESOURCES FIGURES

APPENDIX VR – 1
SAN JOAQUIN VALLEY ENERGY CENTER STAFF ASSESSMENT - VISUAL RESOURCES SUMMARY OF ANALYSIS
(DOES NOT INCLUDE PLUME ANALYSIS)

VIEWPOINT		*EXISTING VISUAL SETTING*								VISUAL CHANGE					IMPACT SIGNIFICANCE		
				Viewer Exposure													
Key Observation Point (KOP)	Description	Visual Quality	Viewer Concern	Visibility	Proximity	Number of Viewers	Duration of View	Overall Viewer Exposure	Overall Visual Sensitivity	Description of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change	Significance without Mitigation	Mitigation / Conditions	Impact Significance with Mitigation[1]
KOP 1 **VR Figure 1**	View looking northwest toward the SJVEC site from the corner of Colorado and Springfield Avenues.	***Low to Moderate***	***Moderate***	**High**	**High**	**Moderate**	**moderate**	**Moderate to High**	***Moderate***	The project would occupy a substantial part of the field of view and a high position in the landscape, and structures would block view of hills	**High**	**High**	**Moderate**	**High**	**Significant**	**VIS-2 VIS-3 VIS-4 VIS-5 VIS-6**	**Not Significant**
KOP 2 **VR Figure 2**	View looking east toward the SJVEC site from residences on Colusa Avenue just to the north of Springfield Avenue	***Moderate***	**Travelers: Moderate Residents: High**	**High**	**Moderate to High**	***Travelers: Low to moderate*** **Residents: Low**	**Travelers: Low Residents: High**	**Travelers: Moderate Residents: Moderate to high**	**Travelers: Moderate Residents: Moderate to high**	. Project would be prominent due its exposed position in the landscape and to considerable skylining.	**High**	**Moderate to High**	**Low to Moderate**	**Moderate to High**	**Significant**	**VIS-2 VIS-3 VIS-4 VIS-5 VIS-6**	**Not Significant**
KOP 3 **VR Figure 3**	View looking southwest towards the SJVEC site from the corner of Manning and Colorado Avenues	***Low to moderate***	***Moderate***	**High**	**High**	**Moderate**	**Moderate**	**Moderate to High**	**Moderate**	. The project would be prominent due to its spatial position in an exposed location in the setting.	**Moderate to high**	**Moderate to High**	**Low to Moderate**	**Moderate to High**	**Significant**	**VIS-2 VIS-3 VIS-4 VIS-5 VIS-6**	**Not Significant**
KOP 4 **VR Figure 4**	View looking southeast towards the CVEC site from the middle of Idaho Avenue at 9th Street	***Moderate***	***High***	**Low to Moderate**	**Moderate**	**Low to Moderate**	**High**	**moderate**	**Moderate to High**	Existing buildings and trees would substantially screen the project, so would not be dominant. .	**Moderate**	**Moderate**	**Low**	**Moderate**	**Not Significant**		**Not Significant**

[1] Staff has identified other mitigation measures that may reduce the visual impacts to KOPs 1-4 to less than significant levels. However, additional information is needed from the Applicant in order for staff to make a final assessment.

WASTE MANAGEMENT

Testimony of Alvin J. Greenberg, Ph.D.

INTRODUCTION

This analysis presents an assessment of issues associated with managing wastes generated from constructing and operating the proposed San Joaquin Valley Energy Center (SJVEC). 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 wastes 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 wastes will 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 will be managed in an environmentally safe manner; and
- The disposal of project wastes will not result in significant adverse impacts to existing waste disposal facilities.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

Resource Conservation and Recovery Act (42 U.S.C. § 6922)

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 that 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.

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.

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.

LOCAL

The Fresno County Human Services System's Department of Community Health, Environmental Health System, has the responsibility for administration and enforcement of the California Integrated Waste Management Act for non-hazardous solid waste at the proposed SJVEC. This agency is also the local Certified Unified Program Agency (CUPA), administering and enforcing compliance with the California Hazardous Waste Control Act.

The SJVEC must also comply with Fresno County General Plan, Public Facilities Elements PF-F.1, which mandates a hierarchical approach to waste management, and PF-F.4, which requires compliance with the County's solid waste management plan.

SETTING

PROJECT AND SITE DESCRIPTION

The proposed San Joaquin Valley Energy Center would be located on a 65-acre parcel of land in an industrial area in the southeast portion of the City of San Joaquin, in Fresno County, California. While it has no street address, the parcel can be identified as located in a portion of the north half of Section 25, Township 15 South, Range 16 East. The triangular-shaped property is bordered by West Springfield Avenue to the south, South Colusa Avenue to the west, and South Colorado Avenue (and the Union Pacific Railroad) to the northeast. A 10-foot wide irrigation ditch runs along the southern property border parallel to West Springfield Avenue. Cultivated and undeveloped fields border the property immediately to the west, typical of all the areas west, south and east of the parcel. The project site itself is currently under cultivation in cotton, wheat, and alfalfa crops. An abandoned agricultural equipment maintenance and storage yard and several commercial and industrial properties border the parcel to the north and northwest. The topography of the proposed project location is flat, at an elevation of approximately 170 feet above mean sea level.

The SJVEC as proposed would be a combined-cycle facility comprised of three new natural gas-fired Combustion Turbine Generators (CTG), Three Heat Recovery Steam Generators (HRSG), and a Steam Turbine Generator (STG), along with accompanying evaporative coolers, condenser, cooling tower, control facilities, electrical transformers and switchgear, and other related equipment. Two pipelines would be constructed to the proposed site to supply natural gas fuel and reclaimed wastewater for cooling tower and process makeup, over distances of 20 and 21 miles respectively. Two additional, much shorter pipelines would be constructed from the City of San Joaquin to the project site to supply water for drinking and sanitary purposes, and for domestic wastewater disposal back to the City's sewer system. Electric connection would be made to existing PG&E transmission lines located on a parcel south of the project site.

As proposed, the electric generating system would have a nominal generating capacity of approximately 1,060 megawatts (MW) at a projected availability factor of 92 to 98 percent. It is designed to operate at between 25 and 100 percent of base load to respond to a dispatch-service-directed supply of customer demands.

A Phase I Environmental Site Assessment (ESA) was conducted by Environmental Resources Management (ERM) in accordance with methods prescribed by the American Society for Testing and Materials (ASTM Standard E 1527). The assessment identified several offsite areas of possible environmental concern, including documented leaking underground storage tanks located approximately ¾ mile from the project site. However, it was determined that the likelihood of these areas posing any risk to the site environment or to the health or safety of site workers was minimal. The project site has historically been used for agricultural crop production and has no record of ever having supported any structures or industrial activity. Agricultural chemicals in the forms of pesticides and fertilizers have been applied to the subject property for at least the past 7 years, presenting the possibility that elevated concentrations of these materials may be found in the site soils (Calpine 2001a, Appendix 8.13A).

Staff requested that a Phase II ESA be performed. The response to this data request (Calpine 2002c) consisted of a document entitled "Soil Sampling and Analysis Results for the [SJVEC] site located near San Joaquin, CA.," dated March 29, 2002. Twelve locations on the site were selected for sampling. Some of these locations are in areas scheduled for site preparation. A few are located in areas that would appear to remain undisturbed. Each surface and subsurface soil sample was combined with a sample from another location. Thus, samples 1 and 2 were combined, 3 and 4 were combined, etc. and then submitted as composites for analysis for Arsenic, total Chromium, Lead (EPA Method 6010B), and pesticides (EPA Methods 8081A and 1851A).

Regarding metals, all but two samples showed typical background levels of arsenic (mean 6.4 ppm for all samples; 4.5 ppm with two elevated samples excluded), total chromium (mean 47.5 ppm), and lead (mean 5.4 ppm). Composite samples 3/4 and 9/10 obtained at 3 feet below ground surface (bgs) showed 10.2 ppm and 21.1 ppm aresenic, respectively. Since these are composites, the level of arsenic in location 9 or 10 could be as high as 38 ppm. (In determining the significance of the analytical results of a composite sample, one must assume that one sample could be uncontaminated while the other is contaminated. Thus, the "clean" soil dilutes the contaminated sample – in this case by one-half – so that the level appears to be lower than reality. In the case of naturally occurring metals in soil, the background levels must be taken into account. Therefore, rather than double the value found by the lab, it is proper to subtract background from "double" the value found. Thus, 21.1 times 2 equals 42.2 minus background of 4.5 equals ~38 ppm.)

Pesticides were not detected at levels above the Practical Quantitation Limit (PQL) in any sample. However, a review of the laboratory reports raises two issues in regard to pesticides. The PQL for toxaphene was 1000 μg/kg for all samples analyzed, a level so far above any health-protective level (approximately 10 μg/kg) as to render this analysis meaningless for determining any risk posed to workers or the public. In addition, the percent recovery for one of the surrogates for at least three samples analyzed for chlorinated pesticides by EPA Method 8081A were at the lower end of the lab's range of 50 – 129 percent. Staff contends that an analysis of a soil sample for toxaphene with a PQL of 1000 μg/kg and a surrogate recovery of 50.1percent is not adequate for reporting purposes. Thus, it is entirely possible that harmful levels of toxaphene and other chlorinated pesticides could be encountered during site preparation activities.

Therefore, based upon staff's evaluation, staff recommends certain mitigation measures as described below in proposed Condition of Certification **WASTE-6**. Alternatively, the applicant can be given the option of demonstrating, through a more rigorous sampling and analysis plan, that the levels of arsenic and chlorinated pesticides are low enough so as to present an insignificant risk to workers and the off-site public.

IMPACTS

PROJECT SPECIFIC IMPACTS

Construction

Site preparation and construction of the proposed generating plant and associated facilities would generate both nonhazardous and hazardous wastes in solid and liquid forms.

Nonhazardous solid wastes anticipated to be generated during construction are detailed in Section 8.13.3.1.1 of the AFC. Approximately 100 tons of wood, paper, glass and plastics; 70 tons of excess concrete; 25 tons of scrap metal; and up to 2,100 barrels (approximately 650 tons) of non-toxic drilling mud could be generated during project construction. Wherever possible and practical these wastes would be recycled, particularly the paper products and metals. Nonrecyclable wastes would be collected and disposed of in a Class III landfill. Exceptions might include the disposal of the waste concrete in a clean fill site if one is available, and the disposal of the drilling mud in a Class II landfill (Calpine 2001a, p. 8.13-5).

Nonhazardous liquid wastes would be generated during construction, and are discussed in the **Soil and Water Resources** section of this document. With the exception of stormwater runoff, all non-hazardous liquid wastes generated during construction would be contained and accumulated for appropriate offsite disposal.

Hazardous wastes anticipated to be generated during construction are discussed in Section 8.13.2.3 of the AFC. *Solid* hazardous wastes may include spent welding materials and dried paint. *Liquid* hazardous wastes would include waste solvents, along with flushing, cleaning and passivating (nitrate or phosphate solution) fluids. Minimal quantities of the solid wastes are anticipated. The liquid flushing, cleaning and passivating wastes would be generated in quantities estimated at one to two times the internal volumes of the pipes being cleaned. Additionally, during site preparation, soil containing harmful levels of arsenic and/or pesticides may be generated.

The construction contractor 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 90-day storage area located at the site construction laydown area. The wastes thus accumulated would be properly manifested, transported and properly disposed of by licensed hazardous waste collection and disposal companies before the 90-day storage limit is exceeded (Calpine 2001a, p. 8.13-5).

Operation

The proposed SJVEC would generate both nonhazardous and hazardous wastes in solid and liquid forms under normal operating conditions.

Nonhazardous solid wastes

Nonhazardous solid wastes generated during plant operation are expected to include rags, turbine air filters, broken and rusted metal and machine parts, broken or defective electrical materials, empty containers, and typical worker and small office wastes. Approximately 50 tons (70 cubic yards) of these wastes are projected to be generated annually. Large metal parts would be recycled. (Calpine 2001a, p. 8.13-6).

zero liquid discharge system

SJVEC proposes to install a zero liquid discharge system in order to reuse all of the process wastewater within the plant. This would minimize the use of fresh water and reduce wastewater discharges. This system consists of three concentration steps: the cooling tower, a high Total Dissolved Solids (TDS) reverse osmosis system, and a brine concentrator (Calpine 2001a, Section 2.2.9.1.2). This process removes calcium, silica and other minerals from the blowdown water and sends approximately 90 percent of the water back to the cooling tower for reuse. The remaining 10 percent is further processed and stored in the demineralized water storage tank for use in the combustion turbines and HRSG.

The operation of the Zero Liquid Discharge Facility (ZLDF) would generate approximately 29 to 48 tons of salt cake waste per day. Expected annual generation is 14,000 tons. If these solid wastes generated from the crystallizer are not classified as hazardous, they would be considered a California designated waste due to their high salt content. The category of designated waste includes nonhazardous waste containing pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations that could exceed applicable water quality objectives or affect the beneficial uses of waters of the state (Cal. Code Regs., tit. 27, § 20210). Designated wastes must be disposed of at Class I or Class II disposal sites. In order to ensure proper disposal of the salt cake, staff proposes Condition of Certification **WASTE-7,** which would require testing of the salt cake.

Testing of the effluent from the brine concentrator in similar projects showed that chromium and selenium are present in quantities that may approach regulatory levels for hazardous wastes. That effluent is subsequently routed to the crystallizer for further concentration. If the effluent were to contain hazardous levels of any constituent, such concentration could be considered hazardous waste treatment, a process that would require a permit from the Department of Toxic Substances Control. However, since the effluent water is reused in the plant, a recycling exemption provided for in Health and Safety Code section 25132.2(c)(2) would apply as long as the following conditions are met:

1. The wastewater must be recycled at the same facility at which it was generated.
2. The wastewater must be recycled within generator waste accumulation time limits.
3. The wastewater must be managed in accordance with all applicable requirements for generators of hazardous wastes under Health and Safety Code Chapter 6.5 and regulations adopted by DTSC.

Staff therefore proposes Condition of Certification WASTE-8 **to require testing of the effluent from the brine concentrator as a hazardous waste. If it were**

determined to be hazardous, SJVEC would have to apply for a recycling exemption from DTSC.

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. A zero liquid discharge treatment system is proposed for this facility to treat and reuse process wastewaters. An exception to this system would involve wastewater containing cleaning chemicals, which would be accumulated and shipped offsite to an approved facility for disposal (Calpine 2001a, p. 8.13-6).

Hazardous wastes

Hazardous wastes anticipated to be generated during routine project operation include waste oil, used oil filters, laboratory waste, Selective Catalytic Reduction (SCR) and oxidation catalysts, oily rags and absorbents, and used acidic and alkaline chemical cleaning wastes (potentially containing high concentrations of heavy metals). Table 8.13-2 in the AFC lists the anticipated wastes (except the cleaning solutions) along with their composition, hazard class, estimated quantity, and disposal method. Most of the wastes would be generated in relatively small quantities and would be recycled by certified recyclers. The acidic and alkaline cleaning wastes would be accumulated during maintenance activities and then disposed of offsite. The emission control catalysts would require regeneration every three to five years resulting in the generation of 1,000 pounds each of both SCR material and CO catalyst material. These wastes could require disposal in a Class I facility if recycling / regeneration proves not to be feasible. Chemical materials collected in drains as a result of spillage, overflows, and maintenance operations would be neutralized onsite (if necessary) and directed into the cooling tower basin (Calpine 2001a, p. 8.13-6). The applicant has stated a goal of recycling 100percent of all hazardous wastes generated during operations (Calpine 2002a)

IMPACT ON EXISTING WASTE DISPOSAL FACILITIES

The AFC indicates that nonhazardous solid wastes generated at the SJVEC would be recycled if possible, or disposed of in a Class III landfill (Calpine 2001a, Section 8.13.4). Mid Valley Disposal, the garbage collection service for the City of San Joaquin and the commercial and industrial sites around it, would service the SJVEC. This company typically uses the Avenal Landfill in Kings County, California, a facility with a 300 ton per day permitted throughput and an 8.2 million cubic yard remaining capacity. The estimated closure date for this facility is 2040 (CH_2M HILL 2002). The most likely alternative to this facility is the American Avenue Landfill in Kerman, California. This facility has a permitted capacity of 32.7 million cubic yards, a 2,200 ton per day permitted throughput, a remaining capacity of 32.4 million cubic yards, and an estimated closure date of 2031. Table 8.13-3 in the AFC lists four other sites that could provide additional alternatives for the disposal of solid nonhazardous wastes generated at the SJVEC. The volume of solid nonhazardous waste from SJVEC requiring off-site disposal (including the salt cake if found nonhazardous) represents less than 2 percent of the daily capacity available at the American Avenue and Avenal landfills alone, which is an insignificant amount. Expected annual generation would be a small fraction 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 (Calpine 2001a, p. 8.13-8).

The AFC notes that the California DTSC lists 46 facilities in California that can accept hazardous wastes for treatment or disposal (Calpine 2001a, p. 8.13-9). Subsequent sections of the AFC discuss the three Class I landfills in California: the Buttonwillow Landfill in Kern County, the Westmorland Landfill in Imperial County, and the Kettleman Hills Landfill in King's County, which is the Class I facility nearest the proposed SJVEC. The Kettleman Hills facility also accepts class II and Class III wastes. In total, there is in excess of 21.9 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with remaining operating lifetimes up to the year 2078. 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.

With the exception of the salt cake from the Zero Liquid Discharge Facility (14,000 tons annually) which must be disposed at a Class I or II landfill, most of the hazardous waste generated by the SJVEC would be generated during facility construction and startup in the forms of flushing and cleaning liquids. Volumes of hazardous wastes generated during facility operation would be minimal. All hazardous wastes generated during both phases would be transported offsite to a permitted TSD facility for appropriate disposition, preferably recycling. The volume of hazardous waste and designated waste from SJVEC requiring off-site disposal would be a very small fraction of the existing combined capacity of the Class I or Class II landfills, and would not significantly impact the capacity or remaining life of any of these facilities (Calpine 2001a, p. 8.13-9).

CUMULATIVE IMPACTS

As proposed, the quantities of nonhazardous and hazardous wastes generated during construction and operation of the SJVEC project would add to the total quantities of waste generated in and around the City of San Joaquin and in Fresno County and the State of California. This facility would generate an estimated 850 tons of solid waste during construction, approximately 50 tons of nonhazardous solid wastes, about 3 tons of hazardous wastes, and as much as 14,000 tons per year of either hazardous or designated waste in the form of the salt cake from the Zero Liquid Discharge System during operation. For comparative purposes, these amounts would comprise approximately 2 percent of the total waste generated in Fresno County in the year 2000. Consequently, because the wastes would be generated in moderate quantities, recycling efforts would be prioritized wherever practical, and capacity is available in a variety of disposal facilities, these added waste quantities generated by SJVEC would not result in significant waste management impacts.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is approximately 63 percent within a six-mile radius of the proposed SJVEC, and Census 1990 information that shows the minority/low income population is approximately 29 percent within the same radius. Since staff has concluded that there would be no significant direct or cumulative waste-related impacts resulting from construction and

operation of the proposed facility, there will also be no significant impact to any minority populations that are identified. Therefore, there are no environmental justice issues.

FACILITY CLOSURE

The AFC discusses the SJVEC's responsibilities for waste management in the event of a facility closure (Calpine 2001a, Section 8.13.5.3). Activities anticipated during these events are detailed elsewhere in facility Contingency, Risk Management, and Closure Plans.

During any type of facility closure (see staff's General Conditions section, which discusses planned, unexpected temporary, and unexpected permanent closure), the primary waste management related concern is that project wastes not pose any potentially significant problem to the public, workers, or the environment. Staff believes that conditions of certification in the General Conditions section will adequately address waste management issues related to closure.

In the case of unexpected temporary closure, waste management practices normally required by LORS and already in-place (such as limiting hazardous waste storage time to 90 days and requiring proper containment) would be adequate to avoid significant problems. In addition, staff's General Conditions for Facility Closure requires preparation of an on-site contingency plan, which shall provide for removal of hazardous wastes and draining of all chemicals from storage tanks and other equipment for temporary closures exceeding 90 days.

An approved on-site contingency plan is also required to protect public health and safety in the case of unexpected permanent closure. As above, the plan must provide for the removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment.

For planned permanent closure, SJVEC would be required to develop a facility closure plan at least 12 months prior to commencement of closure and is committed to complying with LORS that are applicable at the time of closure.

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Energy Commission staff concludes that the San Joaquin Valley Energy Center will be able to comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during facility construction and operation. The applicant is required to dispose of hazardous and non-hazardous wastes at facilities approved by the California Department of Toxic Substances Control (DTSC). Because hazardous wastes would be produced during project construction and operation, both the SJVEC and its construction contractor would be required to obtain hazardous waste generator identification numbers from the DTSC. Accordingly, both SJVEC and its construction contractor would be required to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records, and appropriately train their 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 by the SJVEC, which meets the requirements of SB-14.

MITIGATION

The Applicant has proposed mitigation to effectively handle all solid wastes generated during construction and operation of the proposed facility. Section 8.13.5 of the AFC states that handling and management of wastes at this facility would follow the hierarchical approach described in the following order of preference from greatest to least:

1. Source reduction – through pollution prevention measures
2. Recycling – or reusing waste materials
3. Treatment – to render the waste nonhazardous such as through neutralization,
4. Disposal – of only those wastes that cannot be reduced, treated or recycled.

Sections 8.13.5 of the AFC discuss waste management measures SJVEC would employ during the construction and operation phases to manage and mitigate the impacts of the generation of hazardous wastes. In addition, staff requested that the applicant provide a Waste Management Plan. This plan was provided (Calpine 2002b) and indicates that if the project is approved, the applicant will implement all of the above measures and will ensure minimization and recycling of waste, and proper disposal.

Staff has examined the waste management related measures proposed by the Applicant and concluded that, together with applicable LORS and the Conditions of Certification proposed by staff, they will adequately assure that no significant adverse environmental impacts will result from the management and disposal of project-related waste.

Staff has proposed standard Conditions of Certification **WASTE-1, 2, 3, 4, and 5,** which require that: **1**) the project owner notify the CEC Compliance Project Manager (CPM) whenever the owner becomes aware of any impending waste management-related enforcement action; **2**) if necessary, the project owner and/or its construction contractor obtain a unique hazardous waste generator identification number from the Department of Toxic Substances Control (DTSC) in accordance with DTSC regulatory authority; **3**) the project owner prepare and submit waste management plans for all wastes generated during construction and operation of the facility and submit them to the CPM and the local agency; **4**) 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; and **5**) 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.

Additionally, because the site soil sampling and analysis results indicated the potential for an increased risk to workers and/or the off-site public due to arsenic and/or

pesticides levels, staff proposes that either the applicant conduct more definitive sampling and analysis to demonstrate that the risks are insignificant or that precautions be taken as proposed in Condition of Certification **Waste-6**.

And in order to ensure proper disposal of the salt cake, staff proposes Condition of Certification **WASTE-7,** which would require testing of the salt cake. Staff also proposes Condition of Certification **WASTE-8** to require testing of the effluent from the brine concentrator. If it were determined to be hazardous, SJVEC would be required to apply for a recycling exemption from DTSC.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

AGENCY COMMENTS

Fresno County Department of Community Health

Comment:
The Fresno County Department of community Health commented that all hazardous waste shall be handled in accordance with requirements set forth in the California Health and Safety code, Chapter 6.5.

