Staff Assessment

PICO POWER PROJECT

Application For Certification (02-AFC-3)
Santa Clara County
(Part 1)

CALIFORNIA
ENERGY
COMMISSION

STAFF REPORT

MARCH 2003
(02-AFC-3)

Gray Davis, Governor

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CALIFORNIA ENERGY COMMISSION

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EXECUTIVE SUMMARY

INTRODUCTION

This Staff Assessment (SA) contains the California Energy Commission staff's independent analyses and recommendations on the Pico Power Project (PPP) in all technical areas except air quality and alternatives. The two missing sections will be addressed in a separate document released after the Bay Area Air Quality Management District (BAAQMD) releases its Preliminary Determination of Compliance for the project.

The PPP and related facilities, such as the electric transmission line to the first point of interconnect, natural gas line, 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)).

Energy Commission staff is responsible for completing 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. Staff intends to issue an addendum, to the SA containing updated information in any area, such as the issuance of the Final Determination of Compliance by the BAAQMD. Staff will also address any comments received on the SA.

The Staff Assessment(s) and the addenda 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 7, 2002, the City of Santa Clara's Electric Utility Department, doing business as Silicon Valley Power (SVP), filed an Application for Certification (AFC) with the California Energy Commission (02-AFC-3) seeking approval to construct and operate a nominal 122 MW power plant, with the ability for peak firing up to 147 MW, called the Pico Power Project (PPP). The applicant's proposed site is a 2.85-acre parcel of land owned by SVP, located at 850 Duane Avenue in an industrial area in the City of Santa Clara, in Santa Clara County. **Refer to PROJECT DESCRIPTION Figures 1 and 2** for a map of the region and the project site.

The project would include its own switchyard, and would connect to an existing 115 kV transmission line that currently crosses the proposed plant site. Natural gas for the facility would be delivered via approximately 3 miles of new 12-inch diameter pipeline to convey gas from Pacific Gas & Electric Company's (PG&E) gas distribution Line 132. The Applicant plans to supply the plant's cooling water requirements (roughly 1,057 acre-feet per year) with reclaimed water from the San Jose/Santa Clara Water Pollution Control Plant (WPCP) via an existing pipeline that crosses the proposed plant site. The project's wastewater would be returned to the WPCP via 900 feet of new 18-inch diameter underground pipeline that would connect to a 27-inch wastewater main in Central Expressway, which in turn would convey wastewater to the WPCP.

The project is estimated to have a capital cost of between $155 million and $165 million. The applicant plans to begin construction immediately after receiving a license for the project from the Energy Commission. The applicant intends to bring the plant on-line by the first quarter of 2005. The project would provide for a peak of approximately 206 construction jobs over an 18 to 20 month period, and approximately 15 technical and skilled positions in during operations throughout the life of the plant.

PUBLIC AND AGENCY COORDINATION

In preparing the SA, Energy Commission staff conducted two 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), Bay Area Air Quality Management District, U.S. Fish and Wildlife Service, California Department of Fish and Game, the Santa Clara Valley Water District and the San Francisco Bay Regional Water Quality Control Board.

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;
- 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

Staff's analysis indicates that, for the technical areas covered in this Staff Assessment, 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.

Staff has determined that, with the recommended mitigation, the construction and operation of the PPP would not create a significant impact to the environment, public health, or the electric transmission grid. However, staff's analysis uncovered a few potential impacts that required additional mitigation measures, beyond those proposed by the Applicant, in order to avoid, eliminate, compensate or reduce them to a less-than-significant level. Staff has proposed additional mitigation in the areas of Biological Resources and Visual Resources, as discussed below. Each of these technical areas are briefly discussed below.

Technical Discipline	Environmental / System Impact	LORS Conformance
Biological Resources	Impacts mitigated	Yes
Cultural Resources	Impacts mitigated	Yes
Power Plant Efficiency	None	N/A
Power Plant Reliability	None	N/A
Facility Design	N/A	Yes
Geology	Impacts mitigated	Yes
Hazardous Materials	Impacts mitigated	Yes
Land Use	None	Yes
Noise	Impacts mitigated	Yes
Public Health	Impacts mitigated	Yes
Socioeconomics	None	Yes
Traffic and Transportation	Impacts mitigated	Yes
Transmission Line Safety	None	Yes
Transmission System Engineering	None	Yes
Visual Resources	Impacts mitigated	Yes
Waste Management	Impacts mitigated	Yes
Water and Soils	Impacts mitigated	Yes
Worker Safety	None	Yes

Biological Resources

Commissioning activities and operation of the proposed PPP could result in cumulative nitrogen deposition impacts to serpentine habitats that are potentially significant. To reduce the impact to a less-than-significant level, staff has recommended that the applicant establish a 40-acre preserve of suitable serpentine habitat. Staff also recommends that SVP provide a complete habitat compensation plan and Resource Management Plan for the 40-acre preserve prior to the release of the Addendum to the Staff Assessment and Evidentiary Hearings. Indeed, other than in the area of Air Quality, these final plans are the only additional information needed by staff to recommend approval of the project.

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 Santa Clara 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. Staff also recommends the applicant work with the City's Architectural Review Committee in determining the whether the project design, including landscaping, surface treatments and mechanical screening, would conform to the City's design guidelines. The Architectural Review Committee's determination would be forwarded to the Commission's Compliance Project Manger for use in determining whether the project would conform to the laws, ordinances, regulations and standards applicable to the design and construction of the project.

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 PPP. 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.

PICO POWER PROJECT
(02-AFC-3)
STAFF ASSESSMENT

EXECUTIVE SUMMARY 1

INTRODUCTION 2

PROJECT DESCRIPTION 3

ENVIRONMENTAL ASSESSMENT

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

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

GENERAL CONDITIONS 6

PREPARATION TEAM 7

DECLARATIONS & RESUMES 8

INTRODUCTION

PURPOSE OF THIS REPORT

The Staff Assessment (SA) presents the California Energy Commission staff's independent assessment of Silicon Valley Power's Application for Certification (AFC) of the Pico Power Project (PPP). This document contains analysis for all technical areas except air quality and alternatives. Staff will publish a separate document containing the analysis for those two areas after the Bay Area Air Quality Management District issues its Preliminary Determination of Compliance for the PPP. 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 and an addendum, if necessary, 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 17 of the 19 technical areas examined in a typical SA, excluding air quality and alternatives as explained above. Each technical area included in this SA is included in a separate chapter as follows: biological resources, cultural resources, hazardous materials management, land use, noise, public health, socioeconomics, soil and water resources, traffic and transportation, transmission line safety and nuisance, visual resources, waste management, worker safety and fire protection, facility design, geology and paleontology, power plant efficiency, power plant reliability, and transmission system engineering. These chapters are followed by a discussion of facility closure and project construction and operation compliance monitoring plans.

Each of the 17 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 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.

If the project is approved by the Commission, 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 combination site visit and informational hearing held in Santa Clara, California on December 16, 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 two publicly noticed workshops to address various issues of concern uncovered during the AFC review process. The first of these, a data request workshop, was held in Santa Clara on December 16, 2002, followed by another workshop on the applicant's data responses, held in Sacramento on January 14, 2003. Staff, the Applicant and City of Santa Clara officials all conducted substantial outreach efforts for this project, including widespread distribution of the notices for the public meetings and workshops.

Staff also coordinated with relevant local, state and federal agencies, such as the California Independent System Operator, Bay Area Air Quality Management District, U.S. Fish and Wildlife Service, California Department of Fish and Game, the San Francisco Bay 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.

PROJECT DESCRIPTION

NATURE AND PURPOSE OF PROJECT

On October 7, 2002, the City of Santa Clara's Electric Utility Department, doing business as Silicon Valley Pico Power Project (SVP), filed an Application for Certification (AFC) with the California Energy Commission (02-AFC-3) for a nominal 122 MW power plant, with the ability for peak firing up to 147 MW, called the Pico Power Project (PPP). The applicant's proposed site is a 2.85-acre parcel of land owned by SVP, located at 850 Duane Avenue in an industrial area in the City of Santa Clara, in Santa Clara County. **Refer to PROJECT DESCRIPTION Figures 1 and 2** for a map of the region and the project site, respectively.

SVP's stated purpose for the PPP is to provide approximately 25 percent of SVP's generation resources, which would help SVP meet expected load growth. SVP stated the plant is needed to replace power supplies presently obtained from the Western Area Power Administration through a long-term sales agreement that will expire in 2005. SVP intends to begin construction immediately upon Energy Commission approval so the project could be on-line in the first quarter of 2005.

PROJECT DESCRIPTION AND LINEAR FACILITIES

The PPP would be located west of the intersection of Lafayette Street and Duane Avenue, immediately north of SVP's Kifer Receiving Station in the City of Santa Clara, Santa Clara County, California. The power plant would occupy approximately 2.86 acres.

The natural gas-fired, combined cycle, wet-cooled generating facility would consist of two General Electric LM-6000PC Sprint combustion turbine-generators (CTGs), a single condensing steam turbine generator (STG), a deaerating surface condenser, a mechanical draft plume-abated cooling tower; and associated support equipment. The CTGs would be equipped with water injection to control emissions of oxides of nitrogen (NO_x), standard combustors, and air inlet chilling; the plant would also include two heat recovery steam generators (HRSGs) with duct burners. Total generating capacity would be 122 MW, with the ability to peak fire to 147 MW.

In the combined cycle process, electricity is created both from the combustion turbines and the steam turbine. Each combustion turbine generator converts the thermal energy of natural gas to mechanical energy, which drives an electrical generator. At the same time, the thermal energy in the hot exhaust gas exiting the CTGs is directed to the HRSGs to produce steam, which in turn drives the steam turbine electricity generator. Each CTG would generate approximately 50 MW at base load under average ambient conditions. Steam from the HRSGs would then be admitted to a condensing STG, which with additional duct firing could produce 47 MW under average ambient conditions (SVP 2002).

Associated equipment would include emission control systems necessary to meet the proposed emission limits. NO_x emissions will be controlled using a combination of low water injection in the CTGs and selective catalytic reduction systems in the HRSGs. A

carbon monoxide catalyst would be installed in the HRSGs to limit carbon monoxide (CO) emissions from the CTGs.

Additional project facilities would include:

- a three-cell mechanical draft evaporative cooling tower, to provide cooling water for the steam turbine condenser;
- a gas compressor station located about 500 feet from the PPP site on the City of Santa Clara's maintenance yard, a 0.26-acre parcel at the corner of Lafayette and Comstock Streets in Santa Clara;
- a distributed control system (DCS), including emergency DC and AC power systems supplied by redundant batteries, chargers, and inverters;
- a fire detection and protection system (utilizing carbon dioxide);
- an ammonia storage and loading area;
- miscellaneous storage tanks associated with plant water systems; and
- a maintenance building.

Linear facilities (natural gas and wastewater pipelines) are described below and are illustrated in **PROJECT DESCRIPTION Figure 1**. **PROJECT DESCRIPTION Figure 2** depicts the local setting, including the site layout. An aerial photosimulation of how the project will look at the start of operation is depicted in **PROJECT DESCRIPTION Figure 3.**

TRANSMISSION LINE FACILITIES

The two CTGs would each be connected to a three winding, three-phase step-up transformer and the STG would be connected to either of the step-up transformers connected to the 115 kV Kifer to Scott line at the plant switchyard. The switchyard would consist of a three breaker arrangement with airbreak disconnect switches and SF6 circuit breakers. From the switchyard, the generated power would be transmitted into the Kifer and Scott Receiving stations.

NATURAL GAS PIPELINE

The project would include construction of approximately 2.0 miles of 12-inch diameter pipeline to convey gas from Pacific Gas & Electric Company's (PG&E) gas distribution Line 132. This underground pipeline would begin at the corner of Gianera Street and Wilcox Avenue, north of the PPP site, and extend to the gas compressor station. The plant would also include approximately 500 feet of pipeline to convey compressed natural gas from the compressor station to the PPP site.

WATER SUPPLY

The cooling water and other process water supplies for the project would be tertiary treated recycled waste water from the San Jose/Santa Clara Water Pollution Control Plant (WPCP), located in the City of Alviso, via an existing South Bay Water Recycling Program pipeline located within the boundaries of the PPP site. SVP proposes to drill a new industrial well on the PPP site to provide an emergency backup supply of process water. The City of Santa Clara would provide domestic water for drinking, showers,

sinks and general sanitary purposes from its municipal potable water system. A new connection would be made to the existing 12-inch potable water line that runs on site in the former Pico Way, a surface street that formerly ran through the project site but has since been removed. The City of Santa Clara's water supply comes from City wells and the Hetch Hetchy aqueduct.

WASTEWATER TREATMENT

Approximately 900 feet of new 18-inch diameter underground pipeline would convey the project's wastewater discharge from the PPP site south along Lafayette Avenue to a 27-inch wastewater main in Central Expressway, which conveys wastewater to the WPCP. Sanitary wastewater from sinks and toilets would be discharged to the City of Santa Clara's sewer system.

CONSTRUCTION AND OPERATION

The project is estimated to have a capital cost of between $155 million and $165 million. The applicant plans to begin construction immediately after receiving a license for the project from the Energy Commission, which it predicted would be in June 2003, and complete construction in the third or fourth quarter of 2004. Delays in obtaining needed permits from other agencies will likely result in delays in issuing a license for the project, which may affect the applicant's construction schedule.

The applicant intends to bring the plant on-line by the first quarter of 2005. The PPP would be expected to have an annual availability in the general range of 94 to 96 percent. The project would provide for a peak of approximately 206 construction jobs over an 18 to 20 month period, and approximately 15 technical and skilled positions in during operations throughout the life of the plant.

FACILITY CLOSURE

The planned life of the PPP facility is 30 years or longer. Whenever the facility is closed, either temporally or permanently, the closure procedures would follow the described plan provided in the PPP AFC, LORS, and Staff Assessment, General Conditions, Facility Closure Plan, and Conditions of Certification.

REFERENCES

SVP 2002 (Silicon Valley Power Application for Certification for the Pico Power Project, 02- AFC-3, submitted October 2001)

INSERT PROJECT DESCRIPTION FIGURE 1, REGIONAL SETTING

INSERT PROJECT DESCRIPTION FIGURE 2, LOCAL SETTING

INSERT PROJECT DESCRIPTION FIGURE 3, VISUAL SIMULATION

ENVIRONMENTAL ASSESSMENT

BIOLOGICAL RESOURCES

Testimony of Stuart Itoga

INTRODUCTION

This section provides staff's analysis of potential impacts to biological resources from Silicon Valley Power's (applicant) proposal for the construction and operation of the Pico Power Project (PPP). This analysis is primarily directed toward potential impacts to state and federally listed species, species of special concern, wetlands, and other areas of critical biological concern. This document presents information regarding affected biological resources, 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. This document also determines compliance with applicable laws, ordinances, regulations and standards (LORS), and specifies conditions of certification.

This analysis is based, in part, on Silicon Valley Power's October 7, 2002 Application for Certification (AFC), AFC Supplements in response to data adequacy comments, applicant responses to Data Requests, workshops, site visits, and inter-agency meetings/discussions.