Response:
The applicant has indicated that it will comply with all LORS, including those addressing hazardous waste generation, and staff finds that if the project is operated according to procedures outlined in the AFC, all LORS will indeed be followed. In order to ensure compliance if hazardous waste is unexpectedly encountered during site preparation, staff has proposed two Conditions of Certification, **WASTE-3** and **WASTE-4**.

CONCLUSIONS AND RECOMMENDATIONS

Management of the wastes generated during construction and operation of the SJVEC will not result in any significant adverse impacts if the waste management measures proposed in the Application for Certification and staff's proposed Conditions of Certification are implemented.

CONDITIONS OF CERTIFICATION

WASTE-1 Upon becoming aware of any impending waste management-related enforcement action, the project owner shall notify the CPM of any such action taken or proposed to be taken against it, or against any waste hauler or disposal facility or treatment operator with whom the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action.

WASTE-2 Both the project owner and, if necessary, its construction contractor shall obtain unique hazardous waste generator identification numbers from the Department of Toxic Substances Control (DTSC) in accordance with DTSC regulatory authority.

Verification: The project owner and its construction contractor shall keep copies of the identification numbers on file at the project site and notify the CPM via the monthly compliance report of their receipt.

WASTE-3 Prior to the start of construction and operation activities, the project owner shall prepare and submit to the Fresno County Human Services System's Department of Community Health, Environmental Health System for review and comment, and to the CPM for review and approval, waste management plans for all wastes generated during construction and operation of the facility, respectively. The plans shall contain, at a minimum, the following:

- A description of all expected waste streams, including hazard classifications and projections of quantity and frequency; 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.
- A stated goal that not less than 50 percent of all construction and operation wastes will be recycled. Measures that will allow that goal to be achieved should be identified.
- A statement that the project owner will participate in the local recycling program to the extent that the local program is consistent with state law.

Verification: At least 30 days prior to the start of construction, or a lesser time as mutually agreed to by the project owner and the CPM, the project owner shall submit the construction waste management plan to the Fresno County Human Services System's Department of Community Health, Environmental Health System for review and comment, and to the CPM for review and approval. The operation waste management plan shall be submitted no less than 60 days prior to the start of project operation. The project owner shall submit any required revisions within 30 days of notification by the CPM (or mutually agreed upon date). In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year compared to planned management methods and the actual quantities of material recycled and disposed of.

WASTE-4 The project owner shall have a Registered Professional Engineer or Geologist, with experience in remedial investigation and feasibility studies, available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered. The Registered Professional Engineer or Geologist shall be given full authority to oversee any earthmoving activities that have the potential to disturb contaminated soil.

Verification: At least 30 days prior to the start of construction, or a lesser time as mutually agreed to, the project owner shall submit the qualifications and experience of the Registered Professional Engineer or Geologist contracted for consultation to the CPM for approval.

WASTE-5 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 the 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 notify the CPM and contact representatives of the Fresno County Human Services System's Department of Community Health, Environmental Health System, the Fresno County Fire Department, DTSC, and other agencies as appropriate for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the Registered Professional Engineer or Geologist to the CPM within five days of their receipt.

WASTE-6 All workers involved in site preparation shall be thoroughly trained and prepared to encounter soils containing hazardous wastes. Training shall include Hazardous Waste Operations (8 CCR 5192), Hazard Communication (8 CCR 5194), and special precautions to take when working in environments where exposure to inorganic arsenic is encountered as described in 8 CCR 5214 with the exception of subsection (n). During site preparation, additional dust suppression methods shall be implemented to prevent generation of dust. The project owner shall identify these measures and frequency of implementation in a plan to be submitted to DTSC for review and to the CEC CPM for review and approval. After site preparation, all areas of the site shall be capped either by buildings, asphalt, or concrete

Verification: Not later than 30 days prior to commencement of site preparation, the dust suppression plan shall be submitted to the CPM for review and approval.

WASTE-7 The project owner shall test the salt cake product from the crystallizer for the presence of hazardous levels of metals. If levels are below ten times the Soluble Threshold Level Concentration as listed in Title 22, California Code of Regulations, section 66261.24, then future testing is not required unless there is a substantial change in the wastewater treatment process. If not classified as a hazardous waste, the project owner shall manage the salt cake product appropriately as a designated waste.

Verification: As soon as practicable but no later than 30 days after the initial generation of salt cake, the project owner shall notify the CPM of the test results and the planned disposal method.

WASTE-8 The project owner shall test representative samples of the effluent from the brine concentrator for the presence of hazardous levels of metals. If test results indicate that the effluent is classified as hazardous, then the project owner shall apply to DTSC for a recycling exemption for hazardous waste treatment as provided for in Health and Safety Code section 25132.2(c)(2).

Verification: Within 60 days of beginning commercial operation, the project owner shall notify the CPM of the test results for the brine concentrator effluent. If applicable, the project owner shall include a copy of the DTSC application, and shall notify the CPM upon receipt of the exemption from DTSC.

REFERENCES

Calpine 2001a. Application for Certification for San Joaquin Valley Energy Center (01-AFC-22). October 2001.

Calpine 2002a. Data Response, Set 1A. February 26, 2002.

Calpine 2002b. Waste Management Plan for the San Joaquin Valley Energy Center, prepared by CH2MHill. March 2002.

Calpine 2002c. Data Response Set 1E. Response to data request #145: Soil Sampling and Analysis Summary for the [San Joaquin Valley] Energy Center, prepared by Kleinfelder. March 29, 2002.

CH2MHILL 2002. Personal communications with Karen Parker June 17.

WORKER SAFETY AND FIRE PROTECTION

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

INTRODUCTION

Worker safety and fire protection is legislated by laws, ordinances, regulations, and standards (LORS), and enforced through regulations codified at the Federal, State, and local levels. Worker safety is of utmost priority at the project location and is documented through worker safety practices and training. Industrial workers at the facility operate process equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to either eliminate these hazards or minimize the risk through special training, protective equipment or procedural controls.

The purpose of this analysis is to assess the worker safety and fire protection measures proposed by the San Joaquin Valley Energy Center and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

In December 1970 Congress enacted Public Law 91-596, the Federal Occupational Safety and Health Act of 1970. This Act mandates safety requirements in the workplace and is found in Title 29 of the United States Code, § 651 (29 U.S.C. §§ 651 through 678). Implementing regulations are codified in Title 29 of the Code of Federal Regulations, under General Industry Standards §§ 1910.1 - 1910.1500, and clearly 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. Most of the general industry safety and health standards now in force under this Act represent a compilation of materials from existing federal standards and national consensus standards. These include standards from the voluntary membership organizations of the American National Standards Institute (ANSI) and the National Fire Protection Association (NFPA), which publishes the National Fire Codes.

The purpose of the Occupational Safety and Health (OSH) Act is to “assure 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). The Federal Department of Labor promulgates and enforces safety and health standards that are applicable to all businesses affecting interstate commerce. The Department of Labor

established the Occupational Safety and Health Administration (OSHA) in 1971 to discharge the responsibilities assigned by the OSH Act.

Applicable Federal requirements include:

- 29 U.S. Code § 651 et seq. (Occupational Safety and Health Act of 1970);
- 29 CFR §1910.1 - 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations);
- 29 CFR §1952.170 – 1952.175 (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 – 1910.1500).

STATE

California passed the Occupational Safety and Health Act of 1973 (Cal/OSHA) as published in California Labor Code § 6300. Regulations promulgated as a result of the Act are codified in Title 8 of the California Code of Regulations, beginning with §337-560 and continuing with §1514 through 8568. The California Labor Code requires that the Cal/OSHA Standards Board adopt standards at least as effective as the federal standards (Labor Code § 142.3(a)) and thus all Cal/OSHA health and safety standards meet or exceed the Federal requirements. Hence, California obtained federal approval of its State health and safety regulations, in lieu of the federal requirements published in 29 CFR §1910.1 - 1910.1500). The Federal Secretary of Labor, however, continually oversees California's program and will enforce any federal standard for which the State has not adopted a Cal/OSHA counterpart.

The State of California Department of Industrial Relations is charged with responsibility for administering the Cal/OSHA plan. The Department of Industrial Relations is further split into six divisions to oversee, among other activities: industrial accidents, occupational safety and health, labor standards enforcement, statistics and research, and the State Compensation Insurance Fund (workers compensation).

Employers are responsible for informing their employees about workplace hazards, potential exposure and the work environment (Labor Code § 6408). Cal/OSHA's principal tool in ensuring that workers and the public are informed is the Hazard Communication standard first adopted in 1981 (8 CCR §5194). This regulation was promulgated in response to California's Hazardous Substances Information and Training Act of 1980. It was later revised to mirror the Federal Hazard Communication Standard (29 CFR §1910.1200), which established on the federal level an employee's "right to know" about chemical hazards in the workplace, but added the provision of applicability to public sector employers. A major component of this regulation is the required provision of Material Safety Data Sheets (MSDSs) to workers. MSDSs provide information on the identity, toxicity, and precautions to take when using or handling hazardous materials in the workplace.

Finally, 8 CCR §3203 requires that employers establish and maintain a written Injury and Illness Prevention Program to identify workplace hazards and communicate them to its employees through a formal employee-training program.
Applicable State requirements include:

- 8 CCR §339 - List of hazardous chemicals relating to the Hazardous Substance Information and Training Act;
- 8 CCR §337, et seq. Cal/OSHA regulations;
- 24 CCR § 3, et seq. - incorporates the current addition of the Uniform Building Code;
- Health and Safety Code § 25500, et seq. - Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at the facility;
- Health and Safety Code § 25500 - 25541 - Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergencies at the facility.

LOCAL

The California Building Standards Code published in Title 24 of the California Code of Regulations § 3 et seq is comprised of 11 parts containing the building design and construction requirements relating to fire and life safety, and structural safety. The Building Standards Code includes the electrical, mechanical, energy, and fire codes applicable to the project. Local planning/building and safety departments enforce the California Uniform Building Code.

National Fire Protection Association (NFPA) standards are published in the California Fire Code. The fire code contains general provisions for fire safety, including but not restricted to: 1) required road and building access for fire fighting equipment; 2) water supplies; 3) installation of fire protection and life safety systems; 4) fire-resistive construction; 5) general fire safety precautions; 6) storage of combustible materials; 7) exits and emergency escapes; and 8) fire alarm systems. The California Fire Code reflects the body of regulations published at Part 9 of Title 24 (H&S Code §18901 et seq.) pertaining to the California Fire Code.

Similarly, the Uniform Fire Code (UFC) Standards, a companion publication to the California Fire Code, contains standards of the American Society for Testing and Materials and the 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.

Applicable local (or locally enforced) requirements include:

- 1998 Edition of California Fire Code and all applicable NFPA standards (24 CCR Part 9);
- California Building Code Title 24, California Code of Regulations (24 CCR § 3, et seq.).
- Uniform Fire Code, 1997

SETTING

If approved, the proposed San Joaquin Valley Energy Center (SJVEC) would be a natural gas-fired, combined-cycle facility, with a nominal generating capacity of 1060

megawatts (MW). The facility would comprise of three new natural gas-fired Combustion Turbine Generators (CTGs), three Heat Recovery Steam Generators (HRSGs), and a Steam Turbine Generator (STG), along with other related equipment. The SJVEC would be located on approximately 25 acres near the southeast corner of an 85-acre parcel of land available in a industrial in the southeast portion of the City of San Joaquin, in Fresno County, California. Please refer to the **Project Description** section for more detail.

The Fresno County Fire Protection District (FCFPD) currently provides fire support services for the site, and would continue to do so following construction of the proposed plant. Station 95 located in Tranquility, approximately 4.8 miles from the project site, provides fire protection for all of the City of San Joaquin. This is the closest station to the site, manned by two fire-fighters, and would be assigned as the off-site first responder to the SJVEC. Response time is estimated to be approximately 8-10 minutes. In the event of a building fire on the site, CAL-OSHA regulations prevent entry to a burning building unless there are at least four fire-fighters at the site. In that case, station 96 (Mendota) would provide the backup fire suppression support. Their response time is estimated to be 15 minutes longer; therefore, total response time would increase to 23-25 minutes (Johnson 2002; Karle 2002).

The county does not have a Hazmat team. However, the FCFPD can be called upon for help in the event of a spill. These fire-fighters can help with identifying the spill and with evacuation, but not with the clean-up process (Williams, 2002). Private companies hired by the project owner would be responsible for the clean-up work. Please refer to the staff assessment section on **Hazardous Materials** for more discussion on this matter.

IMPACTS

WORKER SAFETY

Industrial environments are potentially dangerous, during construction and operation of facilities. Workers at the proposed project would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the San Joaquin Valley Energy Center to have well-defined policies and procedures, training programs, 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.

The construction phase is expected to last approximately 22-28 months and would include site preparation, foundation work, installation of major equipment, and installation of major structures.

FIRE HAZARDS

During construction and operation of the proposed San Joaquin Valley Energy Center there is potential for both small fires and major structural fires. Electrical sparks, explosions, over-heated equipment, and combustion of fuel oil, natural gas or flammable liquids may cause small fires. Major structural fires may develop from uncontrolled fires or be caused by large explosions of natural gas or other flammable gasses or liquids. Compliance with all LORS will be adequate to assure protection from all fire hazards.

CUMULATIVE IMPACTS

Staff reviewed the potential for the construction and operation of San Joaquin Valley Energy Center, combined with other pending large facilities that have either been approved by the applicable jurisdiction or have applied for approval, to result in cumulative impacts on the fire and emergency service capabilities of the FCFPD. There are no know pending industrial or commercial projects in the San Joaquin area, and therefore the SJVEC project would not create a significant cumulative impact.

APPLICANT'S PROPOSED MITIGATION

WORKER SAFETY

The applicant would prepare a Safety and Health Program to minimize worker hazards during construction and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that would be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

The San Joaquin Valley Energy Center encompasses construction and operation of a natural gas fired generating facility with ancillary facilities, such as transmission lines and pipelines. Workers would be exposed to hazards typical of construction and operation of a gas-fired combined cycle facility.

Construction Safety Orders are published in 8 CCR § 1502, et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The project's Construction Safety and Health Program must include the following:

- Construction Injury and Illness Prevention Program (8 CCR § 1509);
- Construction Fire Protection and Prevention Plan (8 CCR § 1920);
- Personal Protective Equipment Program (8 CCR §§ 1514 - 1522); and
- Emergency Action Program.

Additional programs under General Industry Safety Orders (8 CCR §§ 3200 - 6184), Electrical Safety Orders (8 CCR §§2299 - 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 - 544) must include:

- Motor Vehicle and Heavy Equipment Safety Program
- Forklift Operation Program;
- Excavation/Trenching Program;
- Fall Prevention Program;
- Scaffolding/Ladder Safety Program;
- Articulating Boom Platforms Program;
- Crane and Material Handling Program;
- Hazardous Waste Program
- Housekeeping and Material Handling and Storage Program;
- Hot Work Safety Program;
- Respiratory Protection Program;
- Employee Exposure Monitoring Program;
- Confined Space Entry 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; and
- Pressure Vessel and Pipeline Safety Program.

The San Joaquin Valley Energy Center AFC includes adequate outlines of each of the above programs (Calpine 2001a, Section 8.7.4.3.1). Prior to the construction of the San Joaquin Valley Energy Center, detailed programs and plans must be provided pursuant to the condition of certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Upon completion of construction and prior to operations at the San Joaquin Valley Energy Center, the Operations and Maintenance Safety and Health Program must be prepared. This operational safety program must include the following programs and plans:

- Injury and Illness Prevention Program (8 CCR § 3203);
- Emergency Action Plan (8 CCR § 3220);
- Plant Operation Safety Program;
- Fire Protection and Prevention Program (8 CCR § 3221); and
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

In addition, the requirements under General Industry Safety Orders (8 CCR §§ 3200 - 6184), Electrical Safety Orders (8 CCR §§2299 - 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 - 544) would be applicable to the project. Written safety programs, which the applicant must develop for the San Joaquin Valley Energy Center, will ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Operations Safety Program and the Injury and Illness Prevention Program (Calpine 2001a, section 8.7.4.3.2). Prior to operation of the San Joaquin Valley Energy Center, all detailed programs and plans must be provided pursuant to condition of certification **WORKER SAFETY-2**.

Safety and Health Program Elements

The Applicant has provided the proposed outlines for both a Construction Safety and Health Program and an Operation 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 must submit an expanded Construction and Operations Illness and Injury Prevention Program to Cal/OSHA for review and comment 30 days prior to construction and operation of the project.

The IIPP would include the following components, as presented in the AFC:

- Identity of person(s) with authority and responsibility for implementing the program;
- Safety and health policy;
- Work rules and safe work practices;
- System ensuring employees comply with safe work practices;
- Employee communications;
- Procedures identifying and evaluating workplace hazards;
- Methods for correcting unhealthy/unsafe conditions, work practices, and work procedures in a timely manner;
- Specific safety procedures;
- Training and instruction.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 CCR § 3220). The AFC describes a proposed emergency action plan (Calpine 2001a, page 8.7-15); the Emergency Action Plan should include the following features:

- Purpose and Scope of Emergency Action Plan;
- Personnel Responsibilities During Emergencies;
- Specific Response Procedures;
- Evacuation Plan;

- Emergency Equipment Locations;
- Fire Extinguisher Locations;
- Site Security;
- Accident Reporting and Investigation;
- Lockout/Tagout Procedures;
- Hazard Communication;
- Spill Containment and Reporting;
- First Aid and Medical Response;
- Respiratory Protection;
- Personal Protective Equipment;
- Sanitation; and
- Work Site Inspections.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 CCR § 3221). The San Joaquin Valley Energy Center AFC describes a proposed fire prevention plan that is acceptable to staff (Calpine 2001a, page 8.7-15). The plan includes the following topics:

- General requirements;
- Fire hazard inventory, including ignition sources and mitigation;
- Procedures for fire control;
- Fixed and portable fire-fighting equipment;
- Housekeeping and proper material storage;
- Employee alarm/communication system;
- Servicing and refueling areas;
- Training;
- Flammable and combustible liquid storage and use;
- Dispensing and disposal of liquids;
- Identity of personnel to contact for information on plan contents.

Staff proposes that the Applicant submit a final Fire Protection and Prevention Plan to the California Energy Commission Compliance Project Manager (CPM) and the FCFPD for review and approval to satisfy proposed conditions of certification **WORKER SAFETY 1** and **2**.

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies wherever hazards are encountered that, due to process, environment, chemicals or mechanical irritants can cause injury or impair bodily function as a result of absorption, inhalation or physical contact (8 CCR § 3380-3400). The San Joaquin Valley Energy Center operational environment would likely require PPE.

All safety equipment must meet National Institute of Occupational Safety and Health (NIOSH) or ANSI standards and must carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and California Department of Health and Human Services 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 provide employees with the information and training necessary to implement the program.

Operations and Maintenance Written Safety Program

In addition to the specific plans listed above, additional LORS are applicable to the project, which are called "safe work practices." Both the Construction and the Operations Safety Programs address safe work practices under a variety of programs. The components of these programs include the following:

- Fall Protection Program;
- Hot Work Safety Program;
- Confined Space Entry;
- Hearing Conservation Program;
- Hazard Communication Program;
- Process Safety Management (PSM) Program; and
- Contractor Safety Program.

Operations and Maintenance Safety Training Programs

Employees must be trained in the safe work practices described in the above-reference safety programs.

FIRE PROTECTION

Staff reviewed the information provided in the AFC regarding available fire protection services and equipment (Calpine 2001a AFC Sections 2.2-12, 8.7 and 8.8.3.6.2) to determine if the project would adequately protect workers and if it would affect the fire

protection services in the area. The project would rely on both onsite fire protection systems and local fire protection services. The onsite fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be required from the FCFPD (Karle 2002).

The information in the AFC indicates that the project intends to meet the applicable fire protection and suppression requirements. Elements include both fixed and portable fire extinguishing systems. Two sources of firewater would be available: a dedicated minimum supply of 240,000 gallons of fire water stored in a tank as the primary source, and a secondary source from the City of San Joaquin domestic water system (Calpine 2001, section 2.2.12). The storage tank water would provide 2 hours of protection from the onsite worst-case single fire. This fire water supply and an on-site electric fire-water pumping system (with diesel generator back-up) would provide more than an adequate quantity of fire-fighting water to yard hydrants, hose stations, and water spray and sprinkler systems.

Fire hydrants with hose stations must be spaced at 300-foot intervals around the facilities, in accordance with NFPA 24 and local fire codes. Sprinkler and fixed spray systems must be designed and installed according to NFPA 13 and 15. Hand held portable fire extinguishers of the appropriate size and rating must be located throughout the facility in accordance with NFPA 10 (Calpine 2001a, page 2-15).

The combustion turbine-generators and accessory equipment would be protected by a fire protection system that uses FM 200 as the chemical fire-fighting agent. FM 200 is a non-halon chemical fire retardant approved by the US EPA for use in occupied structures. This system includes fire and heat detection sensors in all compartments that would provide an alarm on the control panel, trip the combustion turbine, turn off and close ventilation openings, and automatically release an adequate concentration of the FM 200.

A deluge spray system would be provided for the generator transformers and auxiliary power transformer in the event of a fire. Deluge water is fed by the underground fire water/domestic water system.

Fixed fire protection water spray systems would be provided for the STG bearings and lube oil piping and storage area.

Prior to construction and operation of the project, the applicant must provide the final Fire Protection and Prevention Program to staff and to the FCFPD to confirm the adequacy of the proposed fire protection measures.

FACILITY CLOSURE

The project owner/operator is responsible for maintaining an operational fire protection system during closure activities. The project must also stay in compliance with all applicable health and safety LORS during that time. The project owner must develop a facility closure plan prior to closure to incorporate these requirements.

CONCLUSION AND RECOMMENDATIONS

If the Applicant for the proposed San Joaquin Valley Energy Center provides a Project Construction Injury and Illness Prevention Program and a Project Operations Safety and Health Program as required by conditions of certification **WORKER SAFETY 1** and **2**, staff believes that the project will incorporate sufficient measures to ensure adequate levels of industrial safety, and comply with applicable LORS. Staff also concludes that the proposed project will not have significant impacts on local fire protection services. The proposed facility is located within an area that is currently served by the local fire department. The fire risks of the proposed facility are similar to those of existing facilities in the immediate vicinity and thus pose no significant added demands on local fire protection services.

If the Commission certifies the project, staff recommends that the Commission adopt the following proposed conditions of certification. The proposed conditions of certification provide assurance that the Construction Injury and Illness Prevention Program and the Operations Safety and Health Program proposed by the applicant will be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable LORS.

PROPOSED CONDITIONS OF CERTIFICATION

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- A Construction Safety Program;
- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Emergency Action Plan; and
- A Construction Fire Protection and Prevention Plan.

The Safety Program, the Personal Protective Equipment Program, and the Exposure Monitoring Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable Safety Orders. The Construction Fire Protection and Prevention Plan and Emergency Action Plan shall be submitted to the FCFPD for review and comment prior to submittal to the CPM.

Verification At least 30 days prior to the start of construction, or an alternate time frame mutually agreed to by the CPM and the project owner, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a letter from the FCFPD stating that they have reviewed and commented on the Construction Fire Protection and Prevention Plan Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- an Operation Injury and Illness Prevention Plan;
- an Emergency Action Plan;
- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (8 CCR § 3221); and;
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the Cal/OSHA Consultation Service for review and comment concerning compliance of the program with all applicable Safety Orders. The Operation Fire Protection Plan and the Emergency Action Plan shall also be submitted to the FCFPD for review and comment.