LAWS, ORDINANCES, REGULATION AND STANDARDS

The applicant must 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 Code of Federal Regulations, part 30, section 330.5(a)(26), prohibit 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., designate and provide 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, prohibit the take of migratory birds.

STATE

- **California Endangered Species Act of 1984**

  Fish and Game Code sections 2050 et seq. protect California's rare, threatened, and endangered 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.

- **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 as designated in the Migratory Bird Treaty Act or any part of such migratory non-game bird.
- **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.
- **Regional Water Quality Control Board**
  To verify that the federal Clean Water Act permitted actions comply with state regulations, the project owner must obtain a Section 401 certification from the San Francisco Bay Regional Water Quality Control Board (RWQCB). The Regional Board provides its certification after reviewing the federal Nationwide Permit(s) provided by the U.S. Army Corp of Engineers.

LOCAL

- **Santa Clara County General Plan**
  Environmental Protection and Resource Management Plan defines the County's fundamental, long term goals and policies for the natural environment and natural resources conservation.
- **City of Santa Clara General Plan**
  Goals of Chapter 5, Environmental Quality Element, Section 5.3 Flora and Fauna are to conserve and improve the environmental quality of the City of Santa Clara.

SETTING

REGIONAL

The proposed PPP would be located in the Santa Clara Valley, California. The Santa Clara Valley is located south of San Francisco Bay, with the Santa Cruz Mountains to the west and the Diablo Mountain Range to the east. Historically the region was comprised of a variety of habitats. These included grasslands, coastal scrub, oak savannah, riparian woodland, sycamore woodland, oak woodland, serpentine soils, coastal salt marsh and freshwater wetlands. In the mid-1800s, agricultural practices, including orchards and seed farms, were the principal industries. In the mid-1900s housing and commercial/industrial development projects began to replace agricultural operations.

Although a large portion of present day Santa Clara Valley has been developed for residential and commercial use, large parcels of land in the southern valley are still used for agricultural production and rangeland. In addition, approximately 40,000 acres of open space are protected in the form of urban and mountain parks, trails, lakes, streams, and open space, including: Henry Coe State Park, Pacheco State Park, Anderson Lake County Park, Coyote Lake County Park and Joseph D. Grant County Park. The 23,000-acre Don Edwards San Francisco Bay Area National Wildlife Refuge is less than 4 miles north of the proposed project site.

LOCAL

The proposed project would be located in the City of Santa Clara, County of Santa Clara, California. The city of Santa Clara is located in the south San Francisco Bay Area and is bordered by the city of Sunnyvale to the north, Campbell to the south, San Jose to the east, and Cupertino to the west. Santa Clara is largely urbanized and is the third most populated city in Santa Clara County. Major roadways define general geographical borders for the proposed site. Highway 101 to the north, Central Expressway to the south, and Montague Expressway and Lafayette Street to the west and east, respectively. Land use designations around the proposed site are zoned for a variety of uses including industrial, commercial, and residential. Although the local area is mostly developed, areas of open-space still exist in the proposed project area, and burrowing owl sightings have been documented near the proposed project site. Suitable burrowing owl habitat is located approximately 0.16 miles east of the proposed project site.

The proposed project would be located within the Guadalupe Watershed. Waterways within the Guadalupe Watershed include the Guadalupe River and Los Gatos, Ross, Alamitos, and Canoas Creeks. Some waterways within the Guadalupe watershed support anadramous fish runs as well as a variety of riparian wildlife species. Efforts to restore local and regional fish habitat and riparian areas are ongoing. Although not in the Guadalupe watershed, Coyote Creek is less than 2 miles from the proposed PPP.

IMPACTS AND ANALYSIS

Staff's primary concern associated with the proposed PPP is the project's potential cumulative impact on serpentine habitats, and associated sensitive serpentine endemic species, located in the Santa Clara Valley. Operation of the proposed project would result in exhaust stack emissions including nitrogen oxides (NO_x) and ammonia. Staff and the U.S. Fish and Wildlife Service (USFWS) are concerned that the proposed project's emissions of nitrogen and ammonia would have an adverse cumulative impact on serpentine habitat (and associated sensitive serpentine endemic species) designated as critical for the survival and recovery of the bay checkerspot butterfly (*Euphydryas editha bayensis*).

Applicant conducted biological resource surveys on April 26, 2002, June 14 and June 28, 2002. **Table 1** below lists the species applicant considered for the proposed PPP. **Table 2** lists species observed during applicant conducted surveys.

Biological Resources Table 1
Special Status Species Evaluated for the Pico Power Project

Scientific Name	Common Name	*Status: Federal/State/CNPS
Invertebrates		
Adela oplerella	Opler's longhorn moth	SC/--/--
Branchinecta lynchi	vernal pool fairy shrimp	T/--/--
Calicina minor	Edgewood blind harvestman	SC/--/--
Euphydryas editha bayensis	bay checkerspot butterfly	T/--/--
*Hydrochara ricksecker*i	Ricksecker's water scavenger beetle	SC/--/--
Lepidurus packardi	vernal pool tadpole shrimp	E/--/--
Microcina homi	Hom's microblind harvestman	SC/--/--
Microcina juni	Jung's microblind harvestman	SC/--/--
Speyeria adiaste adiaste	unsilvered fritillary butterfly	SC/--/--
Fish		
Eucyclogobius newberryi	tidewater goby	E/--/--
Hypomesus transpacificus	Delta smelt	T/T/--
Oncorhynchus mykiss irideus	central California coastal steelhead, south central California steelhead	T/--/-- T/SC/--
Oncorhynchus tshawytscha	winter-run chinook salmon, central valley spring-run chinook salmon, central valley fall/late-fall run chinook salmon	E/C/-- T/CT/-- C/SC/--
Pogonichthys macrolepidotus	Sacramento splittail	T/SC/--
Spirinchus thaleichthys	longfin smelt	SC/SC/--
Amphibians		
Ambystoma californiense	California tiger salamander	E/SC/--
Rana aurora draytonii	California red-legged frog	T/SC/--
Rana boylii	foothill yellow-legged frog	SC/SC/--
Scaphiopus hammondii	western spadefoot	SC/SC/--
Reptiles		
Anniella pulchra pulchra	silvery legless lizard	SC/SC/--
Clemmys marmorata	western pond turtle	SC/SC/--
Clemmys marmorata marmorata	northwestern pond turtle	SC/SC/--
Clemmys marmorata pallida	southwestern pond turtle	SC/SC/--
Masticophis flagellum ruddocki	San Joaquin coachwhip	SC/SC/--
Phrynosoma cornatum frontale	California horned lizard	SC/SC/--
Birds		
Agelaius tricolor	tricolored blackbird (nesting colony)	SC/SC/--
Aquila chrysaetos	golden eagle	--/SC/--
Amphispiza belli belli	Bell's sage sparrow (nesting)	SC/SC/--
Ardea herodias	Great blue heron (rookery)	--/SC/--
Athene cunicularia	western burrowing owl (burrow sites)	SC/SC/--
Brachyramphus marmoratus	marbled murrelet (nesting)	T/CE/--

Buteo regalis	ferruginous hawk (wintering)	SC/SC/--
Charadrius alexandrinus nivosus	western snowy plover (nesting)	T/SC/--
Charadrius montanus	mountain plover (wintering)	PT/SC/--
Elanus leucurus	White-tailed kite	--/SC/--
Empidonax traillii brewsteri	little willow flycatcher (nesting)	SC/--/--
Falco peregrinus anatum	American peregrine falcon (nesting)	D/E/--
Geothlypsi trichas sinuosa	saltmarsh common yellowthroat	--/SC/--
Haliaeetus leucocephalus	bald eagle (nesting/wintering)	T/E/--
Pelecanus occidentalis	California brown pelican (nesting colony)	E/E/--
Rallus longirostris obsoletus	California clapper rail	E/E/--
Riparia riparia	Bank swallow (nesting)	SC/T
Sterna antillarum browni	California least tern (nesting colony)	E/E/--
Vireo bellii pusillus	lest Bell's vireo (nesting)	E/E/--
Mammals		
Corynorhinus townsendii townsendii	Pacific western big-eared bat	SC/SC/--
Dipodomys heermanni berkrleyensis	Berkely kangaroo rat	--/SC/--
Eumops perotis californicus	greater western mastiff bat	SC/SC/--
Myotis ciliolabrum	Small-footed myotis bat	SC/--/--
Myotis evotis	long-eared myotis bat	SC/--/--
Myotis thysanodes	fringed myotis bat	SC/--/--
Myotis volans	long-legged myotis bat	SC/--/--
Myotis yumanensis	Yuma myotis bat	SC/--/--
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	SC/SC/--
Reithrodontomys raviventris	salt marsh harvest mouse	E/E/--
Sorex vagrans halicoetes	salt marsh wandering shrew	--/SC/--
Sylvilagus bachmani riparius	riparian brush rabbit	E/E/--
Vulpes macrotis mutica	San Joaquin kit fox	E/T/--
Plants		
Astragalus tener var. *tener*	Alkali milk-vetch	SC/--/1B
Atriplex depressa	Brittlescale	SC/--/1B
Atriplex joaquiniana	San Joaquin saltbush	SC/--/1B
Balsamohriza macrolepis var. *macrolepis*	big-scale balsamroot	SC/--/1B
Castilleja affinis ssp. *Neglecta*	Tiburon Indian paintbrush	E/T/1B
Ceanothus ferrisae	coyote ceanothus	E/T/1B
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	SC/--/1B
Chorizanthe robusta var. *robusta*	robust spineflower	E/--/1B
Cirsium fontinale var. *campylon*	Mt. Hamilton thistle	SC/--/1B
Cordylanthus maritimus ssp. *palustris*	Point Reyes bird's beak	SC/--/1B
Cordylanthus mollis ssp. *hispidus*	hispid bird's beak	SC/R/1B
Dudleya setchellii	Santa Clara Valley dudleya	E/--/1B
Erysium franciscanum	San Francisco wallflower	SC/--/4
Fritillaria lilacea	fragrant fritillary	SC/--/1B
Helianthella castanea	diablo rock rose	SC/--/1B
Horkelia cuneata ssp. *Sericea*	Kellog's horkelia	SC/--/1B
Lasthenia conjugens	Contra Costa goldfields	E/--/1B
Lathyrus jepsonii	Delta tule pea	SC/--/1B
Lessingia micradenia var. *glabrata*	smooth lessingia	SC/--/1B
Lilaeopsis masonii	Mason's lilaeopsis	SC/R/1B
Linanthus ambiguous	serpentine linanthus	--/--/4
Malacothamnus hallii	Hall's bush mallow	SC/--/1B
Plagiobothrys glaber	hairless popcorn-flower	SC/--/1A
Streptanthus albidus ssp. *albidus*	Metcalf Canyon jewelflower	E/--/1B
Streptanthus albidus ssp. *peramoenus*	Most beautiful jewelflower	SC/--/1B
Suaeda californica	California seablite	PE/--/1B
Trifolium amoenum	showy indian clover	E/--/1B
Tropidocarpum capparideum	caper-fruited tropidocarpum	SC/--1A

***Federal/State: E**=endangered, **T**=threatened, **R=**California rare **C**=candidate for listing, **PT**=proposed threatened, **SC**=species of concern, **--** =not listed, **PE**=proposed endangered.
CNPS: 1A=presumed extinct in CA, **1B**=rare or endangered in CA, **4**=plants of limited distribution, **--** =not listed.
Source: SVP 2002

Biological Resources Table 2
Species Observed at Proposed Project Site
Results of Applicant Conducted Wildlife Surveys for the Pico Power Project

Scientific Name	Common Name
Birds	
Euphagus cyanocephalus	Brewer's blackbird
Athene cunicularia	burrowing owl
Corvus brachyrhynchos	common crow
Anas platyrhynchos	Mallard
Zenaida macroura	mourning dove
Columba livia	rock dove
Plants	
Avena sp.	wild oat
Baccharis pilularis	coyote brush
Brassica nigra	black mustard
Brassica rapa	Mustard
Bromus catharticus	Brome
Bromus diandrus	ripgut brome
Bromus hordeaceus	soft chess
Capsella bursa-pastoris	shepherd's purse
Cardus pycnocephalus	Italian thistle
Centaurea solstitalis	yellow star thistle
Chamomilla suaveolens	pineapple weed
Chenopodium sp.	lamb's quarters
Convolvulus arvensis	Bindweed
Coronopus didymus	swine cress
Cyperus sp.	umbrella sedge
Erodium spp.	Filaree
Foeniculum vulgare	Fennel
Geranium molle	Geranium
Geranium dissectum	cut-leaf geranium
Hordeum marinum	Mediterranean barley
Hordeum murinum ssp. *Leporinum*	hare barley
Lactuca serriola	prickly lettuce
Lepidium latifolium	perennial pepperweed
Liquidamber sp.	sweet gum
Lolium multiflorum	annual ryegrass
Lotus corniculatus	bird's foot trefoil
Malva sp.	Cheeseweed
Melilotus indica	yellow sweet clover
Nerium oleander	Oleander
Phalaris sp.	canary grass
Picris echioides	bristly ox-tongue
Pinus radiate	Monterey pine
Polygonum sp.	Knotweed
Polypogon monspeliensis	rabbitsfoot grass
Raphanus sativus	wild radish
Rubus discolor	Himalayan blackberry
Senecio vulgaris	common groundsel
Sisybrium sp.	Mustard
Solanum sp.	Solanum
Sonchus asper	Sowthistle
Ulmus sp.	Elm

Source: SVP 2002

Power Plant Site

The proposed power plant would be located immediately west of the intersection of Lafayette Street and Dwayne Avenue. The proposed site is surrounded by commercial development projects and is bordered on its south side by the Kifer Receiving Station. The proposed project would occupy approximately 2.86 acres owned by the city of Santa Clara. The 2.86 acre lot is mostly bare ground and is currently vacant. On-site vegetation is mostly ruderal. Applicant indicated that no sensitive species were documented or observed on the proposed site (SVP 2002a).

A number of large elm trees growing on the east side of the proposed power plant site are proposed for removal. It is staff's opinion that the elm trees located on the east side of the proposed PPP footprint are not protected by the City of Santa Clara General Plan (City of Santa Clara 1998). It is also unlikely that they provide habitat for sensitive species. However, it is likely that the elm trees provide roost and nest habitat for various bird species. Section 3503 of the Fish and Game Code protects the nest or eggs of any bird. Consequently, nest surveys would need to be conducted prior to elm tree removal. As long as bird nest surveys are conducted prior to elm tree removal, and avoidance measures are implemented, staff concludes that removal of the elm trees is not likely to adversely impact biological resources in the proposed project area.

A ditch holding standing water is also located on the east side of the proposed PPP site. It is surrounded by the elm trees. Predominant understory species is Himalayan blackberry. The applicant has proposed filling the ditch. The area west and south of the ditch is used by the City of Santa Clara for cleaning street sweeping machines. A water spigot is located at the south end of the ditch. Applicant indicated that the ditch is used by the City of Santa Clara as a limited water collection sump for the equipment cleaning operations, and water present in the ditch is the result of equipment cleaning. It appears that the ditch has held water for a period of time sufficient to be assessed as a potential jurisdictional wetland (Itoga personal obs.). Applicant did not conduct a wetland delineation to determine wetland status of the ditch. Applicant did, however, excavate a soil pit, away from the ditch, at the north-east portion of the proposed site. Information submitted in the AFC (SVP 2002a) indicated a non-hydric soil type.