Verification At least 30 days prior to the start of operation, or an alternate time frame mutually agreed to by the CPM and the project owner, the project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program.

REFERENCES

1998 California Fire Code. 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.

Calpine 2001a. Application for Certification for San Joaquin Valley Energy Center (01-AFC-22), Dated October 2001.

Johnson, Doug. Engineer, Fresno County Fire Protection District (FCFPD) Station No. 95. Personal communications January 17, 2002.

Karle, Gary. Chief, Fresno County Fire Protection District (FCFPD) personal communications March 19, 2002.

1997 Uniform Fire Code, 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.

Williams, Cary. Captain, Fresno County Fire Protection District (FCFPD) station No. 95. Personal communications March 12, 2002.

FACILITY DESIGN

Testimony of Steve Baker and Al McCuen

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 identified engineering LORS and any special design requirements.

FINDINGS REQUIRED

The Warren Alquist Act requires the commission to "prepare a written decision…which includes…(a) Specific provisions relating to the manner in which the proposed facility is to be designed, sited, and operated in order to protect environmental quality and assure public health and safety [and] (d)(1) Findings regarding the conformity of the proposed site and related facilities…with public safety standards…and with other relevant local, regional, state and federal standards, ordinances, or laws….” (Pub. Resources Code, §25523)

SUBJECTS DISCUSSED

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.

SETTING

The applicant, San Joaquin Valley Center, L.L.C. (SJVEC), a subsidiary of Calpine Corporation, proposes to construct and operate a new 1,060 megawatt (MW) nominal, natural gas fired, combined cycle power plant. The project site is located within the City of San Joaquin in an industrial area at the southeastern border of the city, in Fresno County, approximately 1,500 feet north of Pacific Gas and Electric Company's (PG&E's) Helm substation and approximately 20 miles east of PG&E's Lines 2 and 401 natural gas transmission pipelines. This facility is proposed to include three natural gas fired combustion turbines with electrical generators, three multistage heat recovery steam generators, and one steam turbine generator. The project would also include construction of a new switchyard and 1,500 feet of interconnecting transmission lines; a new 20-mile, 24" diameter natural gas interconnecting pipeline; a 21-mile reclaimed water supply line; and a one-mile domestic water supply pipeline (SJVEC 2001a, AFC §§ 1.1, 2.1). For more information on the site and related project description, please see **Project Description**.

The project site lies in seismic zone 3. Additional engineering design details are contained in the Application for Certification (AFC) Section 10, and Appendices 10A through 10G (SJVEC 2001a).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The applicable LORS for each engineering discipline (civil, structural, mechanical, electrical, and controls) are described in AFC Section 10.4, and in the following AFC Appendices (SJVEC 2001a):

- Appendix 10A – Civil Engineering Design Criteria
- Appendix 10B – Structural Engineering Design Criteria
- Appendix 10C – Mechanical Engineering Design Criteria
- Appendix 10D – Electrical Engineering Design Criteria
- Appendix 10E – Control Systems Engineering Design Criteria
- Appendix 10F – Chemical Engineering Design Criteria
- Appendix 10G – Geologic and Foundation Design Criteria

Some of these LORS include: California Building Code (CBC), American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM), and the American Welding Society (AWS).

ANALYSIS

The basis of this analysis is the applicant's proposed analysis and construction methods and the list of engineering LORS and design criteria set forth in the AFC.

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 a natural gas pipeline, fresh water supply pipeline, a reclaimed water supply line, and an electric transmission line. The applicant proposes to use accepted industry standards (see SJVEC 2001a, Appendices 10A through 10G 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 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 to repair or replace, that require a long lead time to repair or replace, or that are used for the storage, containment, or handling of hazardous or toxic materials. Major structures and equipment would 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 1998 edition of the California Building Code (CBC), and other applicable codes and standards in effect at the time design and construction of the project actually commence. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 1998 CBC is in effect, the 1998 CBC provisions, identified herein, shall be replaced with the applicable successor provisions.

The CBC requires that certain structures in a power plant 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 Proposed 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.

NATURAL GAS PIPELINE

A new 21-mile, 24" diameter natural gas pipeline, owned by the Applicant, would be constructed to provide fuel to the proposed facility. The line would be operated and maintained in accordance with U.S. Department of Transportation (DOT), Title 49, Code of Federal Regulations (CFR) Chapter 1, Part 192 "Transportation of Natural and other Gas by Pipeline: Minimum Federal Safety Standards," and the California Public Utilities

Commission, General Order 112-E (CPUC GO 112-E). Compliance with these requirements will help mitigate the impacts of pipeline rupture by ensuring proper operation and maintenance of the line. Therefore, no mitigation beyond operating and maintaining the pipeline to applicable regulations is necessary.

COMPLIANCE MONITORING

Section 104.2 of the CBC identifies the "building official" as the person who 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 authority to make 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 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 conduct 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 provide 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. Though 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, either the City or 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. For those elements of construction that are not difficult to reverse and are allowed to proceed without approval of the plans, the applicant bears the responsibility to fully modify those elements of construction to comply with all design changes that result from the CBO's 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 the following items:

1. proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
2. all applicable LORS, local/regional plans, and the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;
3. the activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
4. 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 AND RECOMMENDATIONS

CONCLUSIONS

The laws, ordinances, regulations, and standards (LORS) identified in the AFC and supporting documents are those applicable to the project.

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.

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 performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

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.

RECOMMENDATIONS

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 1998 CBC (or successor standard, if such is in effect when the initial project engineering designs are submitted for review); and

3. The CBO review the final designs, conduct plan checking and perform field inspections during construction, and Energy Commission staff 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 1998 California Building Code (CBC) and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval. (The CBC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously.) 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 1998 CBC is in effect, the 1998 CBC 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.

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 [1998 CBC, Section 109 – Certificate of Occupancy].

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 an alternative timeframe mutually agreed to by the project owner and CBO) 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 other documents that must 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 **Table 1** 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.

Table 1: Major Structures and Equipment List

Equipment/System	Quantity (Plant)
Combustion Turbine (CT) Foundation and Connections	3
CT Mechanical Accessories (e.g. lube oil cooler, static motor starter, NO_x control system, compressor wash system, fire detections system, fuel heating system, etc.) Foundation(s) and Connections	3
CT Structure Shell and Façade Foundation and Connections	3
CT Inlet Air Plenum and Filter Structure, Foundation and Connections	3
CT Inlet Air Evaporative Cooler Foundation and Connections	3
Combustion Turbine Generator (CTG) Foundation and Connections	3
Heat Recovery Steam Generator (HRSG) Structure, Foundation and Connections	3
HRSG Exhaust Stack, Foundation and Connections	3
HRSG Transition Duct Burner and Forced Draft Structure, Foundations and Connections	3
Selective Catalytic Reduction Unit Foundation and Connections	3
Steam Turbine (ST) Foundation and Connections	1
ST Structure Shell and Façade Foundation and Connections	1
Steam Turbine Generator (STG) Foundation and Connections	1
STG Lube Oil Skid Foundation and Connections	1

Equipment/System	Quantity (Plant)
STG Hydraulic Control System Foundation and Connections	1
Mechanical Draft Evaporative Cooling Tower, Support Structures, Foundations and Connections	1 Lot
Pipe and Cable Way Structures, Foundations and Connections	1 Lot
Electrical Motor Control Center (MCC) Building Structure, Foundation and Connections	1
18kV Auxiliary Step-Down Transformer Foundation and Connections	2
230kV Step-Up Transformer, Fire Protection System Foundation and Connections	4
Load Center Transformers (4,160 to 480 Volt) Foundation(s) and Connections	1 Lot
125 VDC Power Supply System	1 Lot
Electrical Control Centers, Switchgear and Switchyard Equipment Foundations and Connections	1 Lot
Power Distribution Center Foundation and Connections	1 Lot
Generator – Natural Gas Fired 1,000 kW Emergency, Foundation and Connections	1
Natural Gas Filter/Scrubber/Separator Foundation and Connections	1 Lot
Natural Gas Separator/Heater Foundation and Connections	1 Lot
Natural Gas Metering and Regulating Station Foundations and Connections	1 Lot
All Building Structures, Foundations and Connections (e.g. Control Room, Administration Building, Warehouse, Bulk Storage Building, Equipment Shelter, De-Mineralized Water Treatment Building, Mechanical Shop, Fire Pump Building, Fuel Gas Compressor Building, Compressor Building, Switchyard Control Building, Boiler Feed Pump Building, etc.)	1 Lot
Skid – Ammonia Blower Injection Foundation and Connections	1 Lot
Tank – Ammonia Storage, Foundation and Connections	1
Tank – Raw/Fire Water, 5 Million Gallon, Foundation and Connections	2
Tank – Oily Water Separator, Foundation and Connections	1 Lot
Tank – Combustion Turbine Water, Foundation and Connections	1
Tank – Demineralized Water, 500,000 Gallon, Foundation and Connections	2
Tank – Boiler Blowdown, Foundation and Connections	1 Lot
Tanks – Water Treatment Facilities (e.g. Sulfuric Acid, Scale Inhibitor, Sodium Hypochlorite, Bromine, Non-Oxidizing Biocide, Oxygen Scavenger, Amine, Phosphate, etc.) Foundation and Connections (as required by CBC)	1 Lot
Pump – Fire Water Pump Skid (electric jockey pump, electric main pump, and diesel back-up pump) Foundation and	1 Lot

Equipment/System	Quantity (Plant)
Connections	
Pump – HSRG Feedwater Foundation and Connections	6
Pump – Boiler Water Feed Pump Foundation and Connections	1 Lot
Pump – Demineralized Water Transfer Pump Foundation and Connections	1 Lot
Pump – Condensate Pump Foundation and Connections	3
Pump – Circulating Water Foundation and Connections	2
Pumps – Water Treatment and Cooling Systems (e.g. Auxiliary Cooling Water, Aqueous Ammonia Transfer, Aqueous Ammonia Unloading, Closed Loop Cooling Water, Oily Water Sump, Raw Water, Sulfuric Acid, Scale Inhibitor, Sodium Hypochlorite, Bromine, Non-Oxidizing Biocide, Oxygen Scavenger, Amine, Phosphate, etc.) Foundation and Connections (as required by CBC)	1 Lot
Cooling Tower/Air Cooled Condenser Structure, Foundation and Connections	1 Lot
Boiler – Auxiliary, Stack, Foundation and Connections	1
Auxiliary Boiler SCR System Foundation and Connections	1 Lot
Compressors – Air Foundation(s) and Connections	1 Lot
Compressors – Fuel Gas Foundation(s) and Connections	1 Lot
Pipeline – Water Supply	1
Pipeline – Recycled Water Supply	1
Pipeline – Natural Gas	1
Potable Water Systems	1 Lot
Chemical Containment Systems	1 Lot
Fire Suppression Systems	1 Lot
Drainage Systems (including sanitary, storm drain, and waste)	1 Lot
Waste Water Evaporation Ponds (5 Acres Each)	2
Building Energy Conservation Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
High Pressure Piping	1 Lot
HVAC and Refrigeration Systems	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 1998 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) shall be handled as described in the Conditions of Certification in **Transmission System Engineering**.

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.

7. At least 30 days (or an alternative timeframe mutually agreed to by the project owner and CBO) 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.
8. 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 construction, 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 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; D) a mechanical engineer; and E) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730 and 6736 requires state registration to practice as a civil engineer or structural engineer in California.] Assignment of professionals regarding all transmission facilities (lines, switchyards, switching stations, and substations) is discussed in Conditions of Certification in Transmission System Engineering.

1. 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.
2. 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 [1998 CBC, Section 104.2, Powers and Duties of Building Official].
3. 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. Design, or be responsible for designing, stamping, and signing 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
2. 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 geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

3. Review all the engineering geology reports, and prepare final soils grading report;

4. Prepare the soils engineering reports required by the 1998 CBC, Appendix Chapter 33, Section 3309.5, Soils Engineering Report; and Section 3309.6, Engineering Geology Report;

5. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 1998 CBC, Appendix Chapter 33, Section 3317, Grading Inspections;

6. Recommend field changes to the civil engineer and RE;

7. Review the geotechnical report, field exploration report, laboratory tests, and engineering analyses detailing the nature and extent of the site soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load; and

8. Prepare reports on foundation investigation to comply with the 1998 CBC, Chapter 18 section 1804, Foundation Investigations.

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 [1998 CBC, section 104.2.4, Stop orders].

C: The design engineer shall:

9. Be directly responsible for the design of the proposed structures and equipment supports;

10. Provide consultation to the RE during design and construction of the project;

11. Monitor construction progress to ensure compliance with engineering LORS;

12. Evaluate and recommend necessary changes in design; and

13. Prepare and sign all major building plans, specifications and calculations.

D: The mechanical engineer shall be responsible for, and sign and stamp a statement accompanying, 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.

E: 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 an alternative timeframe mutually agreed to by the project owner and CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resumes 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 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 1998 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(s) shall:

1. Be qualified persons who 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 [1998 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 an alternative timeframe mutually agreed to by the project owner and CBO) 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 [1998 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; and 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. When the work and the "as-built" and "as graded" plans conform to the approved final plans, the project owner shall notify the CPM regarding the CBO's final approval. The marked up "as-built" drawings for the construction of structural and architectural work shall be submitted to the CBO. Changes approved by the CBO shall be identified on the "as-built" drawings [1998 CBC, Section 108, Inspections]. The project owner shall retain one set of approved engineering plans, specifications and calculations at the project site or at another accessible location during the operating life of the project [1998 CBC, Section 106.4.2, Retention of Plans].

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.

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 as required by the 1998 CBC [Appendix Chapter 33, Section 3309.5, Soils Engineering Report and Section 3309.6, Engineering Geology Report].

Verification: At least 15 days (or an alternative timeframe mutually agreed to by the project owner and CBO) 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 earthworks and construction in the affected areas when the responsible geotechnical engineer, or 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 [1998 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 1998 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 [1998 CBC, Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The project owner shall prepare a written report detailing all discrepancies and non-compliance items, and the proposed corrective action, and send copies to the CBO and the CPM.

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. 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 finish grading and erosion and sedimentation control and drainage facilities, the project owner shall obtain the CBO's approval of the final "as-graded" grading plans, and final "as-built" plans for the erosion and sedimentation control facilities [1998 CBC, Section 109, Certificate of Occupancy].

Verification: Within 30 days of the completion of the erosion and sediment control mitigation and drainage facilities, the project owner shall submit to the CBO 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. The project owner shall submit a copy of this report 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 **Table 1** 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 1**, above):

1. Major project structures;
2. Major foundations, equipment supports and anchorage;
3. Large field fabricated tanks;
4. Turbine/generator pedestal; and
5. Switchyard structures.

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 [1998 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 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 on-site fabrication and installation of each structure, equipment support, or foundation [1998 CBC, Section 106.4.2, Retention of plans and Section 106.3.2, Submittal documents]; and

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 [1998 CBC, Section 106.3.4, Architect or Engineer of Record].

Verification: At least 30 days (or an alternative timeframe mutually agreed to by the project owner and CBO) prior to the start of any increment of construction of any structure or component listed in **Table 1** of Condition of Certification **GEN-2** above, the project owner shall submit to the CBO, with a copy to the CPM, the responsible design engineer's signed statement that the final design plans, specifications and calculations conform with all of the requirements set forth in the Energy Commission's Decision.

If the CBO discovers non-conformance with the stated requirements, the project owner shall resubmit the corrected plans to the CBO within 20 days of receipt of the nonconforming submittal with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and are in conformance 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) procedures and results, welder qualifications, certifications, qualified procedure description or number [ref: American Welding Society]); and
5. Reports covering other structural activities requiring special inspections, which shall be in accordance with the 1998 CBC, Chapter 17, Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection); and 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 to the CBO, with a copy of the transmittal letter to the CPM [1998 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 1998 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 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 1998 CBC shall, at a minimum, be designed to comply with Occupancy Category 2 of the 1998 CBC.

Verification: At least 30 days (or an alternate timeframe mutually agreed to by the project owner and CBO) 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 Table 1, 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 [1998 CBC, Section 106.3.2, Submittal Documents; Section 108.3, Inspection Requests; Section 108.4, Approval Required; 1998 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:

1. American National Standards Institute (ANSI) B31.1 (Power Piping Code);
2. ANSI B31.2 (Fuel Gas Piping Code);
3. ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
4. ANSI B31.8 (Gas Transmission and Distribution Piping Code);
5. Title 24, California Code of Regulations, Part 5 (California Plumbing Code);

6. Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
7. Title 24, California Code of Regulations, Part 2 (California Building Code); and
8. Specific City/County code.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [1998 CBC, Section 104.2.2, Deputies].

Verification: At least 30 days (or an alternative timeframe mutually agreed to by the project owner and CBO) prior to the start of any increment of major piping or plumbing construction listed in Table 1, 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 [1998 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 an alternative timeframe mutually agreed to by the project owner and CBO) 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 [1998 CBC, Section 108.7, Other Inspections; Section 106.3.4, Architect or Engineer of Record].

Verification: At least 30 days (or an alternative timeframe mutually agreed to by the project owner and CBO) 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 rated at 480 volts and higher, described 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 1998, 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 [1998 CBC, Section 108.4, Approval Required, and Section 108.3, Inspection Requests]. All transmission facilities (lines, switchyards, switching stations, and substations) are discussed in Conditions of Certification in **Transmission System Engineering**.

1. Final plant design plans shall include:

2. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and
3. system grounding drawings.

B. Final plant calculations shall 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 information shall be reported to the CPM in the Monthly Compliance Report:

1. receipt or delay of major electrical equipment;
2. testing or energizing 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 an alternative timeframe mutually agreed to by the project owner and CBO) 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

SJVEC (San Joaquin Valley Energy Center) 2001a. Application for Certification, San Joaquin Valley Energy Center (01-AFC-22). Dated October 16, 2001 and docketed October 31, 2001.

GEOLOGY, MINERAL RESOURCES, AND PALEONTOLOGY

Testimony of Dr. Patrick Pilling, P.E.

INTRODUCTION

In the geology, mineral resources, and paleontology section, staff discusses potential impacts of the proposed San Joaquin Valley Energy Center (SJVEC) project regarding geologic hazards, geologic (including mineralogic) resources, and paleontologic resources. Energy Commission staff's objective is to ensure that there will be no significant adverse impacts to significant geologic and paleontologic resources during project construction, operation and closure. A brief geologic and paleontologic overview of the project is provided, as are comments regarding selected California Environmental Quality Act (CEQA) checklist items with respect to geologic hazards and resources, and paleontologic resources. 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, REGULATIONS AND STANDARDS (LORS)

The applicable LORS are listed in the Application for Certification (AFC), in Section 8.15, Table 8.15-1, and in Section 8.16, Table 8.16-1 of the AFC (San Joaquin Valley Energy Center, LLC, 2001). The following is a brief description of the LORS for geologic hazards and resources, and paleontologic resources.

FEDERAL

There are no federal LORS for geologic hazards and resources, grading or paleontologic resources for the proposed project. The Federal Antiquities Act of 1906 (L 59-209; 16 United States Code 431 *et seq.*; 34 Stat. 25), in part, protects paleontologic resources from vandalism and unauthorized collection on federal land. The National Environmental Policy Act of 1968 (United States Code, Section 4321 4327; 40 Code of Federal Regulations, Section 1502.25), as amended, requires analysis of potential environmental impacts to important historic, cultural, and natural aspects of our national heritage.

STATE AND LOCAL

The *California Building Code* (*CBC*), 1998 edition, is based upon the *Uniform Building Code* (*UBC*), 1997 edition, which was published by the International Conference of Building Officials. The *CBC* is a series of standards that are used in the investigation, design (Chapters 16 and 18) and construction (including grading and erosion control as found in Appendix Chapter 33). The *CBC* supplements the *UBC*'s grading and construction ordinances and regulations.

The California Environmental Quality Act 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 paleontologic resource or site or unique geologic 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.

The "Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources: Standard Procedures" (Society of Vertebrate Paleontologists [SVP], 1995) is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontologic resources. They were adopted in October 1995 by the Society of Vertebrate Paleontologists (SVP), a national organization.

SETTING

REGIONAL AND SITE GEOLOGY

The proposed SJVEC is located within the California Great Valley geomorphic province. This area within the Great Valley is characterized by relatively flat ground cut by several small drainages, including the Fresno Slough. Major geologic units present beneath and in the vicinity of the site include Holocene flood basin deposits, which may include the Modesto Formation (Page, 1986); Quaternary basin deposits; Tertiary lacustrine, marsh, and continental deposits; Cretaceous deposits; and Pre-Tertiary metamorphic and igneous basement rocks (Jennings and Strand, 1958; Norris and Webb, 1990). The Quaternary deposits consists of unconsolidated silt, clay, sand, and gravel from alluvial, fan, and lacustrine depositional areas. The Tertiary lacustrine and marsh deposits consist of silts, clays, and fine sands. The Tertiary continental deposits consist of fine- to medium-grained sand, silt, clay, and some gravel. The Cretaceous marine deposits consist of consolidated sandstone, siltstone, and shale.

The area proposed to host the SJVEC site and transmission line linear route is mapped as being underlain by Holocene flood basin deposits that consist of clay, silt, and some sand that may include the Modesto Formation (Page, 1986). The SJVEC site has also been mapped by the National Resource Conservation Service (NRCS, 1950) as being underlain by the Merced soil series clay to clay loam with a USCS classification of a fat clay to an elastic silt.

The proposed and alternative gas line linear alignments have been mapped by the NRCS as passing through the Merced, Levis, Oxalis, and Panoche soil series (NRCS, 1950; Fresno County, 2000). The Merced soil series has a United Soil Classification System (USCS) classification of a fat clay to an elastic silt. The Levis and Oxalis soils are described by the NRCS as a silty clay, while the Panoche soil is described as a clay loam to silty clay.

The proposed and alternative water line linear alignments have been mapped by the NRCS as passing through the Merced, Temple, Rossi, Pond, Playas, Traver, Fresno, Hesperia, Cajon, El Peco, Borden, Pachappa, Madera, and Tujunga soil series (NRCS, 1950; Fresno County, 2000). The Merced soil series has a USCS classification of a fat clay to an elastic silt; the Temple classifies as a lean clay or silty sand; the Rossi

classifies as a silty sand, lean clay, or silt; the Pond classifies as a silty sand, silt, lean clay; the Traver classifies as a silty sand, clayey sand, or silt; the Fresno classifies as a silt or lean clay; the Hesperia classifies as a silty sand or silt; the Cajon classifies as a silty sand; the El Peco classifies as a silty sand or silt; the Borden classifies as a lean clay; the Pachappa classifies as a silt or lean clay; the Madera classifies as a silt, lean clay, or silty sand; and the Tujunga classifies as a silty sand.

SITE SEISMICITY

As part of its analysis, Energy Commission staff has reviewed the following publications: "*Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions*" (CDMG, 1994); *Maps of Known Active Fault Near-Source Zones in California and Adjacent Parts of Nevada* (International Conference of Building Officials [ICBO], 1998); *Alquist-Priolo Earthquake Fault Zone Maps* (CDMG, 2000); *Geologic Map of California – Santa Cruz Sheet* (Jennings and Strand, 1958); the *Fresno County General Plan* (2000); the *Database of Potential Sources for Earthquakes Larger than Magnitude 6 in Northern California* (USGS, 1996); and *Update of Mineral Land Classification: Aggregate Materials in the Fresno Production-Consumption Region, California* (CDMG,1992). Based on this review, the proposed SJVEC site, the proposed and alternative water line linears, and the eastern portion of the proposed and alternative gas line linears are located within Seismic Zone 3, as delineated on Figure 16-2 of the *CBC.* The western portion of the proposed and alternative gas line linears is located within Seismic Zone 4. No known faults cross the proposed SJVEC site or proposed linear facility improvements.