The decision to declare an area a wetland is based on a determination of the hydrology, vegetation and soils found on site. If appropriate hydrology, vegetation and soils are found, a determination is made that the site is a wetland. A delineation is then conducted to define boundaries of the wetland (USACE 1987). The applicant contends that once the City of Santa Clara discontinues its equipment cleaning operations, there would no longer be water in the ditch, therefore, it lacks appropriate hydrology to be considered a jurisdictional wetland (SVP 2002a).

It is staff's opinion that the City of Santa Clara street cleaning operation is the primary source of water to the ditch. While it is likely that precipitation is also a water source, precipitation is considered to be an unlikely source for wetland formation (USACE 1987). Staff agrees with applicant's assessment that the ditch lacks the necessary hydrology to be considered a jurisdictional wetland. Because there appears to be no hydrological connectivity from a source other than the equipment cleaning operations, and because of the disturbed nature of the site and surrounding areas, staff concludes that applicant's proposal to fill the ditch is not likely to have an adverse impact on biological resources in the proposed project area.

Natural Gas Compressor Station

The proposed natural gas compressor station would be located east of the proposed PPP at the corner of Comstock and Lafayette Streets. The natural gas compressor station would occupy approximately 1.35 acres owned by the City of Santa Clara. Several buildings and an old foundation are on-site.

It is staff's opinion that the proposed natural gas compressor station site is disturbed in nature and is marginal wildlife habitat at best. Staff concludes that construction and operation of the proposed natural gas compressor station is not likely to have an adverse impact to biological resources in the proposed project area.

Linear Facilities

Transmission Lines

The proposed interconnection (preferred) between the PPP and the Kifer and Scott Receiving Stations would require constructing a 115 kV switchyard and replacing the existing lattice transmission line tower with two monopole towers. Applicant indicated the transmission facilities would be constructed within the proposed PPP fenceline. Replacement of the lattice tower with two monopole towers would be necessary to place the existing Kifer-San Jose B and Newark-Kifer 115 kV transmission lines underground. In addition, the existing SVP NAJ-Kifer 60 kV line would be moved from the west side of the former Pico Way to the east border of the proposed power plant footprint. Applicant indicated that the proposed PPP would not require construction of any new transmission corridors or off-site transmission line towers or facilities.

An alternate route for undergrounding the 115 kV transmission lines has also been proposed. The alternative route would traverse the west side of the proposed project site. The proposed alternate route would require the transmission lines be routed outside the proposed project fenceline. However, the area proposed for the alternate transmission line route is paved, and the surrounding areas are developed.

Because areas proposed for construction and operation of the proposed transmission lines (preferred and alternate) and associated facilities are already disturbed, staff does not anticipate any adverse biological resources impacts from construction and operation of the transmission lines or associated facilities.

Natural Gas Pipeline and Gas Metering Station

A 2.0 mile long, 12-inch diameter gas pipeline would supply natural gas to the proposed PPP. Applicant has identified the Lafayette Street Route as the preferred gas pipe route. The Lafayette Street route would connect to PG&E line 132 at the corner of Gianera Street and Wilcox Avenue. A 30 x 60 ft. gas metering facility would need to be constructed near the aforementioned intersection. The proposed location for the metering facility is between Gianera Street and a Union Pacific Railroad soundwall. From the metering station to the proposed PPP, construction of the proposed gas pipeline would be routed south beneath Lafayette Avenue and Basset Street. The proposed Lafayette Street Route would require underground crossings of Union Pacific Railroad tracks, Montague Expressway, and U.S. Highway 101. The preferred gas pipe route would terminate at the proposed gas compressor station at Lafayette and Comstock Streets. An additional 500 feet of gas pipeline are proposed from the compressor station to the PPP plant site. Construction methods include trenching, directional drilling and bored and jacked casing.

Staff is concerned that proposed trenching associated with construction of the gas pipeline could attract burrowing owls known to occupy the proposed project area,

particularly at the north end of the proposed gas pipeline. Burrowing owl sitings are documented approximately 0.25 miles northeast of the proposed gas metering station, at Mission College, and at the Norman Y. Mineta International Airport, approximately 2 miles east of the preferred pipeline route (SVP 2002a). In addition, the gas pipeline would traverse some open-space areas. Construction activities would not necessarily preclude an area's use by burrowing owls and/or other wildlife. Furthermore, open trenches/uncapped pipes can attract and provide microhabitat for wildlife. If areas associated with gas pipeline construction are not monitored for the presence of wildlife at the start and end of each work day, wildlife inside of trenches and/or uncapped pipes (including burrowing owls, state and federal species of concern) may become trapped, injured and/or killed.

Because the gas pipeline would be routed beneath existing rights of way, it is staff's opinion that impacts to terrestrial habitat would be temporary and minimal. However, the potential exists for wildlife to be harmed by construction of the gas pipeline. Staff does not anticipate adverse impacts to biological resources caused by construction of the gas pipeline, so long as applicant monitors the gas pipeline construction area for the presence of wildlife at the start and end of each workday.

Waterlines

Applicant proposed use of reclaimed, tertiary treated water for cooling and process makeup requirements. Industrial well water has been proposed for emergency backup use.

Reclaimed water for the proposed project would be obtained from an existing South Bay Water Recycling pipeline within the boundaries of the proposed power plant footprint. An on-site industrial well has been proposed for emergency backup use (see Soil and Water Resources section of this assessment for more information).

Approximately 900 feet of 18-inch pipe has been proposed for the proposed project's waste water discharge. The waste water discharge line would be routed south beneath Lafayette Avenue to an existing 27-inch City of Santa Clara sanitary sewer system waste water main beneath the Central Expressway. Because the proposed waste water discharge line would be routed beneath existing roadways, and because of the disturbed nature of the areas that the proposed pipeline would traverse, staff does not anticipate any adverse impacts to biological resources in the proposed project area due to construction of the proposed waste water line.

Worker Parking and Staging Areas

Applicant has proposed the four areas listed below for worker parking/construction laydown:

1. Scott Receiving Station located on Space Park Drive. This area is located approximately 0.2 miles west of the proposed PPP. Approximately 0.4 acres located at the north end of the receiving station has been proposed.

2. Kifer Receiving Station adjacent to the proposed PPP site. Approximately 1.5 acres south of the proposed PPP has been proposed.

3. City of Santa Clara maintenance yard located at the corner of Comstock and Lafayette Streets. A vacant space (approximately 0.4 acres) adjacent to the maintenance yard has been proposed.

4. Silicon Valley Power Brokaw Substation located between Brokaw Road and Coleman Avenue. A vacant lot (approximately 1.9 acres) adjacent to the substation has been proposed.

Applicant indicated that the four areas proposed for worker parking/construction laydown are all owned by the City of Santa Clara, and the proposed areas are all either paved, chip sealed or graveled. It is staff's opinion that the areas proposed for use as worker parking/construction laydown areas are disturbed areas and provide little in the way of habitat for wildlife. Staff does not expect any adverse impacts from use of the aforementioned areas for worker parking and construction/laydown areas.

CUMULATIVE IMPACTS

Cumulative impacts are those that result from the incremental impacts of an action when considered together with 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 primary biological resources concern associated with the proposed PPP would be from its operation. Oxides of nitrogen (NO_x) and the ammonia slip (as byproduct of selective catalytic reduction) emitted from proposed PPP exhaust stacks could potentially impact sensitive serpentine species/habitats in the Santa Clara Valley. Operation of the proposed PPP could adversely affect 12 units designated as critical habitat for the bay checkerspot butterfly (USFWS 2001). It is staff's opinion that the impacts of the proposed project's NO_x emissions and ammonia slip, when considered together with ambient conditions and with three other power facilities in the Santa Clara Valley (Metcalf Energy Center (MEC), Los Esteros Critical Energy Facility (LECEF) and the Gilroy Energy Center (GEC), are potentially significant.

Serpentine soils are characterized by a low calcium/magnesium ratio, lack of essential nutrients (e.g. nitrogen, potassium, phosphorous), and high concentrations of heavy metals. Serpentine soils support endemic plant species adapted to the aforementioned conditions. Such areas are critical for bay checkerspot butterfly (federally threatened) survival and recovery because serpentine soils support plants that provide food for larvae and nectar for adults (USFWS 1998). The Opler's longhorn moth's (federal species of concern) existence depends exclusively on a single serpentine host plant (California cream cups (*Platystemon californicus*)).

Lack of nitrogen (nitrogen being the primary limiting nutrient for plant growth on serpentine soils) prevents invasion of non-native species. Nitrogen deposition, primarily from industrial and vehicle emissions, provides a source of nitrogen to serpentine soils. NO_x and ammonia react with the atmosphere to form nitrogen compounds that accumulate on soils, plants and other surfaces (nitrogen deposition). Nitrogen

deposition results in the growth of invasive non-native grasses that out-compete serpentine endemic plants (Weiss 1999). In addition to potential impacts to the bay checkerspot butterfly, and Opler's longhorn moth, staff and the USFWS are also concerned with potential adverse impacts to Santa Clara Valley dudleya (federally endangered), Coyote ceanothus (federally endangered), Metcalf Canyon jewel-flower (federally endangered), Tiburon paintbrush (federally endangered), Mt. Hamilton thistle (federal species of concern), smooth lessingia (federal species of concern), and most beautiful jewel-flower (federal species of concern).

A nitrogen deposition rate of 3 -10 kilograms per hectare per year (kg/ha/yr) is considered sufficient to impact ecosystem structure and diversity (Fox et al. 1989). Ambient atmospheric nitrogen deposition in the south San Jose area was determined to be 8.4 kg/ha/yr. This indicates that the south San Jose area already has levels of nitrogen considered sufficient to adversely impact ecosystems. Weiss (1999) concluded that invasion of serpentine soils by non-native grasses, and decline of the bay checkerspot butterfly are related to anthropogenic nitrogen deposition.

Nitrogen deposition and its impact to serpentine endemics was analyzed in other Santa Clara Valley siting cases (MEC, LECEF, GEC). During proceedings for the MEC, numerous workshops and extensive modeling were conducted to identify the most appropriate method for use in determining how nitrogen deposition potentially caused by the MEC could affect serpentine habitats in the project area. The same model and assumptions used in assessing the MEC's impacts were also used for the LECEF, GEC and the proposed PPP.

The ISCST3 model was used to predict direct nitrogen deposition values to bay checkerspot butterfly critical habitat. Applicant modeled direct nitrogen deposition values for the 12 aforementioned critical habitat units in the southern Santa Clara Valley. The direct nitrogen deposition impact to 12 individual critical habitat units was modeled in kg/ha/yr. This value was divided by the background deposition value, 8.4 kg/ha/yr and multiplied by the amount of serpentine habitat acreage within each of the 12 critical habitat units. Results of the modeling indicated that the proposed PPP could result in nitrogen deposition to critical serpentine habitat above ambient levels. Because ambient levels of nitrogen are already at levels sufficient to affect ecosystem structure and diversity, staff concludes that the proposed project's emissions of NO_x and ammonia could potentially impact sensitive serpentine species in the Santa Clara Valley.

MITIGATION

Applicant has provided a draft habitat compensation plan addressing potential impacts to bay checkerspot butterfly critical habitat. Potential impacts from nitrogen deposition could be reduced if the proposed PPP could reduce overall nitrogen in the vicinity of the critical habitat units. Applicant has proposed to offset NO_x emissions at a ratio of 1:1 (51.5 tons/year) in the form of Emission Reduction Credits (ERCs). However, proposed ERCs would not be in the immediate vicinity of critical habitat units (for more information see Air Quality section of this assessment), and applicant indicated a preference to mitigate potential nitrogen deposition impacts to serpentine habitats through habitat

compensation (Davy 2002). Staff, applicant and the U.S. Fish and Wildlife Service have discussed mitigation strategies to reduce potential impacts to levels less than significant. During a January 16, 2002, data response workshop, applicant informally proposed to mitigate the proposed project's impacts based on the results of the ISCST3 modeling. Direct nitrogen deposition values at the 12 critical habitat units ranged from 0.014 kg/ha/yr at Bear Ranch to 0.094 kg/ha/yr at Communication Hill. Habitat compensation was calculated by dividing the direct deposition value for each unit by the background nitrogen level (8.4 kg/ha/yr) previously determined during MEC proceedings (Weiss 2001), then multiplying by the amount of serpentine acreage (USFWS 2001) within each corresponding critical habitat unit. Calculations performed by applicant (SVP 2002b) indicated that 40.19 acres of serpentine habitat could potentially be adversely affected. Staff and the USFWS agree that the ISCST3 model is the most appropriate model for use in assessing the project's potential nitrogen deposition impacts and that 40.19 acres would be sufficient mitigation for the projects potential habitat impacts.

Before potential impacts can be mitigated to levels less than significant, applicant must submit a specific, final proposal to mitigate the project's potential habitat impacts. An important component for any plan to mitigate nitrogen deposition impacts in the Santa Clara Valley are adaptive management strategies. One example of an adaptive management strategy is the use of cattle grazing to control invasive non-native grasses. Weiss (1999) found that in addition to preservation of habitat, well-managed, moderate grazing must be maintained at preserve sites expected to support and maintain populations of the bay checkerspot butterfly. By manipulating the number of cattle/acre, grazing has been used successfully to promote biodiversity of serpentine endemic plants on Coyote Ridge (Itoga, personal obs.). It is staff's opinion that grazing be included as part of any adaptive management plan submitted by applicant.

Applicant is in consultation with the USFWS concerning a low effect Habitat Conservation Plan and permit for incidental take associated with operation of the proposed PPP. Because there is no federal action associated with the proposed project, a Habitat Conservation Plan, under Section 10 of the Endangered Species Act, must be prepared before a permit could be issued.

Applicant submitted a draft Resource Management Plan on March 17, 2003 (SVP 2003c). However, the draft plan did not include a specific habitat compensation proposal. Staff and the USFWS cannot determine the proposed project's potential level of impact based on the draft mitigation proposal. Before staff could conclude that potentially significant impacts would be mitigated to levels less than significant, the habitat compensation plan must be updated (see below). Once the final proposal for habitat compensation has been received and accepted by staff, comments on the final Resource Management Plan will be forwarded to applicant.

Although exact habitat compensation acreage has not been identified, applicant has proposed the following mitigation measures (SVP 2003):

- acquisition of mitigation land;
- donation of mitigation land to the Santa Clara Valley Land Trust or other suitable conservation organization for long-term management;

- establishment of an endowment (through a Property Analysis Record (PAR) or other appropriate methodology) to manage mitigation land in perpetuity; and
- adaptive management of mitigation land.
- Staff proposes that applicant submit the following:
- exact amount and location of mitigation land;
- name of conservation organization to which mitigation land will be donated and how land will be protected in perpetuity;
- amount of endowment and how it was calculated; and
- a final adaptive management plan for staff review and approval.