The closest known active fault is the Coast Ranges – Sierran Block Boundary Zone (CRSBBZ), located approximately 20 miles southwest of the site. Energy Commission staff have calculated an estimated deterministic peak horizontal ground acceleration to be on the order of 0.2g for the SJVEC site and electric and water linears, and on the order of 0.4g for the western terminus of the gas linears. This estimate is based upon a moment magnitude 6.4 earthquake in the Coast Ranges – Sierran Block Boundary Zone (CRSBBZ).

Liquefaction, Dynamic Compaction, Hydrocompaction, Subsidence, Expansive Soils, Landslides, Tsunamis, and Seiches

Liquefaction is a nearly complete loss of soil shear strength that can occur during a seismic event. During the seismic event, cyclic shear stresses cause the development of excessive pore water pressure between the soil grains, effectively reducing the internal strength of the soil. This phenomenon is generally limited to unconsolidated, clean to silty sand (up to 35 percent non-plastic fines) and very soft silts lying below the ground water table. The higher the ground acceleration caused by a seismic event, the more likely liquefaction is to occur. Severe liquefaction can result in catastrophic settlements of overlying structural improvements and lateral spreading of the liquefied layer when confined vertically but not horizontally. Since detailed subsurface information was not included in the AFC (SJVEC, 2001), the potential for liquefaction at the SJVEC site is unknown; however, the *Fresno County General Plan* (2000) states soil types in the county are not conducive to liquefaction. In order to accurately assess the liquefaction potential at this site, subsurface exploration and associated

geotechnical laboratory testing and analyses should be performed to evaluate the depth to ground water and soil conditions present at the SJVEC site (see **GEO-1**).

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. Since detailed subsurface information was not included in the AFC (SJVEC, 2001), subsurface exploration and associated geotechnical laboratory testing and analyses should be performed to characterize underlying soil materials and their potential for dynamic compaction (see **GEO-1**).

Partially saturated soils can possess bonds that are a result of chemical precipitates that accumulate under semi-arid conditions. Such soluble compound bonds provide the soils with cohesion and rigidity; however, these bonds can be destroyed upon prolonged submergence. When destroyed, a substantial decrease in the material's void ratio is experienced even though the vertical pressure does not change. Materials that exhibit this decrease in void ratio and corresponding decrease in volume with the addition of water are defined as collapsible soils. Collapsible soils are typically limited to true loess, clayey loose sands, loose sands cemented by soluble salts, and windblown silts. Since detailed subsurface information was not included in the AFC (SJVEC, 2001), subsurface exploration and associated geotechnical laboratory testing and analyses should be performed to characterize underlying soil materials and their collapse potential (see **GEO-1**).

Ground subsidence is typically caused when ground water is drawn down by irrigation activities such that the effective unit weight of the soil mass is increased, which in turn increases the effective stress on underlying soils, resulting in consolidation/settlement of the underlying soils. Water for plant operation would be obtained from the Fresno-Clovis Wastewater Treatment Facility (FCWWTF) via a new system of ground water extraction wells and associated water pipeline to the proposed SJVEC site. Based on information contained in the AFC (SJVEC, 2001), a ground water mound has developed beneath the existing effluent disposal ponds at the FCWWTF. As a result, and in order to help reduce the mound beneath the ponds, the SJVEC intends to install up to six additional extraction wells to provide water to the proposed SJVEC site. The wells would reduce the mound approximately 10 to 20 feet, which would still be slightly above ground water elevations outside the mound area. Based on this information, the potential for impacts due to ground subsidence at the SJVEC site is considered low.

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. As reported by the NRCS, surficial soils in the project area will include clay soils. Since detailed subsurface information was not included in the AFC (SJVEC, 2001), subsurface exploration and associated geotechnical laboratory testing and analyses should be performed to characterize underlying soil materials and their expansion potential (see **GEO-1**).

Landslides typically involve rotational slump failures within surficial soils/colluvium and/or weakened bedrock that are usually implemented by an increase of the material's moisture content above a layer that exhibits a relatively low strength. Debris-flows are shallow landslides that travel downslope very rapidly as muddy slurry. The landslide potential map contained in the *Fresno County General Plan* (2000) indicates the area is considered to exhibit negligible landslide and debris-flow potential. As a result and based on the staff's review of the site geology as presented in the AFC (SJVEC, 2001) and a review of geologic maps of the area, the potential for landslides and debris-flows at the site is considered negligible.

Tsunamis and Seiches are earthquake-induced waves that inundate low-lying areas adjacent to large bodies of water. The proposed site is located in the southern end of the Central Valley, approximately 155 miles southeast of San Francisco Bay. No large bodies of water are present near the SJVEC site, except for several reservoirs present in the Sierra Nevada foothills. As a result, the potential for tsunamis and seiches to affect the site is considered negligible.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff have reviewed applicable geologic maps for this area (CDMG, 1988; CDMG, 1992; CDMG, 1999; Division of Oil, Gas, and Geothermal Resources [DOGGR], 1998). Based on this information and the information contained in the *Fresno County General Plan* (2000), there are no known geologic or mineralogic resources located at or immediately adjacent to the proposed SJVEC site. The W4 alternative water line linear passes immediately adjacent to the Northwest San Joaquin Gas Field; however, this field was abandoned in 1968 (DOGGR, 1998).

A paleontologic resources field survey and sensitivity analysis was conducted for the proposed SJVEC site and the proposed alternative linear facility improvements by the applicant's consultant. No significant fossil fragments were identified at the SJVEC site or associated linears; however, significant fossils were found in the Modesto Formation within ½-mile of the SJVEC site and along the proposed water line linear. As a result, the proposed SJVEC site may contain significant paleontologic resources such that mitigation procedures will be necessary (see **PAL-1** through **PAL-7)**.

IMPACTS

ENVIRONMENTAL CHECKLIST

	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
GEOLOGY – Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:			X	
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			X	
ii) Strong seismic ground shaking?			X	
iii) Seismic-related ground failure, including liquefaction?		X		
iv) Landslides?			X	
b) * Result in substantial soil erosion or the loss of topsoil?				
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?		X		
d) Be located on expansive soil, as defined in Table 18- 1-B of the Uniform Building Code (1994), creating substantial risks to life or property?		X		
e) * Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				
MINERAL RESOURCES – Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X
PALEONTOLOGIC RESOURCES -- Would the project:				
a) Directly or indirectly destroy a unique paleontologic resource or site or unique geologic feature?		X		

* See appropriate heading under **DISCUSSION OF IMPACTS**.

DISCUSSION OF IMPACTS

GEOLOGY

A. Potential Exposure of People or Structures to Impacts due to:

I. Rupture of Known Earthquake Faults:

The proposed SJVEC and related linear facilities are not located on an active fault, as delineated by the ICBO (1998). Therefore, fault rupture is not anticipated.

II. Strong Seismic Groundshaking:

The proposed SJVEC site, water line linears, and the eastern portion of the gas line linears are located in *CBC* Seismic Zone 3. The western portion of the gas line linears is located in Seismic Zone 4. The estimated peak horizontal ground acceleration for the SJVEC site and associated linears is approximately 0.2g, except for the western terminus of the gas line linears where the peak horizontal ground acceleration is estimated to be approximately 0.4g. All structures should be designed accordingly (See **GEN-1, GEN-5, CIVIL-1,** and **CIVIL-3** under **FACILITY DESIGN).**

III. Seismic Related Ground Failure, Including Liquefaction:

Detailed subsurface information was not included in the AFC (SJVEC, 2001). In order to accurately assess the liquefaction potential at this site, subsurface exploration and associated geotechnical laboratory testing and analyses should be performed to evaluate the depth to ground water and soil conditions present at the SJVEC site (See **GEO-1**).

IV. Landslides:

Based on the site geology and configuration of the proposed improvements, the potential for landsliding at or adjacent to the site is considered to be low.

B. Result in Soil Erosion or Loss of Topsoil:

Refer to **SOIL AND WATER RESOURCES** section.

C. Unstable Geologic Unit:

Based on site geology, the potential for lateral spreading, subsidence, or collapse is considered low. However, detailed subsurface exploration and associated geotechnical laboratory testing and analyses are required to quantify the actual potential for collapse and/or liquefaction (see **GEO-1**).

D. Located on Expansive Soils:

Detailed subsurface information was not included in the AFC (SJVEC, 2001). In order to accurately assess the expansion potential of surficial soils at this site, subsurface exploration and associated geotechnical laboratory testing and

analyses should be performed to determine the presence or absence of expansive soils at the SJVEC site (See **GEO-1**).

E. Support Septic Tanks or Alternative Waste Disposal:

Refer to the **SOILS AND WATER RESOURCES** section.

Mineral Resources

A. Loss of Availability of Known Mineral Resource to Region or State:

Construction of the project and its linear facilities would disturb shallow soils, and perhaps limit their use as mineral resources; however, the surficial soils are mapped as consisting of silty sands, silts and clays, so their value as a possible source of aggregate or as firing clays is low. Thus, there is low potential for impacts and no special Conditions of Certification are required for mineral resources.

B. Loss of Availability of a Locally Important Mineral Resource:

Construction of the project and its linear facilities would disturb shallow soils, and perhaps limit their use as mineral resources; however, the surficial soils are mapped as consisting of silty sands, silts and clays, so their value as a possible source of aggregate or as firing clays is low. Thus, there is low potential for impacts and no special Conditions of Certification are required for mineral resources.

Paleontologic Resources

A. Impact Paleontological Resources:

Fossils were encountered near the SJVEC site and linear routes; therefore, a strict protocol will be required during construction (see **PAL-1 through PAL-7**).

CUMULATIVE IMPACTS

The SJVEC site lies in an area that exhibits minor geologic hazards and no known geologic, mineralogic, or paleontologic resources. Construction of the project and its linear facilities would disturb shallow soils, and perhaps limit their use as mineral resources. However, the soils are predominately clays, so their value as a possible source of aggregate or as firing clays is low. Thus, CEC staff concludes that there is no potential for impacts and no special Conditions of Certification are required for mineral resources. Based on this information and the proposed Conditions of Certification to mitigate potential project specific impacts, 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 low.

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 proposed project site. 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 will have been disturbed during construction and operation of the facility.

CONCLUSIONS

The project will result in no significant impacts to the public or the environment with respect to geologic hazards, geologic, mineralogic, or paleontologic resources, or to soils, provided that the proposed conditions of certification are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

General Conditions of Certification with respect to Geology are covered under Conditions of Certification **GEN-1, GEN-5, CIVIL-1 and CIVIL-3** in the **FACILITY DESIGN** section. One additional Condition of Certification for Geology is **GEO-1** below. Seven Conditions of Certification for Paleontology follow.

GEO-1 The Soils Engineering Report required by Appendix Chapter 33, Section 3309.5 Soils Engineering Report of the *CBC* in effect at the time, shall specifically include data regarding the collapse, expansion, and liquefaction of potential site soils. The liquefaction analysis shall be implemented by following the recommended procedures contained in *Recommended Procedures for Implementation of California Division of Mines and Geology Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction Hazards in California* (CDMG 1999). The *CBC* in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously. In the event that the initial geotechnical engineering caluations are submitted to the CBO when a successor to the current *CBC* is in effect, the current *CBC* provisions identified herein shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, method 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.

Verification: The project owner shall include in the application for grading permit a copy of the Soils Engineering Report, which describes the collapse, expansion,and liquefaction potential of the site foundation soils, and a summary of how the results of the analyses were incorporated into the project foundation and grading plan design for review and comment by the Chief Building Official (CBO)

PAL-1 The project owner shall provide the CPM with the resume and qualifications of its Paleontological Resource Specialist (PRS) and

Paleontological Resource Monitors (PRMs) for review and approval. If the approved PRS or one of the PRMs is replaced prior to completion of project mitigation and report, the project owner shall obtain CPM approval of the replacement.

The resume shall include the names and phone numbers of the contacts provided for checking employment or qualifications. 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 Paleontologists (SVP) guidelines of 1995. Demonstration of the experience of the PRS shall include the following:

1) institutional affiliations or appropriate credentials and college degree;
2) ability to recognize and recover fossils in the field;
3) local geological and biostratigraphic expertise;
4) proficiency in identifying vertebrate and invertebrate fossils;
5) publications in scientific journals; and
6) 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 PRS shall obtain qualified paleontological resource monitors to monitor as necessary on the project. Paleontologic resource monitors (PRMs) shall have the equivalent of the following qualifications:

1) BS or BA degree in geology or paleontology and one year experience monitoring in California; or
2) AS or AA in geology, paleontology or biology and four years experience monitoring in California; or
3) 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 for approval. 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 and all linear facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan, and the plan and profile drawings for the utility lines would normally be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances, and can be on a scale ranging between 1 inch = 40 feet to 1 inch = 100 feet. If the footprint of the power plant or linear facility changes, the project owner shall provide maps and drawings reflecting these changes to the PRS and CPM.

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 PRS shall consult 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. (2) If there are changes to the footprint of the project, revised maps and drawings shall be provided 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 PRS shall prepare, and the project owner shall submit to the CPM for review and approval, a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting and sampling activities and may be modified with CPM approval. This document shall be used as a basis for discussion in the event that on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of the Vertebrate Paleontologists (SVP, 1995) and shall include, but not be limited to, the following:

1) Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking; construction monitoring; mapping and data recovery; fossil preparation and recovery; 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 all conditions for 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 beds;

5) A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed schedule for the monitoring;

6) A discussion of the procedures to be followed in the event of a significant fossil discovery, including notifications;

7) A discussion of equipment and supplies necessary for recovery 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 Paleontologists standards and requirements for the curation of paleontological resources; and

9) Identification of the institution that has agreed to receive any data and fossil materials recovered, 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 submit the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for all project managers, construction supervisors and workers who operate ground disturbing equipment or tools. Workers involved in ground disturbing activities in sensitive units shall not operate equipment prior to receiving worker training. 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.

The 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. In-person training shall be provided for each new employee involved with ground disturbing activities, while these activities are occurring in highly sensitive geologic units, as detailed in the PRMMP. The in-person training shall occur within four days following a new hire for highly sensitive sites and as established by the PRMMP for sites of moderate, low, and zero sensitivity. Provisions will be made to provide the WEAP training to workers not fluent in English.

The training shall include:

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

2. For training in locations of high sensitivity, the PRS shall provide good quality photographs or physical examples of vertebrate fossils that may be expected in the area;

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 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 an alternate paleontological trainer is requested by the owner, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval. Alternate trainers shall not conduct training prior to CPM authorization. (4) The project owner shall provide in the Monthly Compliance Report the WEAP copies of the Certification of Completion forms with the names of those trained and the trainer for each training offered that month. The Monthly Compliance Report shall also include a running total of all persons who have completed the training to date.

PAL-5 The PRS and PRM(s) shall monitor, consistent with the 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 PRMMP, the PRS shall notify and seek the concurrence of the CPM.

The PRS and PRM(s) shall 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 PRMMP shall be proposed in a letter from the PRS and the project owner to the CPM prior to the change in monitoring. The letter shall include the justification for the change in monitoring and submitted to the CPM for review and approval.

2. PRM(s) shall keep 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 PRS shall immediately notify the project owner and the CPM 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 immediately (no later than the following morning after the find, or Monday morning in the case of a weekend) of any halt of construction activities.

The PRS shall prepare a summary of the monitoring and other paleontological activities that will be placed in the Monthly Compliance Reports. The summary will include the name(s) of PRS or monitor(s) active during the month; general descriptions of training and construction activities and general locations of excavations, grading, etc. A section of the report will include the geologic units or subunits encountered; descriptions of sampling within each unit; and a list of fossils identified in the field. 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 project shall include a justification in summary as to why monitoring was not conducted.

Verification: The PRS shall submit the summary of monitoring and paleontological activities in the Monthly Compliance Report.

PAL-6 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground disturbing activities. The PRR shall include

an analysis of the recovered fossil materials and related information and submitted to the CPM for review and approval.

The report shall include, but not be 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.

Verification: Within 90 days after completion of ground disturbing activities, including landscaping, the project owner shall submit the Paleontological Resources Report under confidential cover.

PAL-7 The project owner, through the designated PRS, shall ensure the recovery, preparation for analysis, analysis, identification and inventory, the preparation for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during the monitoring, data recovery, mapping, and mitigation activities related to the project.

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 PRR. The project owner shall be responsible to pay curation fees for fossils collected and curated as a result of paleontological monitoring and mitigation.

Certification of Completion of Worker

Environmental Awareness Program

POWER PLANT NAME (DOCKET #)

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 & Biology 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. Please include this completed form in your Monthly Compliance Report.

No.	Employee Name	Company	Signature
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			
26.			
27.			
28.			
29.			
30.			

Cul Trainer: _____ Signature:_____ Date: ___/___/____

PaleoTrainer: _____ Signature:_____ Date: ___/___/____

Bio Trainer: _____ Signature:_____ Date: ___/___/____

REFERENCES

CBC (California Building Code). 1998

CDMG (California Division of Mines and Geology), 1988, *Mineral Land Classification: Aggregate Materials in the Fresno Production-Consumption Region*, CDMG Special Report 158.

CDMG (California Division of Mines and Geology), 1992. *Peak Acceleration from Maximum Credible Earthquakes in California (Rock and Stiff-Soil Sites),* CDMG Open-File Report 92-1.

CDMG (California Division of Mines and Geology), 1994. *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions*, Scale: 1:750,000.

CDMG (California Division of Mines and Geology), 1999, *Mines and Mineral Producers Active in California*, CDMG Special Publication 103.

CDMG (California Division of Mines and Geology), 1999, *Recommended Procedures for Implementation of California Division of Mines and Geology Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction Hazards in California*, dated March 1999.

CDMG (California Division of Mines and Geology), 1999, *Update of Mineral Land Classification: Aggregate Materials in the Fresno Production-Consumption Region, California*, CDMG Open-File Report 99-02.

CDMG (California Division of Mines and Geology), 2000, *EFZ Maps of California Central – Coastal Region*, CDMG Publication CD 2000-004.

Division of Oil, Gas, and Geothermal Resources (DOGGR), 1998, *California Oil & Gas Fields – Volume I, Central California*, DOGGR Publication TR10/CD-1.

Fresno County, 2000, *Fresno County General Plan – Background Report*, Adopted October 3, 2000.

ICBO (International Conference of Building Officials), 1998. *Map of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada.*

Jennings, C. W. and Strand, R. G., 1958, *Geologic Map of California – Santa Cruz Sheet*, California Division of Mines and Geology, 1:250,000 scale.

National Resource Conservation Service (NRCS) (formerly the Soil Conservation Service), 1950, *Soils of Western Fresno County, California*.

Norris, R. M. and Webb, R. W., 1990, Geology of California, Second Edition, John Wiley & Sons, New York.

Page, R. W., 1986, *Geology of the Fresh Ground-water Basin of the Central Valley, California, with Texture Maps and Sections*, USGS Professional Paper 1401-C.

San Joaquin Valley Energy Center, LLC (SJVEC), 2001, *Application for Certification (AFC) for Central Valley Energy Center*.

SVP (Society for Vertebrate Paleontology), 1995. *Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontologic Resources: Standard Procedures.*

U. S. Geological Survey (USGS), 1996, *Database of Potential Sources for Earthquakes Larger than Magnitude 6 in Northern California*, USGS Open-File Report 96-705.

POWER PLANT EFFICIENCY

Shahab Khoshmashrab

INTRODUCTION

The Energy Commission makes findings as to whether energy use by the San Joaquin Valley Energy Center (SJVEC) would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the SJVEC's consumption of energy creates a significant adverse impact, it must determine whether any feasible mitigation measures 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:

- determine whether the facility will likely present any adverse impacts upon energy resources;
- determine whether these adverse impacts are significant; and if so,
- determine whether feasible mitigation measures exist that would eliminate the adverse impacts, or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

No federal laws apply to the efficiency of this project.

STATE

California Environmental Quality Act Guidelines

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).

LOCAL

No local ordinances apply to power plant efficiency.

SETTING

The applicant proposes to construct and operate the 1,060 MW (nominal gross output) merchant SJVEC power plant. The SJVEC would generate peaking, load following and/or base load power, selling energy to the power market or directly to customers via short-, mid- and long-term contracts (SJVEC 2001a, AFC §§ 1.1, 2.2.16, 10.2.2, 10.3). (Note that this nominal rating is an approximate value based upon preliminary design information and generating equipment manufacturers' projected performance with the plant operating at full load with maximum duct firing.) Although the AFC described the SJVEC as a 1,060 MW (nominal) combined cycle power plant, the project is actually an 840 MW combined cycle baseload power plant (at average ambient conditions), with up to an additional 220 MW of peaking capacity (depending on the ambient conditions) provided by large duct burners and a large steam turbine generator.

As proposed, the SJVEC would consist of: three Siemens-Westinghouse 501FD combustion turbine generators with inlet air fogging systems and steam injection, producing approximately 183 MW each at average ambient conditions with inlet air fogging and no steam injection (SJVEC 2001a, AFC Figure 2.2-5a); three multi-pressure heat recovery steam generators (HRSGs) with duct burners; and one three-pressure, reheat, condensing steam turbine generator producing a maximum of 512 MW (average ambient conditions). The facility would be arranged in a three-on-one combined cycle train, totaling approximately 1,060 MW at average ambient conditions. The gas turbines and HRSGs would be equipped with dry low-NOx combustors and selective catalytic reduction to control air emissions (SJVEC 2001a, AFC §§ 1.1, 2.2.2, 2.2.4.1, 2.2.4.2, 2.2.4.4, 2.4.2.1). Natural gas would be delivered by the existing Pacific Gas & Electric (PG&E) backbone gas transmission Line 2 and Line 401 via a new 24-inch diameter 20-mile natural gas pipeline (SJVEC 2001a, AFC §§ 1.1, 2.1, 2.4.3, 6.0, 6.1, 10.2.1).

ANALYSIS

ADVERSE IMPACTS ON ENERGY RESOURCES

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- adverse effects on local and regional energy supplies and energy resources;
- a requirement for additional energy supply capacity;
- noncompliance with existing energy standards; or
- the wasteful, inefficient and unnecessary consumption of fuel or energy.

Project Energy Requirements and Energy Use Efficiency

Any power plant large enough to fall under Energy Commission siting jurisdiction will consume large amounts of energy. The SJVEC would burn natural gas at a nominal rate of 120 billion Btu per day lower heating value (LHV) (SJVEC 2001a, AFC §§ 2.2.6, 10.3). This is a substantial rate of energy consumption and holds the potential to impact

energy supplies. Under expected project conditions, electricity would be generated at a baseload (840 MW) efficiency of approximately 53.2 percent LHV, and additional peaking capacity (up to 220 MW) at an incremental efficiency of 41 to 42 percent LHV, yielding a full load (up to 1,060 MW) efficiency ranging from 51 to 51.5 percent LHV (SJVEC 2001a, AFC Figures 2.2-5a & 2.2-5b). Compare this to the average fuel efficiency of a typical 1960s-era utility company baseload power plant at approximately 35 percent LHV.

Adverse Effects on Energy Supplies and Resources

The applicant has described its sources of supply of natural gas for the project (SJVEC 2001a, AFC §§ 1.1, 1.3.2, 2.1, 2.4.3, 6.0, 10.2.1). Natural gas for the SJVEC would be supplied from the existing PG&E system via PG&E's Line 401 and Line 2 (located approximately 20 miles west of the SJVEC site). Line 401 is capable of delivering the required quantity of gas to the SJVEC. Furthermore, the PG&E gas supply infrastructure is extensive, offering access to vast reserves of gas from Canada and the Southwest United States. This source represents far more gas than would be required for a project this size. It is therefore highly unlikely that the project could pose a substantial increase in demand for natural gas in California.

Additional Energy Supply Requirements

Natural gas fuel would be supplied to the project by PG&E's existing Line 2 and Line 401 via a new 24-inch diameter pipeline (SJVEC 2001a, AFC §§ 1.1, 1.3.2, 2.1, 2.4.3, 6.0, 6.1, 10.2.1). These lines should provide adequate access to natural gas fuel. There is no real likelihood that the SJVEC will require the development of additional energy supply capacity.

Compliance With Energy Standards

No standards apply to the efficiency of the SJVEC or other non-cogeneration projects.

Alternatives to Reduce Wasteful, Inefficient and Unnecessary Energy Consumption

The SJVEC could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce the project's use of fuel. Evaluation of alternatives to the project that could reduce wasteful, inefficient or unnecessary energy consumption first requires examination of the project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by the configuration of the power producing system and by the selection of equipment used to generate power.

Project Configuration

The SJVEC would be configured as a combined cycle power plant, in which electricity is generated by three gas turbines, and additionally by a steam turbine that operates on heat energy recuperated from the gas turbines' exhaust (SJVEC 2001a, AFC §§ 1.1, 2.2.2, 2.2.3, 2.2.4). By recovering this heat, which would otherwise be lost up the exhaust stacks, the efficiency of any combined cycle power plant is increased considerably from that of either gas turbines or conventional steam turbines operating alone. Such a configuration is well suited to the large, steady loads met by a baseload plant, intended to supply energy efficiently for long periods of time.

Duct Burners

A combined cycle power plant with duct burning, such as the SJVEC, offers an opportunity to design in the operating flexibility that makes a power plant a valuable asset to the system. In any combined cycle power plant, the hot gas turbine exhaust is directed into a HRSG, where this heat that would otherwise be wasted is used to create steam. This steam, in turn, powers a steam turbine generator, effectively generating "free" electricity. This greatly enhances the plant's power output and fuel efficiency compared to a simple cycle power plant (a gas turbine plant without the steam cycle). The power output of the steam turbine generator in such a combined cycle plant is typically about half that of the gas turbine generator; in other words, the steam cycle accounts for about one-third of the total plant output.

While duct burners are commonly employed in combined cycle power plants, the SJVEC presents a new approach to the use of duct burners. As the gas turbine's hot exhaust gases flow into the HRSG through the transition duct, a nozzle arrangement injects more natural gas fuel into the exhaust gas stream. The additional fuel burns, adding heat to the gas stream. This increased heat can serve several purposes. It ensures that the steam produced for the steam turbine is sufficiently hot to provide optimum steam turbine performance; it can produce additional steam for injection into the gas turbine, increasing the gas turbine's power output; and it can produce still more steam to drive an even larger steam turbine. Another valuable feature of duct burners is their contribution to flexibility; while a modern clean-burning combined cycle operates optimally at steady (baseload) output, the duct burner allows the unit to load follow, throttling up and down in response to system load changes. In the SJVEC, the duct burners will perform all these tasks.

In a common combined cycle power plant (such as Calpine's Metcalf Energy Center project), a pair of F-class gas turbine generators produce 544 MW; the balance of the plant's 600 MW output, or 56 MW, is provided by the duct burners. Thus, about 9 percent of the plant's total power output is generated by heat from the duct burners.

Another example of duct burning is Calpine's Delta Energy Center, in which three F-class gas turbine generators produce 816 MW of the plant's 880 MW capacity. The balance, 64 MW, is provided by heat from the duct burners; this represents 7 percent of the plant's total output.

The SJVEC, also a Calpine project, represents a wide departure from this norm. The unique feature of the SJVEC is that the duct burners are much larger than normal. While complete data were not made available to Energy Commission staff for a thorough numerical analysis of project efficiency, the information provided by the applicant demonstrates the following. Maximum power output from the plant will be 1,060 MW (at ambient conditions, with maximum inlet air fogging, duct burning and steam injection). Subtracting the power output of the three gas turbine generators, and the steam turbine at base load, or 840 MW (SJVEC 2001a, AFC Figures 2.2-5a and 2.2-5b) yields 220 MW to be provided by heat from the duct burners. This represents 21 percent of total power output.

It should be noted that this reliance on large duct burners appears to be the beginning of a trend. Calpine has previously filed AFCs for the Inland Empire Energy Center (01-AFC-17) and the East Altamont Energy Center (01-AFC-4), which both employ these large duct burners. The chief benefits of this configuration involve capital investment; the developer can save substantial money in building the project compared to a more typical four-on-two combined cycle arrangement. Energy Commission staff fully expects Calpine's competitors to consider following this lead in their future designs.

Alternative to Duct Burners

The operating flexibility afforded by duct burning in the SJVEC could alternatively be supplied by a three-on-one non-duct fired combined cycle plant of 840 MW, plus several smaller peaking plants generating 220 MW, totaling 1,060 MW. The most effective means of achieving this peaking capacity would be with five GE LM6000 Enhanced SPRINT gas turbine generators, rated at 48 MW each for a total of 240 MW. The LM6000 SPRINT offers the best fuel efficiency and air emissions performance of any such machine available today. The claimed efficiency of these machines is 39.6 percent LHV (GTW 2000).

If the SJVEC were operated without duct burning, and five LM6000 SPRINT peakers were operated in conjunction to provide 1,080 MW total, the resulting net fuel efficiency would be 51 percent LHV. This is approximately equal to the percentage rate projected for the SJVEC with duct burning, and offers no advantage in fuel efficiency or air emissions performance. The LM6000 peaker alternative would also involve considerable additional expense and complication in building, operating and maintaining the facility.

Equipment Selection

Modern gas turbines embody the most fuel-efficient electric generating technology available today. Their higher pressure ratio and firing temperature offer higher efficiencies than conventional turbines. They offer proven technology with numerous installations and extensive run time in commercial operation. Emission levels are also proven, and guaranteed emission levels have been reduced based on operational experience and design optimization by the manufacturers. The F-class gas turbines to be employed in the SJVEC represent some of the most modern and efficient such machines now available. The applicant intends to employ three Siemens-Westinghouse 501FD (W501FD) gas turbine generators in a three-on-one combined cycle power train (SJVEC 2001a, AFC §§ 1.1, 2.2.2, 2.2.4, 2.2.4.1). This configuration is nominally rated at approximately 825 MW and 55.8 percent efficiency LHV at ISO1 conditions (GTW 2000).

One possible alternative machine is the Alstom Power ABB KA24, a gas turbine nominally rated in a three-on-three configuration at 780 MW and 56.5 percent efficiency LHV at ISO conditions (GTW 2000).

---

1 International Standards Organization standard conditions are 59°F (15°C), 60 percent relative humidity, and sea level pressure (29.92 in. Hg).

Another alternative is the General Electric GE Frame 7FA nominally rated in three-on-one configuration at approximately 795 MW and 56.5 percent efficiency LHV at ISO conditions (GTW 2000).

Any differences among the GE 7FA, ABB KA24 and W501FD in actual operating efficiency would be insignificant. Selecting among these machines is thus based on other factors, such as generating capacity, cost, commercial availability, and ability to meet air pollution limitations.

Efficiency of Alternatives to the Project

The project objectives include competing as a merchant plant, generating energy for sale on the spot market, and directly to customers via short-, mid- and long-term contracts (SJVEC 2001a, AFC §§ 1.1, 2.2.16, 10.2.2, 10.3).

Alternative Generating Technologies

Alternative generating technologies for the SJVEC are considered in the AFC (SJVEC 2001a, AFC §§ 1.4, 9.5). Conventional boiler and steam turbine, simple cycle combustion turbine, conventional combined cycle, advanced combustion turbines, natural gas, coal, oil, solar, wind, hydroelectric, biomass, geothermal, nuclear, municipal solid waste technologies are all considered. Given the project objectives, location and air pollution control requirements, staff agrees with the applicant 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 strongly motivated to purchase fuel-efficient machinery.

Capital cost is also important in selecting generating machinery. Recent progress in the development of large, stationary gas turbines, aided by the incorporation into these machines of technological advances made in the development of aircraft (jet) engines, has created a market in which several large manufacturers compete vigorously to sell their machines. This, combined with the cost advantages of assembly line manufacturing, has driven down the prices of these machines. Thus, the power plant developer can purchase a turbine generator that not only offers the lowest available fuel costs, but at the same time sells for the lowest per-kilowatt capital cost.

One possible alternative to an F-class gas turbine is a G-class machine, such as the Siemens-Westinghouse 501G gas turbine generator, which employs partial steam cooling to allow slightly higher firing temperatures. This results in a combined cycle rating of 365 MW at 58.0 percent LHV at ISO conditions (GTW 2000). The 501G is still relatively new; the first such machines only recently began operation at the McIntosh plant in Florida owned by Lakeland Electric and Water, and at PG&E National Energy's Millennium plant in Charlton, Massachusetts (GTW 2001, p. 45). Given the minor efficiency improvement promised by the G-class turbine and the lack of a proven track

record for the 501G, the applicant's decision to purchase F-class machines is a reasonable one.

Another possible alternative to the F-class gas turbine is an H-class machine. An example is the General Electric S107H, with rated power output of 400 MW and a claimed fuel efficiency of 60 percent LHV at ISO conditions (GTW 2000). This high efficiency is achieved through a higher pressure ratio and higher firing temperature, made possible by cooling the initial turbine stages with steam instead of air. This first Frame 7H application is not expected to enter service until the end of 2003 at Sithe Energy's Independence Station in Scriba, New York (GTW 2001, p. 28). Given the lack of proven performance, staff agrees with the applicant's decision to employ F-class machines.

Inlet Air Cooling

A further choice of alternatives involves the selection of gas turbine inlet air cooling methods. 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. A mechanical chiller can offer greater power output than the evaporative cooler on hot, humid days, but consumes electric power to operate its refrigeration process, thus slightly reducing overall net power output and, thus, overall efficiency. An absorption chiller uses less electric power, but necessitates the use of a substantial inventory of ammonia. An evaporative cooler or a fogger boosts power output best on dry days; it uses less electric power than a mechanical chiller, possibly yielding slightly higher operating efficiency. The difference in efficiency among these techniques is relatively insignificant.

The applicant proposes to employ inlet air fogging (SJVEC 2001a, AFC §§ 2.2.4.1, 2.2.7). Given the climate at the project site and the relative lack of clear superiority of one system over the other, staff agrees that the applicant's approach will yield no significant adverse energy impacts.

In conclusion, the project configuration (combined cycle) and generating equipment (F-class gas turbines) chosen appear to represent the most efficient feasible combination to satisfy the project objectives. There are no alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

There are no nearby power plant projects that hold the potential for cumulative energy consumption impacts when aggregated with the project. Staff knows of no other projects that could result in cumulative energy impacts.

Staff believes that construction and operation of the project will 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 SJVEC. Since natural gas will be burned by the power plants that are most competitive on the spot market, the most efficient plants should run the most. Operating in baseload mode, the high efficiency of the proposed SJVEC should allow it to compete very favorably, running at a high capacity factor,

replacing less efficient power generating plants in the market, and therefore not affecting or even reducing the cumulative amount of natural gas consumed for power generation. Operating in peaking mode, the SJVEC's fuel efficiency compares favorably to alternative peaking plants, and would therefore have no indirect impact on fuel consumption.

FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, will not influence, nor will it be influenced by, project efficiency. Any efficiency impacts due to closure of the project would be on the electric system as a whole. The vast size of the electric system serving California, the number of generating plants offering to sell power into it, and the existence of the California Independent System Operator to ensure the efficient management of the system, all lend assurance that closure of this facility will not produce significant adverse impacts on efficiency.

CONCLUSIONS AND RECOMMENDATIONS

The project, if constructed and operated as proposed, would generate a nominal 840 MW of baseload electric power at an overall fuel efficiency around 53.2 percent LHV, and up to 220 MW of peaking power at an efficiency of around 41 to 42 percent LHV, yielding a total nominal output of 1,060 MW at an overall fuel efficiency around 51 to 51.5 percent LHV. As proposed, the SJVEC would consume substantial amounts of energy at efficiency levels comparable to a typical combined cycle baseload power plant in conjunction with a typical peaking plant. However, it will not create significant adverse effects on energy supplies or resources, nor will it require additional sources of energy supply or consume energy in a wasteful or inefficient manner. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

No energy standards apply to the project. No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

From the standpoint of efficiency, staff believes the SJVEC can be certified. No Conditions of Certification are proposed.

REFERENCES

GTW (Gas Turbine World). 2000. Gas Turbine World 2000-2001 Handbook, volume 21, pages 68-89.

GTW (Gas Turbine World). 2001. *Gas Turbine World*, May-June 2001.

Power (Power Magazine). 1994. "Operating and maintaining IPP/cogen facilities," Power, September 1994, p. 14.

SJVEC (San Joaquin Valley Energy Center). 2001 a. Application for Certification for the San Joaquin Valley Energy Center (01-AFC-22). Submitted to the California Energy Commission, October 31, 2001.

POWER PLANT RELIABILITY

Shahab Khoshmashrab

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 (applicant) has predicted a 92 to 98 percent availability for the San Joaquin Valley Energy Center (SJVEC) (see below), staff uses the benchmark identified above, rather than the applicant's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Presently, there are no laws, ordinances, regulations or standards (LORS) that establish either power plant reliability criteria or procedures for attaining reliable operation. However, 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's reliability 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 (see **Setting** below).

SETTING

In the regulated monopoly electric industry of past decades, the utility companies assured overall system reliability, in part, by maintaining a "reserve margin." This amounted to having on call, at all times, sufficient generating capacity, in the form of standby power plants, to quickly handle unexpected outages of generating or transmission facilities. The utilities generally maintained a 7- to 10-percent reserve margin, meaning that sufficient capacity was on call to quickly replace from 7 to 10 percent of total system resources. This margin proved adequate, in part because of the reliability of the power plants that constituted the system.

Now, in the newly restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the California Independent System Operator (CaISO), an entity that purchases, dispatches and sells electric power throughout the state. How CaISO will ensure system reliability is still being determined; protocols are being developed and put in place that will, it is anticipated, 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 (Mavis 1998, pers. comm.).

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 CaISO (Detmers 1999, personal communication).

The CaISO's mechanisms to ensure adequate power plant reliability apparently were devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there 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. On November 29, 2001, the CaISO Board of Directors determined to pursue a program to establish and enforce power plant maintenance standards (McCorkle 2001).

Until the restructured competitive electric power system has undergone a shakeout period, and the effects of varying power plant reliability are thoroughly understood and compensated for, staff deems it wise to encourage power plant owners to continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

The applicant proposes to operate the 1,060 MW (nominal) SJVEC, selling energy and capacity to the power market and via bilateral contracts (SJVEC 2001a, AFC §§ 1.1, 2.1, 2.2.2, 2.2.16, 2.4.1, 9.4, 10.2.2). The SJVEC will operate as an 840 MW baseload power plant with an additional peaking capacity of up to 220 MW, achieved through the use of unusually large duct burners (see **Power Plant Efficiency**). The project is expected to operate at an overall availability in the range of 92 to 98 percent (SJVEC 2001a, AFC §§ 2.2.2, 2.2.16, 2.4.1, 10.2.2), and at a capacity factor, over the life of the plant, of 25 to 100 percent of base load (SJVEC 2001a, AFC §§ 2.4.1, 10.2.2).

ANALYSIS

The availability factor for 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, making a reliable power plant one that is available when called upon to operate. Throughout its intended 30-year life (SJVEC 2001a, AFC § 10.2.2), the SJVEC 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 SJVEC 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 (SJVEC 2001a, AFC § 2.4.5) typical of the power industry. Equipment would be purchased from qualified suppliers, based on technical and commercial evaluations. The project would maintain a record of documents for review and reference including vendor instruction manuals; design calculations and drawings; quality assurance reports; inspection and equipment testing; conformed construction drawings and records; procurement specifications; and purchase orders and correspondence. 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 in baseload service 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 (SJVEC 2001a, AFC § 2.4.2). The fact that the project consists of three trains of gas turbine generators/HRSGs provides inherent reliability. Failure of a non-redundant

component of one train should not cause the other trains to fail, thus allowing the plant to continue to generate (at reduced output). Further, the plant's distributed control system (DCS) will be built with typical redundancy (SJVEC 2001a, AFC § 2.4.2.2). Emergency DC and AC power systems will be supplied by redundant batteries, chargers and inverters (SJVEC 2001a, AFC § 2.2.5.3). Other balance of plant equipment will be provided with redundant examples (SJVEC 2001a, AFC § 2.4.2), thus:

- Two 100-percent HRSG feed water pumps per HRSG;
- three 50-percent condensate pumps;
- two 50-percent circulating water pumps;
- two 100-percent closed-cycle cooling water pumps;
- two 100-percent closed-cycle cooling water heat exchangers; and
- three 50-percent demineralized water systems with redundant installed pumps.

The applicant proposes to construct the SJVEC power generation facility in a three-on-one configuration (with only one condenser and one cooling system). (For a more detailed discussion of this configuration, see **Power Plant Efficiency**.) If the steam turbine generator should fail, steam from the HRSGs can be bypassed directly to the condenser, allowing the gas turbines to continue to operate, producing up to 540 MW. However, a single failure of the condenser or the cooling system would force the entire plant to shut down, resulting in the loss of up to 1,060 MW at maximum generation. In the Potrero Power Plant Unit 7 Project (00-AFC-4), the CaISO expressed concern that the 540 MW unit could be shut down by a single condenser or cooling system failure.

On the other hand, CaISO is not overly concerned with the SJVEC project due to its remote location (Miller 2002). CaISO typically plans for a single system loss of 1,150 MW, their chief concern being a system stability problem from failure of a plant. This concern arises mainly where local area benefits are a question, as at Potrero in San Francisco, where the loss of only 500 MW from a single failure is a concern.

Applicant has proposed to employ all customary measures to minimize the likelihood of plant failure due to a single failure of the condenser or the cooling system for the East Altamont Energy Center (EAEC 2001hh), a 1,100 MW (nominal) three-on-one combined cycle project, also owned by Calpine (01-AFC-4). For the SJVEC, with similar configuration and output capacity, applicant plans to take all of the same measures to minimize such likelihood (Argentine 2002). The SJVEC steam turbine would have two dual flow low pressure sections. Because of this, the turbine would have two surface condensers. The most common failure mode for the surface condensers is a tube leak, where circulating water leaks into the condensate, thus contaminating the condensate (EAEC 2001hh). To avoid the necessity of tripping the steam turbine because of a condenser leak, the applicant proposes to utilize condensers with divided water boxes. This feature allows one-half of the condenser to be taken out of service to repair tube leaks while the other half continues to operate. The benefit of this design is that the steam turbine continues to operate, generating a large amount of its full-load output. Also, because the SJVEC is a zero liquid discharge facility (SJVEC 2001a, AFC § 2.2.9.1), the condensers would be constructed of titanium. The welded joints

and superior corrosion resistance of the titanium condensers should result in fewer tube leaks than condensers fabricated of standard materials.

The circulating water piping would be concrete with welded steel joints. Thus, the potential for leaks in the circulating water piping would be extremely low.

The cooling tower for the SJVEC would contain 16 cells, each of which could be individually isolated in the event of a fan, motor or gearbox failure (EAEC 2001hh). With 15 cells working, the cooling tower would be capable of operating at more than 90 percent of its design capacity. The cooling tower basin for the SJVEC would be constructed such that approximately one-half of the basin can be taken out of service while the other half continues to operate. Typically, the cooling tower basin would be cleaned during plant outages. However, this feature would allow half the cooling tower to be taken out of service without tripping the steam turbine in the event that the basin needs to be cleaned between outages. With only half of the cooling tower in operation, the steam turbine would be capable of generating more than half of its maximum output (EAEC 2001hh).

The SJVEC would use two 50-percent circulating water pumps. If one pump were to fail, the other pump would "run out" further on its curve, pumping much more than 50-percent of the total design flow, thus allowing the steam turbine to generate two thirds of its maximum output (EAEC 2001hh).

With the opportunity for continued operation in the face of equipment failure, staff believes that equipment redundancy would be sufficient for a project such as this.

Maintenance Program

The applicant proposes to establish a plant maintenance program typical of the industry (SJVEC 2001a, AFC §§ 2.4.1, 2.4.5, 10.2.2). Equipment manufacturers provide maintenance recommendations with their products; the applicant will base its maintenance program on these recommendations. For example, each gas turbine would be scheduled for a week to 10 days per year off-line (at times of low electricity demand) in order to perform annual inspections and cleaning. Every third year, each gas turbine would undergo a hot gas path inspection lasting up to three weeks. Every sixth year, each gas turbine would undergo a major maintenance turnaround that typically lasts at least four weeks. The program would encompass both preventive and predictive maintenance techniques. Maintenance outages would be planned for periods of low electricity demand. In light of these plans, staff expects that the project would 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 SJVEC would burn natural gas from the Pacific Gas and Electric Company (PG&E) system. Gas would be transmitted to the plant, via a new 24 inch diameter pipeline connection to PG&E's existing Line 2 and Line 401 (SJVEC 2001a, AFC §§ 1.1, 1.3.2, 2.1, 2.4.3, 6.0, 10.2.1). The PG&E natural gas system represents a resource of considerable capacity. This system offers access to adequate supplies of gas (SJVEC 2001a, AFC §§ 2.4.3, 10.2.1). Staff agrees with the applicant's prediction that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The SJVEC would obtain reclaimed water for plant cooling and process makeup via the Fresno-Clovis Wastewater Treatment Facility (WWTF), from six new extraction wells (SJVEC 2001a, AFC §§ 1.1, 1.5.2, 7.0, 8.14, 10.2.2). Domestic water would be provided by the City of San Joaquin. For further discussion of water supply, see **Water Resources**.

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, tsunamis (tidal waves) and seiches (waves in inland bodies of water) will not likely represent a hazard for this project, but flooding and seismic shaking (earthquake) present credible threats to reliable operation.

Flooding

The site is essentially flat with an elevation of approximately 170 feet above mean sea level and is not within either the 100- or 500-year flood plain. A storm water detention pond would be used to limit storm water discharges to pre-construction flow rates (SJVEC 2001a, AFC §§ 2.3.1, 8.14.1.3, 8.14.2.3, 8.14.5.6). Staff believes there are no concerns with the power plant functional reliability due to flooding events. For further discussion, see **Water Resources**.

Seismic Shaking

The site lies within Seismic Zone 3 (SJVEC 2001a, AFC § 2.3.1); see **Geology and Paleontology**. The project would be designed and constructed to the latest appropriate LORS (SJVEC 2001a, AFC § 10.4, Appendix 10B2). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking compared to older facilities, because these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project would likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no real concern that power plant reliability will affect the electric system's reliability due to seismic events.