COMPLIANCE WITH LORS

Potential adverse cumulative impacts associated with operation of the proposed PPP have not been mitigated to levels less than significant. Although applicant has discussed some mitigation strategies with staff and the USFWS, and submitted a draft Resource Management Plan, no formal habitat compensation proposal has been made. Applicant seeks protection for incidental take under Section 10 of the Endangered Species Act (Act), and the proposed project could be in violation of the Act if any NO_x or ammonia were emitted from the proposed project's exhaust stacks before completing consultation with the USFWS. A formal proposal to mitigate habitat impacts needs to be submitted and approved before staff would be able to determine the project's compliance with applicable LORS.

FACILITY CLOSURE

The proposed PPP site and the area surrounding it are already disturbed. It is staff's opinion that closure of the proposed project, sometime in the future, would not have an adverse impact on biological resources. Staff does not have any biological resource facility closure recommendations in the event of a planned or unexpected permanent or temporary closure of the proposed PPP.

CONCLUSIONS AND RECOMMENDATIONS

Commissioning activities and operation of the proposed PPP could result in cumulative nitrogen deposition impacts to serpentine habitats that are potentially significant. With implementation of proposed Conditions of Certification **Bio-7** and **Bio-9,** this impact would be adequately mitigated. However, staff recommends that SVP provide a complete habitat compensation plan and Resource Management Plan prior to the release of the Addendum to the Staff Assessment and Evidentiary Hearings.

PROPOSED CONDITIONS OF CERTIFICATION

Designated Biologist Selection

BIO-1 The project owner shall submit the resume, including reference contact information, of the proposed Designated Biologist to the Compliance Project Manager (CPM) for approval.

Verification: The project owner shall submit the specified information at least 60 days prior to the start of any site (or related facilities) mobilization. Site and related facility activities shall not commence until an approved Designated Biologist is available to be on site.

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; and

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

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

Designated Biologist Duties

BIO-2 The project owner shall ensure that the Designated Biologist shall perform the following activities during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities:

1. Advise the project owner's Construction and Operation Managers 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. 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;
4. Notify the project owner and the CPM of any non-compliance with any biological resources Condition of Certification; and

5. Respond directly to inquiries of the CPM regarding biological resource issues.

Verification: The project owner shall ensure that the Designated Biologist maintains 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.

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

The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be adverse impact to biological resources if the activities continued;
2. Inform the project owner and the Construction/Operation Manager when to resume activities; and
3. Notify the CPM if there is a halt of any activities, and advise the CPM of any corrective actions that have been taken, or will be instituted, as a result of the halt.

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

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by the CPM within five working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.

Worker Environmental Awareness Program

BIO-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, ground disturbance,

grading, construction, operation and closure, are informed about sensitive biological resources associated with the project.

The WEAP must:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material is made available to all participants;
2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas;
3. Present the reasons for protecting these resources;
4. Present the meaning of various temporary and permanent habitat protection measures;
5. Identify whom to contact if there are further comments and questions about the material discussed in the program; and
6. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

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

Verification: At least 60 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM two copies of the 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 provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date.

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 two copies of the proposed BRMIMP to the CPM (for review and approval) and to USFWS (for review and comment) and shall implement the measures identified in the approved BRMIMP.

The final BRMIMP shall identify :

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

2. All biological resources Conditions of Certification identified in the Commission's Final Decision;
3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, if any, such as those provided in a USFWS Biological Opinion;
4. All biological resources mitigation, monitoring and compliance measures required in other state agency terms and conditions, if any, such as those provided in a CDFG Incidental Take Permit and Streambed Alteration Agreement, and in Regional Water Quality Control Board permits;
5. All biological resources mitigation, monitoring and compliance measures required in local agency permits, such as site grading and landscaping requirements;
6. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation and closure;
7. All required mitigation measures for each sensitive biological resource;
8. Required habitat compensation strategy, including provisions for acquisition, enhancement, and management for any temporary and permanent loss of sensitive biological resources;
9. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;
10. 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;
11. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities - one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography and a description of why times were chosen;
12. Duration for each type of monitoring and a description of monitoring methodologies and frequency;
13. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
14. All performance standards and remedial measures to be implemented if performance standards are not met;
15. A discussion of biological resources related facility closure measures;
16. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval; and
17. A copy of all biological resources permits obtained.

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

The CPM, in consultation with the USFWS and any other appropriate agencies, will determine the BRMIMP's acceptability within 45 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.

Any changes to the approved BRMIMP must also be approved by the CPM in consultation with the USFWS and appropriate agencies to ensure no conflicts exist.

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 site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.

U.S. Fish and Wildlife Consultation

BIO-6 The project owner shall provide final copies of all documents obtained as a result of formal consultation with the USFWS. The terms and conditions contained in any documents obtained from the USFWS shall be incorporated into the project's BRMIMP.

Verification: At least 60 days prior to initial commissioning activities, the project owner shall submit to the CPM copies of all documents obtained as the result of consultation with the U. S. Fish and Wildlife Service. To be included are copies of the Habitat Conservation Plan and Incidental Take Permit (per Section 10 of the federal Endangered Species Act).

Adaptive Management Plan

BIO-7 The project owner shall prepare an adaptive management plan that demonstrates how the habitat compensation acreage will be managed for the preservation and recovery of serpentine endemic species.

Verification: At least 60 days prior to initial commissioning activities, the project owner shall submit to the CPM a copy of the adaptive management plan to be reviewed and approved in consultation with staff and the USFWS. The approved adaptive management plan shall be incorporated into the project's BRMIMP.

Mitigation Measures

BIO-8 The project owner shall implement the mitigation measures listed below.

1. Provide wildlife escape ramps for construction areas that contain steep walled holes or trenches if outside of an approved, permanent exclusionary fence;
2. Inspect trenches each morning for entrapped animals prior to the beginning of construction. Construction will be allowed to begin only after trapped animals are able to escape voluntarily;
3. Inspect all construction pipes, culverts, or similar structures with a diameter of 4 inches or greater for sensitive species (such as burrowing owls) prior to pipe burial. Pipes to be left in trenches overnight will be capped;

4. Provide a post-construction compliance report, within 45 calendar days of completion of the project, to the Energy Commission CPM;
5. Report all inadvertent deaths of sensitive species to the appropriate project representative. Injured animals shall be reported to CDFG and the project owner shall follow instructions that are provided by CDFG.
6. Conduct pre-construction bird nest surveys. Upon discovery of any bird nests, the CPM will be notified as to appropriate action necessary.

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

Habitat Compensation

BIO-9 To compensate for impacts to serpentine habitats and associated endemic species, the project owner shall provide a minimum of 40 acres of land within critical habitat occupied by sensitive serpentine endemic species. The project owner shall calculate an appropriate endowment for management of the compensation habitat in perpetuity using the Center for Natural Lands Management Property Analysis Record (PAR). Also to be provided is the name of the entity that would manage and protect the land in perpetuity.

Verification: At least 60 days prior to initial commissioning activities, the project owner shall provide to the CPM for approval, in consultation with the USFWS, the name of the management entity and written verification that the compensation lands have been purchased and protected in perpetuity. The project owner shall also provide the PAR analysis and written verification that the appropriate endowment fund (determined by the PAR analysis) has been received by the approved management entity.