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 1994 through 1998 (NERC 1999):

For Combined Cycle units (All MW sizes)
Availability Factor = 91.49 percent

The Siemens-Westinghouse 501FD gas turbines that are planned for the project have been on the market for several years now, and can be expected to exhibit typically high availability. In light of this, the applicant's prediction of an annual availability factor in the 92 to 98 percent range (SJVEC 2001a, AFC §§ 2.2.2, 2.2.16) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). In fact, these new, large machines can well be expected to outperform the fleet of various (mostly older and smaller) gas turbines that make up the NERC statistics. Further, since the plant would consist of three parallel gas turbine generating trains, much maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures. The applicant's estimate of plant availability therefore appears realistic. The stated procedures for assuring design, procurement and construction of a reliable power plant are in keeping with industry norms.

Note that the applicant proposes to take all customary measures to maximize the reliability of the condenser and cooling system, including the incorporation of dual steam condensers with divided water boxes, use of titanium condenser tubing, and designing cooling tower and circulating water system designs to minimize the chances of a failure causing plant shutdown (EAEC 2001hh; Argentine 2002).

Energy Commission staff believes the SJVEC can be expected to be adequately reliable, in line with industry norms.

FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, cannot impact power plant reliability. Reliability impacts on the electric system from facility closure, should there be any, are dealt with in **Transmission System Engineering**.

CONCLUSIONS AND RECOMMENDATION

The applicant predicts an equivalent availability factor in the 92 to 98 percent range, which staff believes is achievable in light of the industry norm of 91.5 percent for this type of plant. CaISO has stated that it can plan around a plant failure of up to 1,150 MW (Miller 2002). The applicant proposes to take all customary measures to maximize the reliability of the condenser and cooling system in order to minimize the possibility of total plant failure (EAEC 2001hh; Argentine 2002). Therefore, staff is not overly concerned about a single failure of the condenser or the cooling system.

Staff concludes that if approved, 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.

REFERENCES

Argentine, Mike. 2002. SJVEC Project Manager, Calpine. Telephone conversation with Mathew Trask (California Energy Commission), March 12, 2002.

Detmers, Jim. 1999. Director of Maintenance and Reliability, California Independent System Operator. Interview with Steve Baker (California Energy Commission), July 13, 1999.

EAEC (East Altamont Energy Center) 2001 hh. East Altamont Energy Center Informal Data Requests and Responses Set #3 (01-AFC-4), dated November 21, 2001.

Mavis, Steve. 1998. Transmission Planner, California Independent System Operator. Telephone conversation with Steve Baker (California Energy Commission), January 23, 1998.

McCorkle, Stephanie. 2001. California Independent System Operator News Release, November 29, 2001.

McGraw-Hill (McGraw-Hill Energy Information Services Group). 1994. *Operational Experience in Competitive Electric Generation, an Executive Report*, 1994.

Miller, Jeff. 2002. California Independent System Operator. Telephone conversation with Steve Baker (California Energy Commission), January 28, 2002.

NERC (North American Electric Reliability Council). 1999. 1994-1998 Generating Availability Report.

SJVEC (San Joaquin Valley Energy Center) 2001a. Application for Certification, San Joaquin Valley Energy Center (01-AFC-22). Submitted to the California Energy Commission on October 31, 2001.

TRANSMISSION SYSTEM ENGINEERING

Testimony of Mark Hesters and Al McCuen

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 as a result of the project.

Staff's analysis evaluates the power plant switchyard, outlet line, termination and downstream facilities identified by the applicant and provides proposed conditions of certification to ensure the project complies with applicable LORS during the design review, construction, operation and potential closure of the project.

The California Independent System Operator (Cal-ISO) 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 with those standards. The Cal-ISO will provide testimony on these matters at the Energy Commission's hearings in the San Joaquin Valley Energy Center proceeding.

Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations (CCR), Title 14, §15378). Therefore, the Energy Commission must identify and evaluate the environmental effect of construction and operation of any new or modified transmission facilities required for the project's interconnection to the electric grid, and also for any construction or operation of facilities that are likely to be required as a result of the power plant's addition to the California transmission system but are beyond the project's interconnection with the existing transmission system.

SUMMARY OF CONCLUSIONS

The San Joaquin Valley Energy Center (SJVEC) proposed switchyard and the facilities connecting to the PG&E grid will be adequate. The design and proposed operation of the power plant switchyard, outlet lines, and terminations are in accordance with good utility practices and are acceptable. The Interconnection Study performed by PG&E for the SJVEC indicated that three transmission lines will likely require reconductoring as a result of construction and operation of the SJVEC. The environmental analysis of the potential environmental impacts that could result from the identified reconductoring projects will be included as an appendix to the Transmission System Engineering chapter in an addendum to this Staff Assessment. Staff concludes that power plant switchyard and outlet facilities will comply with LORS, assuming the Conditions of Certification **TSE-1** through **TSE-7** are implemented.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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.

Western Systems Coordinating Council (WSCC) Reliability Criteria provides 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 includes 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).

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; however, the NERC planning standards apply not only to interconnected system operation, but also to individual service areas (NERC 1998).

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 WSCC’s 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.

Cal-ISO Scheduling Protocols and Dispatch Protocols require conformance with NERC, WSCC, and Local Area Reliability and Planning Criteria. These standards will be applied to the assessment of the system reliability implications of the SJVEC project. Also of major importance to projects are the Cal-ISO Day/Hour Ahead Inter-zonal Congestion Management Scheduling Protocol (SP 10), the Transmission System Loss

Management Scheduling Protocol (SP 4), and the Creation of the Real Time Merit Order Stack (SP 11). The Congestion Management Scheduling Protocol provides that the operation of power plants must not violate system criteria when market participants request generation dispatch or the use of major interties. The Real Time Merit Order Stack is developed based on ascending energy bid prices so that the least cost bids are accepted early on, and the highest bids are not selected if congestion is anticipated. The Transmission System Loss Management Scheduling Protocol uses the Cal-ISO power flow model to identify total transmission losses at each generating unit and scheduling point. Additional calculations are performed to determine the actual net power output required by the generating units to meet their scheduled obligations. (Cal-ISO 1998a, Cal-ISO 1998b).

Cal-ISO Participating Generator Agreement consists of detailed explanations of the requirements in the Cal-ISO Tariff pertaining to the paralleled generating unit.

EXISTING FACILITIES AND RELATED SYSTEMS

The proposed SJVEC site is located in the Greater Fresno Area of PG&E's network. According to PG&E's draft "Greater Fresno Area Long Term Supply Planning Report," the area "…primarily imports electric transmission power through eleven 230 kV circuits and one 115 kV double circuit tower" (PG&E 2002a, Page 1). The Greater Fresno Area is an area of special concern being studied because of long-term concerns about the PG&E's ability to serve area loads and utilize the Helms pumped storage facilities.

PROJECT DESCRIPTION

SJVEC is nominally rated at 1,060 MW and would produce a maximum of 1,097 MW. As proposed, SJVEC would connect to a new, 12-breaker switchyard in a breaker-and-a-half arrangement and from there to PG&E's electric transmission network. PG&E's Panoche–McCall and Panoche–Kearny 230 kV lines would loop into the new switchyard.

POWER PLANT SWITCHYARD

The new power plant design consists of three combustion turbine generators and one steam generator. Each combustion turbine generator has a dedicated 15 kV to 230 kV step-up transformer, and the steam generator has a dedicated 18 kV to 230 kV step-up transformer (Calpine 2001a, page 2-5). As proposed by the Applicant, the high voltage side of the transformers would connect to the new San Joaquin Valley Energy Center switchyard through overhead circuits. This configuration is acceptable.

The new SJVEC switchyard would be a 12-breaker switchyard in a breaker-and-a-half arrangement (Calpine 2001a, page 5-4). This configuration is acceptable.

TRANSMISSION LINE

As proposed, the SJVEC will connect to the PG&E electrical grid by looping the Panoche–McCall 230 kV line and the Panoche–Kearney 230 kV line into the SJVEC switchyard. This would require two new double circuit 230 kV lines approximately 1,500 feet in length. These lines would use the same right-of-way and would change the

existing PG&E network by looping into two lines. The existing Panoche–McCall (Helm) 230 kV line would become the Panoche–SJVEC 230 kV line and the SJVEC–McCall 230 kV line. The existing Panoche–Kearney 230 kV line would become the Panoche–Helm 230 kV, Helm–SJVEC 230 kV and the SJVEC–Kearney 230 kV lines. The new lines would be constructed with 954 thousand circular mills (kcmil) 45/7 ACSS "rail" or a similar conductor (Calpine 2001a, page 5-5). This configuration is acceptable.

ANALYSIS

SYSTEM RELIABILITY

Introduction

Calpine provided a System Impact Study (SIS) for the SJVEC that studied the impacts of the proposed project on PG&E's network. The original SIS analyzed a connection to the Helms substation; later a sensitivity was completed, which determined that electrically there is no significant difference between the proposed and the studied interconnection. The SIS and subsequent studies analyze the effects of connecting a new power plant to the existing electric grid and identify potential impacts along with proposed mitigation measures. Any new transmission facilities required for connecting a project to the grid, such as the power plant switchyard, the outlet line, and downstream facilities[1], are considered part of the "project" and are subjected to this environmental review process. Based on the results of the SIS, operation of the SJVEC could result in several normal overloads and many contingency overloads. Staff has identified three transmission lines whose reconductoring is a reasonably foreseeable consequence of the operation of the SJVEC. The analysis of the potential impacts of the reconductoring of these lines on other technical areas will be discussed in an addendum to this Staff Assessment.

Draft System Impact Study Summary

The SIS analyzed the effects of SJVEC on the transmission interconnection and system, included the following scope:

- Steady State Power Flow Study: These studies were conducted using PG&E 2004 Summer Peak, Winter, and Spring Case Full Loop Base Cases and a sensitivity analyzing Spring Off-Peak Conditions. The study analyzed adverse impacts to normal operating conditions. Further studies were conducted taking single and multiple lines out of service for contingency analysis.
- Dynamic Stability Study: Dynamic facility studies were performed for the SIS.
- System Protection Study: The SIS analyzed short-circuit fault duty.

As with all system studies, various assumptions were made and listed in the SIS (Calpine 2001b, pages 4-6). The SIS is intended to analyze the SJVEC project, as well

[1] Downstream facilities are those that are beyond the point where the line emanating from the power plant joins with the (existing) interconnected system. (see California Public Utilities Commission v. California Energy Resources Conservation and Development Commission (1984) 150 Cal. App. 3d 437 [197 Cal. Rptr. 866].)

as other proposed generation projects in the generation queue ahead of SJVEC, and to determine the impacts from operation of those projects on the transmission grid. The study provides the basis for determining any system modifications, Special Protection Systems (SPS), or operational measures necessary to approve interconnection of the generation to the electrical transmission grid. Conclusions drawn from the study are highlighted below:

1. Steady State and Contingency Power Flow Study:

Numerous normal and contingency overloads are listed in the System Impact Study tables 7-1 to 7-10 (Calpine 2001b, pages 9-19). Many of the overloads listed in the SIS occur under some conditions without the project and staff expects the mitigation of these overloads is the responsibility of the interconnecting utility, PG&E. Some of the other overloads are mitigated through switching systems that are already in place, off-peak generation reduction of the SJVEC, planned system improvements and Special Protection Systems (SPS). Three of the identified overloads may require reconductoring as a reasonably foreseeable consequence of the SJVEC.

A. 230 kV Overloads:

- Borden–Gregg 230 kV (8 miles). This overload is identified in the Greater Fresno Area Long-term Reliability Study and requires upgrade in 2006. The environmental impacts of mitigating this overload are the PG&E's responsibility, although Calpine could be required to pay PG&E to move up the online date.
- SJVEC–Panoche 230 kV (25 Miles). This line overloads under normal Summer and Spring Peak conditions and emergency conditions in all studied cases including a 136 percent emergency loading under summer peak conditions. This line will likely require reconductoring as a result of the interconnection and operation of the SJVEC.
- Helm–Panoche 230 kV (25 miles). This line in overloads under normal Spring Peak conditions and has emergency overloads under Summer, Spring Peak and Spring Off-peak conditions. The summer emergency loading is 115 percent. This line will likely require reconductoring as a result of the interconnection and operation of the SJVEC.
- SJVEC–McMullin 230 kV. Under normal conditions this line overloads only in the Spring Off-peak and there is a significant (131 percent) summer emergency loading. This line will likely require reconductoring as a result of the interconnection and operation of the SJVEC.
- McMullin–Kearny 230 kV (14 miles). Under normal conditions this line overloads only in the Spring Off-peak and there is a significant (111 percent) summer emergency loading. This line will likely require reconductoring as a result of the interconnection and operation of the SJVEC.
- Kearny–Herndon 230 kV (11 miles). Under normal conditions this line overloads only in the Spring Off-peak and there is a (108 percent) summer emergency overloading. This line also overloads in the Winter case without SJVEC. The environmental impacts of the mitigation of this overload are the responsibility of PG&E, although Calpine could be required to pay PG&E to move up the online date of the mitigation.

B. 115 kV Overloads

Nine 115 kV lines overloads are identified in the SIS. Each of these lines becomes overloaded under at least one contingency case without the SJVEC. PG&E is responsible for mitigation these overloads. .

C. 70 kV Overloads

Seven 70 kV line overloads are identified in the SIS. These overloads can all be mitigated through switching systems and SPS.

2. Dynamic Stability Study:
   a. The SJVEC project will not adversely impact the stable operation of the transmission system.

3. System Protection Study:
   a. The System Protection Study analyzes the fault duty of circuit breakers and as mitigation requires the replacement of existing breakers with higher rated breakers. The System Protection Study identified three 230 kV circuit breakers that will be overstressed from operation of the SJVEC:
      - Helm 230 kV circuit breaker (CB) 232
      - Panoche 230 kV CB 322
      - Panoche 230 kV CB 222

   The upgrade of circuit breakers usually occurs within the fenceline of existing substations. The replacement of circuit breakers, for the purposes of this analysis, are not considered significant downstream facilities and environmental impacts will be de minimis.

Cal-ISO Summary

On December 14, 2001, the Cal-ISO issued a preliminary approval to connect the SJVEC to the PG&E network. The Cal-ISO will grant final approval for interconnection based on the results of the Detailed Facility Study, and will provide testimony on based the SIS and their preliminary approval.

STUDY CONCLUSIONS

The SIS indicates that there are significant transmission impacts with the proposed interconnection of SJVEC. Accelerating the construction of Cal-ISO approved PG&E transmission projects, system protection schemes and switching systems could mitigate most of the overloads identified. The overload of three lines that act essentially as outlet lines for the SJVEC, (Panoche–Helm 230 kV, Panoche–SJVEC 230 kV and SJVEC–Kearney–Herndon 230 kV) will likely trigger the need for reconductoring those lines. The environmental analysis of the impacts of the reconductoring will be submitted in this proceeding in an addendum to this Staff Assessment. The dynamic stability analysis showed that the SJVEC project will not adversely impact the stable operation of the network. The short circuit duty study indicated that three circuit breakers might require replacement; however, this work will occur within the fenceline of existing substations.

Final approval by the Cal-ISO of the SJVEC interconnection to the transmission grid will not be granted until a full review of the future Detailed Facility Study is completed. The

Condition of Certification, TSE-5f, provides for Commission review of this information. Based on the SIS, the interconnection of SJVEC could require significant downstream transmission facilities.

TRANSMISSION ALTERNATIVES

Calpine analyzed two interconnection alternatives. One alternative was rejected because it did not provide enough transmission capacity for the plant and the other was rejected because of the potential for higher costs and greater impact on the environment.

INTERCONNECTION ALTERNATIVES

Calpine first considered a loop into either the Panoche–Kearney 230 kV line or the Panoche–McMullin 230 kV line. With either of these interconnections only one line would be looped into the SJVEC switchyard. While costs and environmental impacts will be reduced compared to the proposed interconnection, neither of these alternatives will allow for the full output of the SJVEC to be reliably transmitted to the grid (Calpine 2001a, page 6-6). Staff agrees that neither of these alternatives will allow the full output of SJVEC to be reliably transmitted to the grid.

The other alternative interconnection was a direct interconnection to the Helms substation through two double circuit 230 kV lines. This interconnection would also effectively loop either the Panoche–McMullin 230 kV line or the Panoche–Kearney 230 kV line into the SJVEC switchyard. While very similar to the proposed interconnection, this alternatively was viewed as more costly (Calpine 2001a, page 6-7).

CUMULATIVE IMPACTS

The operation of SJVEC in conjunction with existing and anticipated generation projects in California could have significant negative cumulative impacts. SJVEC's proposed location in the Greater Fresno Area places the project near a significant load center. However the size of the plant (1,097 MW) places a significant stress on the existing transmission network as is readily apparent by the normal and contingency overloads identified in the SIS. Other, currently unknown, plants located in the Greater Fresno Area will also have impacts on the transmission network and could require significant downstream facilities. Impacts of these potential projects will be analyzed and mitigated as part of the application process of each project.

FACILITY CLOSURE

PLANNED CLOSURE

This type of closure occurs in a planned and orderly manner such as at the end of its useful economic or mechanical life or due to gradual obsolescence. Under such circumstances, the owner is required to provide a closure plan 12 months prior to closure, which in conjunction with applicable LORS is considered sufficient to provide adequately for safety and reliability. For instance, a planned closure provides time for the owner to coordinate with the Participating Transmission Owner (PTO), in this case

PG&E, to assure (as one example) that the PTO's system will not be closed into the plant's outlet, thus energizing the project substation. Alternatively, the owner may coordinate with the PTO to maintain some power service via the outlet line to supply critical station service equipment or other loads.[1]

UNEXPECTED TEMPORARY CLOSURE

An unplanned closure occurs when the facility is closed suddenly and/or unexpectedly for a short term due to unforeseen circumstances such as a natural or other disaster or emergency. During such a closure the facility cannot insert power into the utility system. Closures of this sort can be accommodated by establishing an on-site contingency plan (see **General Conditions including Compliance Monitoring and Closure Plan**).

UNEXPECTED PERMANENT CLOSURE

This unplanned closure occurs when the project owner abandons the facility. This is considered to be a permanent closure. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. An on-site contingency plan, that is in place and approved by the Energy Commission's Compliance Project Manager (CPM) prior to the beginning of commercial operation of the facilities, will be developed to assure safety and reliability (see **General Conditions including Compliance Monitoring and Closure Plan**).

RESPONSES TO PUBLIC COMMENTS ON THE PSA

Staff is not aware of any public comments regarding Transmission System Engineering.

CONCLUSIONS AND RECOMMENDATIONS

Staff's concludes that significant additional new transmission facilities, which include approximately 45-miles of line reconductoring, are a reasonably foreseeable consequence of the interconnection of the SJVEC. These facilities will be necessary to meet NERC, WSCC, and Cal-ISO reliability criteria and the environmental impacts of these facilities will be analyzed in an addendum to this testimony.

The Cal-ISO has provided preliminary contingent approval of the SJVEC interconnection.

The power plant switchyard, outlet lines, and termination are acceptable and will comply with LORS assuming the proposed conditions of certification are implemented.

The issuance of the Cal-ISO's final interconnection approval will assure conformance with NERC, WSCC and Cal-ISO reliability criteria. **Conditions of Certification TSE-5e and TSE-5f** provide for Energy Commission review of the Cal-ISO's final

[1] These are mere examples, many more exist.

interconnection approval letter, the Cal-ISO Participating Generator Agreement and the PG&E/Applicant Generator Special Facilities Agreement.

Staff proposes the following conditions of certification to insure system reliability and conformance with LORS.

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 with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 The project owner shall keep the CBO informed regarding the status of engineering design and construction. If any discrepancy in design and/or construction is discovered, the project owner shall document the discrepancy and recommend the corrective action required. The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification.

Verification: The project owner shall submit monthly construction progress reports to the CBO and CPM to be included in response to **TSE-3**. The project owner shall transmit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days. If 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.

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 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 substitution of Compliance Project Manager (CPM) and CBO approved "equivalent" equipment and equivalent substation configurations is acceptable. 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," National Electric Code (NEC) and related industry standards.
b) Breakers and busses in the power plan 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) Termination facilities shall comply with PG&E's Interconnection Handbook and applicable interconnection standards.
e) The project conductors shall be sized to accommodate the full output from the project.
f) The project owner shall provide:

i) The final Detailed Facility Study (DFS) including a description of facility upgrades, operational mitigation measures, and/or Special Protection System sequencing and timing if applicable,
ii) Executed Facility Interconnection Agreement,
iii) Cal-ISO Participating Generator Agreement
iv) Verification of Cal-ISO Notice of Synchronization.

Verification: At least 60 days prior to the start of construction of transmission facilities, the project owner shall submit the following materials to the CBO for approval:

a) Design drawings, specifications and calculations conforming with CPUC General Order 95 or NESC, Title 8, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders," NEC, applicable interconnection standards and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems and major switchyard equipment.
b) For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst case conditions"[2] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders," NEC, PG&E's Interconnection Handbook, 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 Facilities Study and signed letter from the applicant stating that mitigation is acceptable shall be provided concurrently to the CPM and CBO. Substitution of equipment and substation configurations shall be identified and justified by the project owner for CBO approval.

TSE-6 The project owner shall inform the CPM and CBO of any impending changes that may not conform to the requirements **TSE-5** a) through f), and have not received CPM and CBO approval, and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

Verification: At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes that may not conform to requirements of **TSE-5** and request approval to implement such changes.

TSE-7 The applicant shall provide the following Notice to the California Independent System Operator (Cal-ISO) prior to synchronizing the facility with the California Transmission system:

[2] Worst case conditions for the foundations would include, for instance, a dead-end or angle pole.

1. At least one week prior to synchronizing the facility with the grid for testing, provide the Cal-ISO a letter stating the proposed date of synchronization; and
2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 to 1530 at (916) 351-2300.

Verification: The applicant 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. 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," PG&E's Interconnection Handbook, 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," PG&E's Interconnection Handbook 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 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

WSCC (Western Systems Coordinating Council) 1997. Reliability Criteria, August 1998.

Calpine (Calpine Corp) 2001a. Application for Certification, San Joaquin Valley Energy Center (01-AFC-22), October 2001.

Calpine (Calpine Corp) 2001b. System Impact Study, Calpine Corporation, System Impact Study, December 7, 2001.

Cal-ISO (California Independent System Operator) 2001a. Central Valley Energy Center System Impact Study – CAISO Preliminary Assessment, Dated December 14, 2001.

Cal-ISO (California Independent System Operator). 1998a. Cal-ISO Tariff Scheduling Protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

Cal-ISO (California Independent System Operator). 1998b. Cal-ISO Dispatch Protocol posted April 1998.

DEFINITION OF TERMS

AAC All Aluminum conductor.

Ampere The unit of current flowing in a conductor.

Bundled Two wires, 18 inches apart.

Bus Conductors that serve as a common connection for two or more circuits.

Conductor The part of the transmission line (the wire) that carries the current.

Congestion Management
Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports) will not violate criteria.

Emergency Overload
See Single Contingency. This is also called an L-1.

Kcmil or kcm
Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.

Kilovolt (kV)
A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.

Loop An electrical cul de sac. A transmission configuration which interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.

Megawatt (MW)
A unit of power equivalent to 1,341 horsepower.

Multiple Contingencies
A condition that occurs when more than one major transmission element (circuit, transformer, circuit breaker, etc.) or more than one generator is out of service

Normal Operation/ Normal Overload
When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.

N-1 (N minus 1) Condition
See Single Contingency.

Outlet

Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Power Flow Analysis
A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.

Reconductoring
Replacing the conductors of an existing circuit with new conductors.

Remedial Action Scheme (RAS)
A remedial action scheme is an automatic control provision, which, for instance, will trip a selected generating unit upon a circuit overload.

Single Contingency
Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid dielectric cable
Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

Special Protection System
See Remedial Action Scheme.

Switchyard
A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.

TSE
Transmission System Engineering.

ALTERNATIVES

Susan V. Lee

INTRODUCTION

This section considers potential alternatives to the construction and operation of the proposed San Joaquin Valley Energy Center (SJVEC). The purpose of this alternatives analysis is to comply with California's environmental laws by providing an analysis of a reasonable range of feasible alternatives that could substantially reduce or avoid any potentially significant adverse impacts of the proposed project (Cal. Code Regs., tit. 14, §15126.6; Cal. Code Regs., tit. 20, § 1765). This section identifies potentially significant impacts of the proposed project and analyzes different technologies and alternative sites that may reduce or avoid significant impacts. Staff has also analyzed the impacts that may be created by locating the project at alternative sites.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The "Guidelines for Implementation of the California Environmental Quality Act," Title 14, California Code of Regulation §15126.6(a), 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 basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." In addition, the analysis must address the "no project" alternative (Cal. Code Regs., tit. 14, §15126.6(e)).

The range of alternatives is governed by the "rule of reason," which requires consideration only of those alternatives necessary to permit informed decision-making and public participation. The California Environmental Quality Act (CEQA) states that an environmental document does not have to consider an alternative for 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).

DESCRIPTION OF THE PROPOSED PROJECT

The proposed SJVEC would be a nominal 1,060 megawatt (MW) natural-gas-fired, generating facility located on approximately 25 acres within an 85-acre parcel. The site is located in an industrial area on the southern edge of the City of San Joaquin, in Fresno County. The SJVEC would consist of three combustion turbine generators equipped with dry, low oxides of nitrogen combustors and steam injection power augmentation capability; three heat recovery steam generators with duct burners; one condensing steam turbine generator; a deaerating surface condenser; and a 16-cell mechanical draft cooling tower (SJVEC 2001a, Page 2-2).

The proposed power plant would require a 230-kilovolt (kV) switchyard, approximately 1,500 feet of new 230 kV transmission line, and rerouting of approximately 2,900 feet of

70 kV distribution line. Natural gas for the facility would be delivered via approximately 20 miles of new 24-inch natural gas pipeline that would connect to Pacific Gas and Electric's (PG&E's) main natural gas system, either to Line 401 or Line 2, west of the project site at the intersection of Manning Road and Jerrold Avenue (SJVEC 2001a, Figure 6.1-1). The Fresno-Clovis Wastewater Treatment Facility (WWTF) would supply roughly 7,000 gallons per day (gpd) of reclaimed water for cooling water via 21 miles of new 27-inch pipeline (SJVEC 2001a, Page 1-1, 2). The City of San Joaquin would supply less than three acre-feet of domestic water per year for the SJVEC. A new road would be built, off Colusa Avenue on the west side of the parcel, to provide access to the site (SJVEC 2001a, Page 2-2).

SITE SELECTION

As stated in the AFC, the Applicant chose the proposed site for the following reasons (SJVEC 2001a, Page 9-2):

- The site is close to a transmission interconnection with access to Fresno Local Region electrical markets;
- Sufficient land is available for the 25-acre site plus a 20-acre construction lay down area;
- The site is a feasible distance to the Fresno-Clovis WWTF;
- The site is a feasible distance to a PG&E natural gas pipeline;
- The site is away from sensitive land uses; and
- A power plant at this site would be compatible with the existing land use.

SCOPE AND METHODOLOGY OF THE ALTERNATIVES ANALYSIS

The purpose of staff's alternatives analysis is to provide a reasonable range of feasible alternatives that could substantially reduce or avoid any potentially significant adverse impacts of the proposed project. To accomplish this, staff must determine the appropriate scope of analysis. Consequently, it is necessary to identify and determine the potentially significant impacts of the proposed project and then focus on alternatives that are capable of reducing or avoiding the significant impacts of the proposed project.

To prepare this alternatives analysis, staff used the following methodology:

- Identify the basic objectives of the project, provide an overview of the project, and describe its potentially significant adverse impacts.
- Identify and evaluate technology alternatives to the project, including conservation and renewable sources.
- Identify and evaluate alternative locations or sites.
- Evaluate the impacts of not constructing the project, known as the "no project" alternative under CEQA.

PROJECT OBJECTIVES

Based on analysis of the SJVEC Application for Certification (AFC), the Energy Commission staff has determined the project's objectives are:

- Construction and operation of a power plant with access to Fresno Local Region electrical market;
- To be located a feasible distance to a substation and key infrastructure for natural gas, water supply and transmission lines;
- Generation of approximately 1,000 MW of electricity; and
- To be online by approximately 2004.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS

Staff's assessment of environmental impacts is presented in detail in the individual sections of this Staff Assessment. No significant impacts are identified, assuming that all recommended mitigation is incorporated. Therefore, alternative sites are evaluated for potential impacts in the technical areas that are generally of most concern in power plant siting: land use, noise, biological resources, visual resources, and water and soils.

SITE ALTERNATIVES

Four sites were identified as potential power plant site alternatives. The applicant presented five sites as part of its alternatives analysis, but three of those sites are eliminated in this study. Staff identified two additional alternative sites. The following discussion includes a detailed analysis of potential alternative sites as well as a discussion about the eliminated alternatives.

SCREENING CRITERIA USED TO SELECT ALTERNATIVE SITES

The following criteria were used to identify potential alternative sites:

The site should avoid or substantially lessen one or more of the potential significant effects of the project; and
The site should meet most of the project objectives:

a. Location. In order to meet reliability objectives, the site should be located near the Fresno Local Region electrical market.
b. Site suitability. Sufficient land is needed to construct and operate a generating facility of this size. The proposed power plant would be located on 25 acres of land, however 20 acres is proposed for construction laydown and parking for construction workers. (SJVEC 2001a, AFC Page 2-18). The Applicant requested a minimum of 30 acres for construction and operation of the SJVEC (SJVEC, 2002a). Therefore, Staff used 30 acres as the minimum lot size needed to construct and operate the facility.
c. Availability of infrastructure. The site should be within a reasonable distance of natural gas, water supply, and transmission interconnections.

The site should be vacant.
The site should not be located adjacent to moderate or high density residential areas, sensitive receptors (such as schools and hospitals), or recreation areas.

Four alternative sites are evaluated: Kearney Site, Panoche Site, Gregg Site, and Madera Site. Please see **ALTERNATIVES Figures 1, 2 and 3** for maps of these four sites.

KEARNEY SITE

The Kearney Site would be located adjacent to PG&E's Kearney Substation. The Fresno-Clovis WWTF is immediately east of this site. The Kearney Site is located on the west side of Cornelia Road and south of Jensen Avenue, with the southern border of the parcel along a canal that runs west to east through the sewage treatment plant. The site is 5.5 miles west of Highway 99 and about 22 miles east of the proposed site. The site sits at approximately 250 feet of elevation.

The Kearney Site is located in unincorporated Fresno County. The site is currently used for agriculture, is zoned Exclusive Agriculture 20 (SJVEC, 2002a), and has been disturbed by agriculture practices. Although this parcel would require a rezoning, a power plant at this site would be compatible with surrounding industrial land uses (the sewage treatment plant) (SJVEC 2002a).

ALTERNATIVES Figure 1
Map of Kearney Site

ALTERNATIVES Figure 2
Map of Panoche Site

ALTERNATIVES Figure 3
Map of Madera Site and Gregg Site

According to the AFC, the Kearney Substation would require substantial transmission upgrades in order to support the proposed project (SJVEC, 2001a). It would also require an approximately 500-foot long transmission connection into the Kearney Substation.

Natural gas supply for this site would likely require an approximately 46-mile long natural gas pipeline to interconnect to PG&E's backbone natural gas supply pipeline Line 300, which would interconnect at Panoche Road near I-5. It is unlikely that there would be sufficient natural gas supply to accommodate a 1,000 MW power plant via the smaller natural gas supply pipeline that runs along the Highway 99 corridor. In particular, the Kearney Site is located in the southern portion of the City of Fresno, where natural gas is less likely to be available for a new power plant (PG&E, 2002). In order to determine the availability of natural gas supply, the Applicant would have to contract with PG&E to complete a System Impact Study (PG&E, 2002). Fresno-Clovis WWTF would supply roughly 7,000 gpd of reclaimed water for cooling (SJVEC, 2002a). The cooling water would be supplied to the Kearney Site via a new approximately 2.5 mile long pipeline, which would enter into the south side of the Fresno-Clovis WWTF (SJVEC, 2001a, Figure 7.1-3).

The closest residence to the Kearney Site is approximately 1,100 feet away and there are no other sensitive receptors identified within one mile of the site (SJVEC, 2002a).

Advantages

- **Infrastructure and Construction Access:** Reclaimed water for cooling is available from the adjacent wastewater treatment plant. There is good construction access from Highway 99 and Jensen Road.
- **Lands Use**: This land is zoned for agriculture; however, a power plant at this location would be consistent with the surrounding industrial land uses. There are few nearby residences along Jensen Road within a mile of the Kearney Site. Also, the Kearney Site is further from the higher density populations of the City of Fresno than the proposed site is from the City of San Joaquin.
- **Visual Resources**: A power plant at this location would not be visually inconsistent with the surrounding industrial land uses.

Disadvantages

- **Infrastructure Connections:** A power plant at this location could require substantial transmission upgrades to support a 1,060 MW power plant.

PANOCHE SITE

The Panoche Site would be located adjacent to PG&E's Panoche Substation, about 22 miles northwest of the proposed site. The Panoche Site is located on the south side of Panoche Road, on the west side of Fairfax Road and 2.5 miles east of I-5. The site sits at approximately 400 feet of elevation.

The site is located in unincorporated Fresno County. The site is approximately a 30-acre flat parcel surrounded by the Panoche Substation, a small generating facility, open

space and agricultural land uses. The site is disturbed and was previously used for agriculture. The closest residence is approximately 1,700 feet away from the Panoche Site.

The PG&E-owned Panoche Substation provides 230 and 115 kV service. The Panoche Substation also marks the connection point for PG&E's backbone natural gas supply pipeline Line 300. There is sufficient natural gas supply available at the site. There is a water supply pipeline in Panoche Road, however, that water supply is intended for domestic purposes. To cool a power plant at this site, an approximately 46-mile long water supply pipeline could be built to bring water from the Fresno-Clovis WWTF. Alternatively, dry cooling technology could be used. This technology requires minimal cooling water.

Advantages

- **Infrastructure and Construction Access:** Natural gas is available from the PG&E main natural gas pipeline Line 300. Transmission interconnection is available at the Panoche Substation. There is good construction access from Interstate 5 and Panoche Road.
- **Lands Use and Soils**: This land is also zoned for agriculture; however, a power plant at this location would be consistent with the surrounding uses, (Panoche Substation and natural gas facilities). There are few nearby residences or sensitive receptors.
- **Visual Resources**: A power plant at this location would be consistent with the surrounding industrial uses.

Disadvantages

- **Infrastructure Connections:** A long water supply pipeline would need to be built to this site or dry cooling technology would require a change in the project design.

GREGG SITE

The Gregg Site would be located adjacent to PG&E's Gregg Substation and is about 24 miles northeast of the proposed site. The Gregg Site is located on the north side of Avenue 7, at the intersection of Avenue 7 and 34th Avenue in unincorporated Madera County. This site is located approximately 0.5 mile north of the San Joaquin River.

This alternative site is currently a flat, vacant, undeveloped lot. The parcel sits at 80 feet of elevation. Transmission lines traverse the south side of Avenue 7 and north of the parcel. A power plant at this site would be compatible with the surrounding land uses, which include several transmission lines, a large substation and orchards. The closest residence is located approximately 0.5 mile west of the parcel, on the opposite side of the existing Gregg Substation. The community of Herndon is located 3.5 miles southeast of the Gregg Site.

The Gregg Substation is considered a critical transmission entry point into the Fresno area and has the capacity to carry at least 1,000 MW to meet local demand (SJVEC, 2001a). Natural gas supply for this site would likely require an approximately 47-mile

natural gas pipeline to interconnect to PG&E's backbone natural gas supply pipelines that are located near I-5 (SJVEC, 2002a). It is unlikely that there would be sufficient existing natural gas supply to accommodate a 1,000 MW power at this site (PG&E, 2002). In order to determine the availability of natural gas supply, the Applicant would need to contract with PG&E to complete a System Impact Study (PG&E, 2002).

The City of Madera's Wastewater Treatment Plant has approximately 5 million gallons per day of secondary treated water available. The water treatment plant is located approximately four miles from the Gregg Site, on the east side of Highway 99 and south of the City of Madera.

Advantages

- **Infrastructure and Construction Access:** Reclaimed water for cooling is available from the wastewater treatment plant, four miles away. Transmission interconnection is available at the Gregg Substation. There is good construction access from Highway 99 and Avenue 12.
- **Noise:** There are no nearby sensitive receptors.
- **Transmission System Engineering**: The Gregg Substation could support a 1,060 MW power plant and could supply power to the Fresno Local Regional market.

Disadvantages

- **Biological Resources:** Potential habitat near the San Joaquin River would need to be evaluated for presence of sensitive species that could be affected by construction or operation.
- **Visual Resources:** A power plant at this site would be visible from the San Joaquin River.

MADERA SITE

The Madera Site is a 30-acre portion of a 300-acre parcel located in Madera County, on the north side of Avenue 11, two miles east of Highway 99. The Northern Santa Fe Railroad runs northwest to southeast and passes the northeast corner of the parcel. This parcel is located within the City of Madera's industrial park, which is located between Avenues 11 and 12. There is a community college on the north side of Avenue 12.

The site is surrounded by agricultural land and sits at 80 feet of elevation. It is zoned Heavy Industrial and is part of Madera's industrial park (Madera County, 2002). Currently, there are only two industrial buildings in Madera's industrial park. When the area was rezoned from agricultural to heavy industrial to accommodate the industrial park, there were no California Natural Diversity Database (CNDDB) records of sensitive species or habitat occurrences on this site (Madera County, 2002). The site is about four miles southeast of the center of the city of Madera and approximately 15 miles northwest of the center of the City of Fresno. The center of the community of Trigo is located 0.8 miles to the east of the industrial park, and the closest resident to the parcel is located 0.5 miles east of the site at the intersection of Avenue 11 and Road 32.

The Borden Substation is located on Avenue 12, due north of the parcel, and the Gregg Substation is four miles southeast of the site. Two 230 kV transmission lines cross the northeast corner of the parcel and connect to PG&E's Gregg Substation approximately four miles southeast of the site. The Gregg Substation is a critical entry point for transmission into the Fresno area (SJVEC, 2001, Page 9-2). The City of Madera's water treatment plant has approximately 5 million gpd of secondary treated water available. The water treatment plant is located approximately four miles east of the Madera Site, on the east side of Highway 99 and south of the City of Madera. Although a main PG&E natural gas pipeline runs north to south along Highway 99, two miles west of the Madera Site, it is likely that an approximately 35 mile natural gas pipeline to connect with PG&E's backbone gas supply Line 300 (at Panoche Road) would be necessary.

Advantages

- **Biological Resources:** The site is currently vacant and disturbed, and according to the California Natural Diversity Database, there are no records of sensitive species occurrence at this site. Therefore, no habitat disturbance is expected to occur at this site.
- **Infrastructure and Construction Access:** Reclaimed water for cooling is available from the wastewater treatment plant, four miles away. Transmission interconnection is available at the Gregg Substation. There is good construction access from Highway 99 and Avenue 7.
- **Noise:** There are no nearby sensitive receptors.

Disadvantages

- In comparison to the proposed project, there are no disadvantages to using the Madera Site.

NO PROJECT ALTERNATIVE

The no project alternative under CEQA assumes that the project is not constructed. In the CEQA analysis, the no project alternative is compared to the proposed project and determined to be superior, equivalent, or inferior to it. The CEQA Guidelines state that "the purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. §15126.6(i)). Toward that end, the no project analysis considers "existing conditions" and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…." (§15126.6(e)(2)).

The no project alternative assumes that the power plant will not be constructed. If this facility were not constructed, the proposed site would likely remain in agricultural production for at least the near-future, and the construction and operational impacts of the SJVEC would not occur. The area could remain farmland or would be available for another industrial use and the water proposed to be used by the plant would be

available for other uses. In addition, although the proposed parcel is designated industrial, the area has a rural character, which would be preserved.

However, if the project were not constructed, the proposed SJVEC would not contribute to California's electricity resources, increase competition, nor help form a more reliable electric system that meets the goals of the deregulated energy market. Due to market forces, the proposed facility may also serve to replace older, inefficient facilities; this replacement may not occur in the absence of the plant's construction.

ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

This section describes alternatives that did not satisfy the screening criteria for inclusion in the more detailed analysis presented above, and include the following:

- Three alternative sites
- Demand side management
- Distributed generation
- Renewable resources

Each of these alternatives, and the reasons they were not considered in detail in this analysis, is addressed below.

SITE ALTERNATIVES ELIMINATED FROM THIS ANALYSIS

CEQA guidelines state that the alternatives discussion need not consider alternatives that are either infeasible or do not avoid significant environmental impacts. The following sections define other sites that were considered as alternatives to the SJVEC project and the reasons for their elimination from consideration.

McCall Site

The McCall Site is located adjacent to PG&E's McCall Substation, is east of the proposed site, and one mile east of the intersection of Highway 99 and Manning Avenue. The Applicant identified this site in the AFC. The McCall Site is located on the west side of De Wolf Road and on the south side of the Kirby Canal. The Union Pacific Railroad tracks travel northwest to southeast, approximately 0.8 miles west of the western edge of the parcel. The site sits at approximately 310 feet of elevation.

The McCall Substation is considered a critical entry point into the Fresno area and has the capacity to carry at least 1,000 MW to meet local demand in the Fresno local area (SJVEC, 2001a). A power plant at the McCall Site would require an approximately 700-foot long transmission connection into the McCall Substation. Fresno-Clovis WWTF would supply roughly 7,000 gpd of reclaimed water for cooling water (SJVEC, 2002a). The cooling water would be supplied to the McCall Site via a new approximately 14 mile long pipeline, which would enter into the south side of the Fresno-Clovis WWTF (SJVEC, 2001a, Figure 7.1-3).

This site was eliminated because there are approximately 15 residences observed in close proximity of the McCall Site and the developed area along Manning Road.

Helms South Site

The Helms South Site is located adjacent to PG&E's Helms Substation and is 100 feet south of the proposed site. The Applicant in the AFC identified this site. The Helms Site is located on the south side of Springfield Road and on the east side of Placer Avenue, with the northern boarder to the parcel along Springfield Road. The site is 3,600 feet south of the intersection of Manning Road and the Colorado Avenue. The San Joaquin Valley Railroad is adjacent to the northeastern corner of the parcel. The site sits at approximately 170 feet of elevation.

This site was eliminated because it is so close to the proposed site that it would not avoid or reduce impacts of the proposed project.

Herndon Site

The Herndon Site is located adjacent to PG&E's Herndon Substation near the community of Herndon and is northeast of the proposed site. The Applicant identified this site in the AFC. The Herndon Site is located on the west side of Riverside Avenue and along the southern shore of the San Joaquin River. The Herndon Site is 0.5 miles east of Highway 99 and is located approximately 200 feet southwest of the Riverside Municipal Golf Course (SJVEC, 2002a). The parcel sits at 295 feet of elevation.

The closest resident to the site is approximately 1,000 feet away from the site and the closest sensitive receptors are the Riverside Municipal Golf Course, 200 feet northeast of the site, and a middle school that is under construction 2,400 feet southeast of the site (SJVEC, 2002a). This site was eliminated due to its greater proximity to residences, a new school and because of the potential biological and visual impacts to the San Joaquin River.

TECHNOLOGY ALTERNATIVES

Conservation and Demand-Side Management

Conservation and demand-side management (DSM) include a variety of approaches, including energy efficiency and conservation, building and appliance standards, load management and fuel substitution. Public Resources Code Section 25305(c) states that conservation, load management, or other demand reducing measures reasonably expected to occur shall be explicitly examined in the Energy Commission's energy forecasts and shall not be considered as alternatives to a proposed facility during the siting process. The forecast that will address this issue is the Commission's California Energy Outlook. Thus, such alternatives are not included in this analysis.

Since 1975, the displaced peak demand from all of these efforts has been roughly the equivalent of 18 power plants with 500-MW of generating capacity each. The annual impact of building and appliance standards has increased steadily, from 600 MW in 1980 to 5400 MW in 2000, as more new buildings and homes around the U.S. are built under increasingly stringent energy efficiency standards. Savings from energy efficiency programs implemented by utilities and state agencies have also increased (from 750 to 3300 MW). Recent demand reducing proposals from the Governor and Legislature reduced consumption by an average of 3,500 MW during the summer of 2001 (CEC, 2001a). In addition, voluntary conservation measures adopted by

residential and commercial/industrial users in response to the current energy situation led to a 7.5 percent drop in electricity use throughout the state as of August 2001; but that by October 2001 voluntary measures were accounting for only a 1.5 percent reduction in energy use (CEC, 2001a).

District Energy

At the Informational Hearing and Site Visit held on February 7, 2002, a member of the public suggested that the Energy Commission consider district energy in its analysis. District energy systems provide thermal energy from a power plant in the form of steam or hot water through a network of pipes to provide processed heat to meet the needs of connected residential, commercial and industrial users (Rochester, 2002). District heating combined with electrical generation would create a more efficient generating unit and would provide benefits to the community.

In order for cogeneration to be implemented, a facility that can benefit from waste heat must be collected within the project. In this case, the proposed project would be installed in an agricultural field with no immediately adjacent facilities that could benefit from waste heat. Also, installing a district energy system to heat homes in the City of San Joaquin would not be practical or efficient due to losses from long piping systems because while the town is small, it is not compact.

GENERATION TECHNOLOGY ALTERNATIVES

Staff considered several alternative generation technologies that do not burn fossil fuels: solar, wind, biomass, geothermal, and hydropower.

Solar Generation

There are two types of solar generation: solar thermal power and photovoltaic (PV) power generation.

Solar thermal power generation involves the conversion of solar radiation to thermal energy, which is then used to run a conventional steam power system. Solar thermal is a viable alternative to conventional generation systems and, depending on the technology, is suited to either distributed generation on the kW scale or to centralized power generation on scales up to several hundred MW. Current solar thermal systems utilize three designs to generate electricity: parabolic trough concentrating collectors, power tower/heliostat configurations, and parabolic dish collectors. Parabolic trough and power tower systems typically run conventional power units, such as steam turbines, while parabolic dish systems power a small engine at the focal point of the collector.

PV power generation involves the direct conversion of light to electricity. PV is best suited to distributed generation uses rather than centralized power generation. PV is the most capital intensive of any alternative generation technology. PV power systems consist of solar electric modules (built from PV cells) assembled into arrays of varying sizes to produce electric power proportional to the area of the array and the intensity of the sunlight. PV arrays can be mounted on either the ground or on buildings. They can be installed on dual-purpose structures such as covered parking lots.

Solar resources would require large land areas in order to generate 1,060 MW of electricity. Specifically, assuming location in an area receiving maximum solar exposure (such as desert areas of San Bernardino County), central receiver solar thermal projects require approximately five acres per MW, so 1,060 MW would require approximately 5,300 acres, which is more than 200 times the amount of land area that would be taken by the proposed plant site and linear facilities. At 10 percent sun conversion efficiency, PV generation requires 1 square kilometer (about 400 acres) to produce at least 100 MW of power and 600 MWh of energy per day.

Although air emissions are significantly reduced or eliminated for solar facilities, they can have significant visual effects. Solar generation results in the absence or reduction in air pollutant emissions, and visible plumes. Water consumption for solar generation is substantially less than for a natural gas fired plant because no thermal cooling is needed for PV generation, and only a comparatively small amount is needed for solar thermal generation.

Like all technologies generating power for sale into the state's power grid, solar thermal facilities and PV generation require access to transmission lines. Large solar thermal plants must be located in desert areas with high direct normal insolation, and in these remote areas, transmission availability is limited. Additionally, solar energy technologies cannot provide full-time availability due to the natural intermittent availability of sunlight. Therefore, solar energy technologies do not meet the project needs, which is to supply immediate electric generation to accommodate peaks in electricity demand.

Wind Generation

Wind carries kinetic energy that can be utilized to spin the blades of a wind turbine rotor and an electrical generator, which then feeds alternating current (AC) into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind's kinetic energy into electricity. Modern wind turbines represent viable alternatives to large bulk power fossil power plants as well as small-scale distributed systems. The range of capacity for an individual wind turbine today ranges from 400 watts up to 3.6 MW. California's installed 1,671 MW of wind power represents 3.7 percent of the state's electrical capacity, which is currently 44,756 MW (AWEA, 2002; CAISO, 2002).

Although air emissions are significantly reduced or eliminated for wind facilities, they can have significant visual effects and wind turbines also cause bird mortality (especially for raptors) resulting from collision with rotating blades.

Wind resources would require large land areas in order to generate 1,060 MW of electricity. Depending on the size of the wind turbines, wind generation "farms" generally can require between 5 and 17 acres to generate one megawatt (resulting in the need for between 5,300 and 18,020 acres to generate 1,060 MW) (CEC, 2001b). Although 7,000 MW of new power wind capacity could cost-effectively be added to California's power supply, the lack of available transmission access is an important barrier to wind power development (Beck, 2001). California has a diversity of existing and potential wind resource regions that are near load centers such as San Francisco, Los Angeles, San Diego and Sacramento (CEC, 2001e). However, wind energy technologies cannot provide full-time availability due to the natural intermittent

availability of wind resources. Therefore, wind generation technology would not meet the project's goal, which is to provide immediate power to meet peaks in demand.

Biomass Generation

Biomass generation uses a waste vegetation fuel source such as wood chips (the preferred source),agricultural waste, municipal solid waste, animal wastes, waste from food processing, aquatic plants, and algae. The fuel is burned to generate steam. Another fuel for biomass plants is methane. Methane is a flammable gas produced from landfill wastes through anaerobic digestion, gasification or natural decay. Gasifiers are also used to convert biomass into a combustible gas, biogas. The biogas is then used to drive a high-efficiency, combined-cycle gas turbine. Currently, more than 100 power plants in 31 states burn landfill-generated methane (NREL, 2002). In California, there are 31 power plants that burn landfill gas, which generate a total of 183 MW (CEC, 2000).

In general, biomass facilities can generate substantially greater quantities of air pollutant emissions than natural gas burning power plants. In addition, biomass plants are typically sized to generate less than 20 MW, which is substantially less than the capacity of the 1,060 MW SJVEC project. Although at the peak of biomass industry, 66 biomass plants were in operation in California. Currently, there are about 30 direct-combustion biomass facilities in operation (CEC, 2001c).

In order to generate 1,060 MW, which is proposed for SJVEC, 53 biomass facilities generating 20 MW each would be required. However, these power plants would have potentially significant environmental impacts of their own.

Geothermal

Geothermal technologies use steam or high-temperature water (HTW) obtained from naturally occurring geothermal reservoirs to drive steam turbine/generators. There are vapor dominated resources (dry, super-heated steam) and liquid-dominated resources where various techniques are utilized to extract energy from the HTW. Geothermal is a commercially available technology, but it is limited to areas with geologic conditions resulting in high subsurface temperatures. Although geothermal resources do exist in California, there are no viable geothermal resources in the Kings County or Fresno County region or along a transmission corridor that supplies the Fresno local electrical market (CEC, 2001d).

Hydropower

While hydropower does not require burning fossil fuels and may be available in the Fresno region, this power source can cause significant environmental impacts due primarily to the inundation of many acres of potentially valuable habitat and the interference with fish movements during their life cycles. As a result of these impacts, it is extremely unlikely that new hydropower facilities could be developed and permitted in the Fresno region within the next several years.

Conclusion Regarding Alternative Technologies

Alternative generation typically provides lower efficiencies, has specific resource needs, environmental impacts, permitting difficulties, and intermittent availability. Therefore, they do not fulfill a basic objective of this plant: to provide reliable baseload power in

order to ensure reliability for electricity in California. Consequently, staff does not believe that these renewable technologies present feasible alternatives to the proposed project.

CONCLUSIONS

Staff does not believe that alternative technologies (geothermal, solar, wind, biomass, and hydroelectric) currently present feasible alternatives to the proposed project. While the no project alternative would eliminate all impacts of this project, the benefits of increasing in-state generation would also not be achieved, and impacts could be shifted to other locations.

All four alternative sites would be located on agricultural parcels, and none have residences closer that those near the proposed project. The major differences among the sites are their proximity to required infrastructure and the construction impacts associated with those infrastructure connections.

The proposed project would require minor new transmission facilities, but it would require 20 miles of new natural gas pipeline and 21 miles of new water supply pipeline. The major gas transmission lines run along the west side of the San Joaquin Valley (near I-5) and water tends to be available only along the more developed east side of the valley (Highway 99 corridor) where cities' treatment plants are located. Therefore, the approximately 45-mile distance between these resource supplies must generally be covered with either a gas or water pipeline (or half the distance of each, as for the proposed project).

The Panoche, Gregg and Kearney sites are in more isolated locations than the proposed project, which is immediately adjacent to the City of San Joaquin (the center of town is less than a mile from the proposed site). The Madera Site is the only alternative site on land currently zoned for industrial use, but it is similarly located near the community of Trigo.

The four site alternatives considered in this section offer some advantages and disadvantages in comparison to the proposed project, but overall the proposed site has no identified significant impacts. Therefore, no alternative is recommended over the proposed project.

REFERENCES

AWEA (American Wind Energy Association). 2002. Internet Website at http://www.awea.org/projects/california.html.

Beck (Beck, Fredric and Singh, Virinder et al). 2001. *Renewable Energy for California: Benefits, Status and Potential,* Washington, DC: Renewable Energy Policy Project, August 24, p.17.

CAISO (California Independent System Operator). 2002. Internet Website at http://www.caiso.com/outlook.html.

CEC (California Energy Commission). 2001a. Internet Website at http://www.energy.ca.gov/electricity/peak_demand_reduction.html.

CEC (California Energy Commission). 2001b. Internet Website at http://www.energy.ca.gov/wind/overview.html.

CEC (California Energy Commission). 2001c. Internet Website at http://38.144.192.166/development/biomass/biomass.html.

CEC (California Energy Commission). 2001d. Internet Website at http://www.energy.ca.gov/maps/geothermal_map.html.

CEC (California Energy Commission). 2001e. Internet Website at http://www.energy.ca.gov/maps/windmap.html.

CEC (California Energy Commission). 2000. Internet Website at http://38.144.192.166/greenpower/landfillgas.html.

Duke (Avenal Energy Project) 2001a. Application for Certification, Volume 1, Avenal Energy Project (01-AFC-20). Dated October 9, 2001.

Duke (Avenal Energy Project). 2002a. Data Request Responses, Avenal Energy Project (01-AFC-20). Dated February 25, 2002.

Kings (Kings County). 2001a. Planning Department. Personal Communication of Rebecca Morgenstern, (Aspen Environmental Group) with Planning Department. December 7.

Kings (Kings County). 2001b. Planning Department. Internet Web page at http://www.countyofkings.com/planning/Plan/Zoning.htm.

Madera (Madera County). 2002. Personal Communication of Rebecca Morgenstern, (Aspen Environmental Group) with Jennifer Shehorn, Madera County, Economic Development Department. February 6.

NREL (National Renewable Energy Laboratory). 2002. Internet Website at http://www.nrel.gov/lab/pao/biomass_energy.html.

PG&E (Pacific Gas and Electric Company). 2002. Personal Communication of Rebecca Morgenstern, (Aspen Environmental Group) with Michael O'Brien, Contract Development and Management. March 15.

Rochester (University of Rochester). 2002a. Internet Website at http://www.energy.rochester.edu.

SJVEC (San Joaquin Valley Energy Center, LLC). 2001a. Application for Certification, Volume 1, Central Valley Energy Center (01-AFC-20). Dated October 2001.

SJVEC (San Joaquin Valley Energy Center, LLC). 2002a. Data Responses, Central Valley Energy Center (01-AFC-20). Dated February 26.

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Christopher Meyers

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 conjunction with air and water quality, public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission (Energy Commission) and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of the following elements:

1. General conditions that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions; and
- establish requirements for facility closure plans.

2. Specific conditions of certification:

- Specific 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 verifying that the condition has been satisfied.

GENERAL CONDITIONS OF CERTIFICATION

DEFINITIONS

To ensure consistency, continuity and efficiency, the following terms, as defined, apply to all technical areas, including Conditions of Certification:

SITE MOBILIZATION:

Moving trailers and related equipment onto the site, usually accompanied by minor ground disturbance, grading for the trailers and limited vehicle parking, trenching for utilities, installing utilities, grading for an access corridor, and other related activities. Ground disturbance, grading, etc. for site mobilization are limited to the portion of the site necessary for placing the trailers and providing access and parking for the occupants. Site mobilization is for temporary facilities and is therefore not considered construction.

GROUND DISTURBANCE:

Onsite activity that results in the removal of soil or vegetation, boring, trenching or alteration of the site surface. This does not include driving or parking a passenger vehicle, pickup truck, or other light vehicle, or walking on the site.

GRADING:

Onsite activity conducted with earth-moving equipment that results in alteration of the topographical features of the site such as leveling, removal of hills or high spots, or moving of soil from one area to another.

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:

a. The installation of environmental monitoring equipment.
b. A soil or geological investigation.
c. A topographical survey.
d. Any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility.
e. Any work to provide access to the site for any of the purposes specified in a., b., c., or d.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, “commercial operation” is that phase of project development which begins after the completion of start-up and commissioning, and the power plant has reached steady-state production of electricity with reliability at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER (CPM) RESPONSIBILITIES

A CPM will oversee the compliance monitoring and shall be responsible for:

- ensuring that the design, construction, operation, and closure of the project facilities is in compliance with the terms and conditions of the Energy Commission Decision;
- resolving complaints;
- processing post-certification changes to the conditions of certification, project description, and ownership or operational control;

- documenting and tracking compliance filings; and,
- 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 staff and management.

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.

Pre-Construction and Pre-Operation Compliance Meeting

The CPM may schedule 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 and milestones 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 shall ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight or inadvertence 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):

- all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
- all monthly and annual compliance reports filed by the project owner;
- all complaints of noncompliance filed with the Energy Commission; and,
- all petitions for project or condition changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

It is the responsibility of the project owner to ensure that the general compliance conditions and the conditions of certification 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, compliance conditions, 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.

Access

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

The project owner shall maintain project files on-site or at an alternative site approved by the CPM, for the life of the project. The files shall contain copies of all "as-built" drawings, all documents submitted as verification for conditions, and all other project-related documents for the life of the project, unless a lesser period is specified by the conditions of certification.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files.

Compliance Verifications

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:

- 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;
- appropriate letters from delegate agencies verifying compliance;
- Energy Commission staff audits of project records; and/or
- Energy Commission staff inspections of mitigation and/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:

Christopher Meyer,
Compliance Project Manager
California Energy Commission
1516 Ninth Street (MS-3000)
Sacramento, CA 95814

If the project owner desires Energy Commission staff action by a specific date, they shall so state in their submittal and include a detailed explanation of the effects on the project if this date is not met.

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 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

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:

- the technical area,
- the condition number,
- a brief description of the verification action or submittal required by the condition,
- the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.),
- the expected or actual submittal date,
- the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable,
- the compliance status for each condition (e.g., "not started," "in progress" or "completed" [date]), and
- the project's preconstruction and construction milestones, including dates and status.

Completed or satisfied conditions do not need to be included in the compliance matrix after they have been identified as completed/satisfied in at least one monthly or annual compliance report.

Pre-Construction Matrix

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. It will be in the same format as the compliance matrix referenced above.

Construction and Operation Security Plan

Prior to commencing construction, a site-specific Security Plan for the construction phase shall be developed and maintained at the project site. Prior to commercial operation, a site specific Security Plan for the operational phase shall be developed and maintained at the project site. The plans may be reviewed at the site by the CPM during compliance inspections. The Security Plans should address the following measures:

CONSTRUCTION SECURITY PLAN

- Site fencing enclosing the construction area
- Use of Security Guards
- Check in procedure or tag system for construction personnel and visitors
- Protocol for contacting law enforcement and CPM in the event of suspicious activity or emergency
- Evacuation procedures

Operation Security Plan

- Permanent site fencing and security gate
- Security alarm for critical structures
- Perimeter breach detectors and onsite motion detectors
- Video/Camera monitoring system
- Fire Alarm monitoring system

The CPM may authorize modifications to these measures, or may require additional measures.

Tasks Prior to Start of Construction

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. Project owners

frequently anticipate starting project construction as soon as the project is certified, and in those cases it may be necessary for the project owner to file compliance submittals prior to project certification 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 are at the owner's own risk, and any approval by Energy Commission staff could be subject to change based upon the final Decision

Monthly Compliance Report

The first Monthly Compliance Report is due the month following the Energy Commission business meeting date on 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 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:

- a summary of the current project construction and milestones status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;
- 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;
- an initial, and thereafter updated, compliance matrix which shows the status of all conditions of certification and preconstruction and construction milestones (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
- 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;
- a list of any submittal deadlines that were missed accompanied by an explanation and an estimate of when the information will be provided;
- a cumulative listing of any approved changes to conditions of certification;
- a listing of any filings with, or permits issued by, other governmental agencies during the month;
- 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;
- a listing of the month's additions to the on-site compliance file; and

- any requests to dispose of items that are required to be maintained in the project owner's compliance file.
- a listing of complaints, notices of violation, official warnings, and citations received during the month; a description of the resolution of any complaints that have been resolved, and the status of any unresolved complaints.

Annual Compliance Report

After the Air District has issued a Permit to Operate, 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:

- 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);
- a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;
- 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;
- a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;
- an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
- a listing of filings made to, or permits issued by, other governmental agencies during the year;
- a projection of project compliance activities scheduled during the next year;
- a listing of the year's additions to the on-site compliance file, and
- an evaluation of the on-site contingency plan for unexpected facility closure, including any suggestions necessary for bringing the plan up to date [see General Conditions for Facility Closure addressed later in this section].
- a listing of complaints, notices of violation, official warnings, and citations received during the year; a description of the resolution of any complaints that were resolved, and the status of any unresolved complaints.

Confidential Information

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 determined to be

confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

Department of Fish and Game Filing Fee

Pursuant to the provisions of Fish and Game Code Section 711.4, the project owner shall pay a filing fee in the amount of $850. The payment instrument shall be provided to the Energy Commission's Project Manager at the time of project certification and shall be made payable to the California Department of Fish and Game. The Energy Commission's Project Manager will submit the payment to the Office of Planning and Research at the time of filing of the notice of decision pursuant to Public Resources Code Section 21080.5.

Reporting of Complaints, Notices, and Citations

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 inquiries 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 www.energy.ca.gov/sitingcases. 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 of all complaint forms, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt, to the CPM. 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 on the following page.

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.)

PRE-CONSTRUCTION MILESTONES [ONE-YEAR TO START SUBSTANTIAL CONSTRUCTION]

The project must commence substantial construction within one-year of certification. In accordance with Section 2031 of Title 20, California Code of Regulations, commencement of substantial construction is defined as:

- completion of at least 30 percent of the engineering design of the entire project; and,
- completion of at least 5 percent of the physical construction of the entire project, absent circumstances beyond the control of the applicant.

To track the progress towards the commencement of substantial construction, the Commission has established several pre-construction milestones. The project owner's projected date for achieving the pre-construction milestones must be submitted to the CPM for approval no later than 60 days after project certification (unless construction has already commenced). The following is the procedure for establishing and modifying pre-construction milestones.

I. ESTABLISH PRE-CONSTRUCTION MILESTONES TO ENABLE COMMENCEMENT OF SUBSTANTIAL CONSTRUCTION WITHIN ONE YEAR OF CERTIFICATION

- Obtain financing.
- Mobilize site.
- Begin rough grading for permanent structures

The CPM and the project owner may negotiate alternative milestones dates so long as the one-year deadline to start construction is maintained, if such changes are justified. The CPM may agree to modify milestone dates if the project owner demonstrates good-cause for not meeting the originally established milestones. The Commission must authorize start of construction beyond the one-year deadline. The Commission and the CPM will consider the good-cause criteria as described below.

II. A FINDING THAT THERE IS GOOD CAUSE FOR FAILURE TO MEET MILESTONES WILL BE MADE IF ANY OF THE FOLLOWING CRITERIA ARE MET:

- The milestone is changed due to circumstances beyond the project owner's control.
- The milestone will be missed, but the project owner demonstrates a good-faith effort to meet the project milestone.
- The milestone will be missed due to unforeseen natural disasters or acts of God which prevent timely completion of the milestones.

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 exists at the time of closure. 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, unexpected temporary closure and unexpected permanent closure.

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.

UNEXPECTED TEMPORARY CLOSURE

An unplanned unexpected 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.

UNEXPECTED PERMANENT CLOSURE

An unplanned unexpected permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected 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

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, local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

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.

In addition, 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.

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.

UNEXPECTED TEMPORARY CLOSURE

In order to ensure that public health and safety and the environment are protected in the event of an unexpected 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, 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 unexpected 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 unexpected temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, e-mail, etc., 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 a temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with that 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).

UNEXPECTED PERMANENT CLOSURE

The on-site contingency plan required for unexpected temporary closure shall also cover unexpected permanent facility closure. All of the requirements specified for unexpected temporary closure shall also apply to unexpected 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 unexpected permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, e-mail, etc., 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 that for a planned closure shall be developed and submitted to the CPM within 90 days of the permanent closure (or other period of time agreed to by the CPM).

DELEGATE AGENCIES

To the extent permitted by law, the Energy Commission may delegate authority for compliance verification and enforcement to various state and local agencies that have expertise in subject areas where specific requirements have been established as a condition of certification. If a delegate agency does not participate in this program, the Energy Commission staff will establish an alternative method of verification and

enforcement. Energy Commission staff reserves the right to independently verify compliance.

In performing construction and operation monitoring of the project, the Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). The Energy Commission staff retains this authority when delegating to a local CBO. Delegation of authority for compliance verification includes the authority for enforcing codes, the responsibility for code interpretation where required, and the authority to use discretion, as necessary, in implementing the various codes and standards.

Whenever an agency's responsibility for a particular area is transferred by law to another entity, all references to the original agency shall be interpreted to apply to the successor entity.

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, inadvertence, unforeseeable events, and other factors the Energy Commission may consider.

Moreover, to ensure compliance with the terms and conditions of certification and applicable laws, ordinances, regulations, and standards, 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.

INFORMAL DISPUTE RESOLUTION PROCEDURE

The following procedure is designed to informally resolve disputes concerning 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 of the results of the investigation, including corrective measures proposed or undertaken, to the CPM. 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 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:

- immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;
- secure the attendance of appropriate Energy Commission staff and staff of any other agency with expertise in the subject area of concern as necessary;
- 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,
- 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 Chairman, 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 (Title 20, California Code of Regulations, sections 1232 - 1236).

POST CERTIFICATION CHANGES TO THE ENERGY COMMISSION DECISION: AMENDMENTS, INSIGNIFICANT PROJECT CHANGES AND VERIFICATION CHANGES

The project owner must petition the Energy Commission, pursuant to Title 20, California Code of Regulations, section 1769, to: 1) delete or change a condition of certification; 2) modify the project design or operational requirements; and 3) transfer ownership or operational control of the facility.

A petition is required for **amendments** and for **insignificant project changes**. 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 Energy Commission's Docket in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of change process applies are explained below.

AMENDMENT

A proposed change will be processed as an amendment if it involves a change to the requirement or protocol (and in some cases the verification) portion of a condition of certification, an ownership or operator change, or a potential significant environmental impact.

INSIGNIFICANT PROJECT CHANGE

The proposed change will be processed as an insignificant project change if it does <u>not</u> require changing the language in a condition of certification, have a potential for significant environmental impact, and cause the project to violate laws, ordinances, regulations or standards.

VERIFICATION CHANGE

As provided in Title 20, Section 1770 (d), California Code of Regulations, a verification may be modified by staff without requesting an amendment to the decision, if the change does not conflict with the conditions of certification.

KEY EVENT LIST

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION	DATE
Certification Date	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Rough Grading	
Start Construction	
First Combustion of Gas Turbine	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
SYNCHRONIZATION WITH GRID	
COMPLETE T/L CONSTRUCTION	
FUEL SUPPLY LINE ACTIVITIES	
Start Fuel Supply Line Construction	
COMPLETE FUEL SUPPLY LINE CONSTRUCTION	
WATER SUPPLY LINE ACTIVITIES	
START WATER SUPPLY LINE CONSTRUCTION	
COMPLETE WATER SUPPLY LINE CONSTRUCTION	

SAN JOAQUIN VALLEY ENERGY CENTER
POWER PLANT PROJECT
PREPARATION TEAM

Executive Summary ..... Matt Trask

Introduction ..... Matt Trask

Project Description ..... Matt Trask

Air Quality ..... William Walters and Lisa Blewitt

Alternatives……..…Susan Lee

Biological Resources ..... Tom Scofield

Cultural Resources ..... Judy McKeehan and Gary Reinoehl

Haz Materials and Worker Safety/Fire Protection ..... Alvin Greenberg, Ph.D. and Rick Tyler

Land Use.....Dan Gorfain and Eileen Allen

Noise and Vibration.....Bill Thiessen

Public Health ..... Alvin Greenberg, Ph.D.

Socioeconomics.....Dan Gorfain

Soil and Water Resources .....Joe Crea, Charlie Moore, Jim Thurber,
..... Aurie Patterson and John Kessler

Traffic and Transportation ..... David Young

Transmission Line Safety and Nuisance.....Obed Odoemelam, Ph.D.

Visual Resources ..... Ken Peterson and William Walters

Waste Management ..... Alvin Greenberg, Ph.D.

Facility Design.....Steve Baker and Al McCuen

Geology and Paleontology .....Patrick Pilling, Ph.D.,P.E.

Power Plant Efficiency ..... Shahab Khoshmashrab

Power Plant Reliability ..... Shahab Khoshmashrab

Transmission System Engineering ..... Richard Minetto, P.E. and Ajoy Guha, P.E.

Compliance Monitoring and Facility Closure.....Christian Huntley

Project Assistant ..... Pat Owen

Support Staff .....Raquel Rodriguez, Adrian McCullough and Angie Hockaday