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CULTURAL RESOURCES

Testimony of Dorothy Torres

INTRODUCTION

The cultural resources section identifies potential impacts of the proposed Pico Power Project regarding cultural resources. Staff defines the term cultural resources to refer to anything created or affected by human beings. Cultural resources, as defined in law, include buildings, sites, structures, objects, and historic districts. Ordinarily, cultural resources over 45 years of age are considered for eligibility to the National Register of Historic Places (NRHP) or the California Register of Historic Resources (CRHR), but more recent cultural resources may be considered, if they appear exceptional, such as Cape Canaveral, for example. The primary purpose of the cultural resources analysis is to ensure that all potential impacts are identified, and that conditions of certification are set forth that ensure impacts are mitigated below a level of significance under the California Environmental Quality Act (CEQA).

Staff provides a cultural resources overview of the project, as well as an analysis based on CEQA criteria that assesses potential project related impacts. If cultural resources are identified, staff determines whether the project may affect any identified resources, and whether the resources are eligible for the CRHR or the National Register of Historic Places NRHP. If recommended as eligible to either register, the cultural resource is considered significant and staff recommends mitigation that ensures no significant impacts will occur. In addition, a project may affect a previously unidentified resource or an identified historical resource in an unanticipated manner. Staff therefore recommends procedures in the conditions of certification that mitigate these potential impacts.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

FEDERAL

- Federal Guidelines for Historic Preservation Projects (36 C.F.R. § 61): The US Secretary of the Interior has published a set of Standards and Guidelines for Archaeology and Historic Preservation. These are considered to be the appropriate professional methods and techniques for the preservation of archaeological and historic properties. The State Historic Preservation Office refers to these standards in its requirements for selection of qualified personnel and in the mitigation of potential impacts to cultural resources on public lands in California.
- Title 36, Code of Federal Regulations, Part 800 et seq, the implementing regulations of Section 106 of the National Historic Preservation Act, 16 U.S.C. § 470, requires federal agencies to take into account the effects of their undertakings on historic properties through consultations beginning at the early stages of project planning, or if unanticipated discoveries occur during activities conducted under a federal permit. The regulations implementing this act, which were revised in 1997, set forth procedures for determining eligibility of cultural resources, determining the effect of the undertaking on the historic properties, and how the effect will be taken into

account. The eligibility criteria and the process described in these regulations are used by federal agencies. Very similar criteria and procedures are used by the state in identifying cultural resources eligible for listing in the California Register of Historical Resources.

STATE

- Title 14, California Code of Regulations, 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 (CRHR), criteria for eligibility to the CRHR and defines eligible resources. It identifies any unauthorized removal or destruction of historic resources on sites located on public land as a misdemeanor. It also prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and establishes the penalty for possession of such artifacts with intent to sell or vandalize them as a felony. This section defines procedures for the notification of discovery of Native American artifacts or remains, and states that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated.
- The California Environmental Quality Act (Pub. Resources Code, §21000 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 effect on “unique” archaeological resources. If so, an EIR shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, the lead agency may require reasonable steps to preserve the resource in place. Otherwise, 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. The California Energy Commission process is a CEQA equivalent process and Staff Assessments serve as the CEQA environmental documents.
- 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.
- The CEQA Guidelines prescribe the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project’s impact on a historical resource (Cal. Code Reg, Tit.14, § 15126.4(b)). This section also 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.

- Section 15064.5 of the CEQA Guidelines 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.
- 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

City of Santa Clara

The City of Santa Clara General Plan, Section 2.8 Architecturally and Historically Significant Properties, considers the preservation of historic cultural resources in general and specifies that it incorporates by reference the List of Designated Architecturally and/or Historically Significant Properties (City 2002a, p. 66 to 68).

A letter to the applicant from Gloria Sciara, the City’s Historic Resources Coordinator, on July 18, 2002, provided information that the area is sensitive for archaeological resources. Staff also spoke with Gloria Sciara by telephone on January 14, 2003. Ms. Sciara confirmed that there were no additional General Plan Elements that addressed cultural resources (Sciara 2003a).

ENVIRONMENTAL SETTING

The proposed project site (2.86 acres) and associated linear routes for natural the gas and reclaimed water lines are located in the City of Santa Clara in Santa Clara County. The gas compressor station would be located on 0.26 acres of city property approximately 500 feet from the PPP site (SVP 2002a p. 1-1). The project area is at an approximate elevation of 32 feet above mean sea level (SVP 2002a, p. 8.4-1) within the northern end of the Santa Clara Valley, just south of San Francisco Bay. The project and gas compressor sites would rest on Holocence (11,000 years ago to the present) floodbasin deposits from the Guadalupe River and San Tomas Aquinas Creek. The Guadalupe River was a meandering stream that created a ecologically diverse flood plain, which allowed access to diverse food sources. "The inland-valley floor, especially along river terraces and marshlands, is a high sensitivity area for archaeological sites, and the project area lies within this zone" (SVP 2002a, p. 8.3-4).

The Pico Power Plant would be located in an established industrial belt. Structures in the immediate area of the plant include a self storage facility, several communications facilities and a substation (SVP 2002a p.8.6-2). The project site would be located in Township 6S, Range 1W, Section 26 or 27 (the United States Geological Survey (USGS) Milpitas 7.5-minute topographic quadrangle (SVP 2002a, p.2-1).

Refer to the **PROJECT DESCRIPTION** section of this Staff Assessment for additional information and maps of the project development region and the project area.

PREHISTORIC SETTING

Archaeological literature indicates that early residents of California typically lived near water sources that could provide them with access to a wide variety of plant and animal resources. The area of the Guadalupe River was a meandering river that created a diverse ecological environment. The environment around the San Francisco Bay and inland areas similar to the area of the Guadalupe River afforded a high density of reliable terrestrial food resources, supplemented by aquatic resources from the bay, rivers, creeks, and sloughs. Although traces of human occupation provide evidence for habitation in this area for at least 11,500 years, it is likely that rising seas and deposits of sediments in the area hide sites that date back approximately 15,000 years (SVP 2002a, p. 8.3-4).

ETHNOGRAPHIC BACKGROUND

The term Coastanoan refers to a language family that includes eight distinct languages. They are part of the Pentutian language stock. Native American descendents from the area prefer the term Ohlone rather than Coastanoan. The project site is located within historical Taymen (Tamien) territory. Ethnographic accounts indicate that fish and shellfish, as well as hunting and gathering, were an important part of the Ohlone diet. There is evidence that villages existed on the Western bank of the Guadalupe River (SVP 2002a, p. 8.3-5 to 8.3-8).

The Coastanoan speaking people lived in approximately 50 tribelets that consisted of one village and several temporary camps. Each village consisted of about 200 people. European contact occurred in 1772. Missions were established and included peoples of different linguistic and cultural backgrounds. The effects of military enforcement of mission rules and disease contributed to considerable decrease in the Ohlone population. In the 1830's and 1840's Americans and Mexicans secured land grants to land that was formerly Ohlone (SVP 2002a, p.83-5 to 8.3-8).

HISTORIC SETTING

Spanish missionaries began their exploration of California and development of the missions in 1769. Mission Santa Clara de Asis was established in the vicinity of the project in 1777. By 1834 much of the land in the project area was parceled out as land grants. The project area is within the area of "Rancho Ulistac," deeded to three Native Americans in May of 1845. The Rancho was ultimately divided into parcels and sold (SVP 2002a, p. 8.3-9).

The California Gold Rush brought immigrants to the area in the mid 1800's. They supplied food, hardware, and clothing to miners in the Sierra Nevada Mountains. In the late 1800's the area grew in agriculture and ranching. James Lick established noteworthy orchards and Abram Agnew produced a variety of agricultural crops in the 1870's. The South Pacific Coast Railroad was constructed in 1876 and the Agnews Insane Asylum was built in 1885 on property purchased from James Lick.

Agriculture was the main industry in the area until the mid 20th century. After 1950, residential housing, business and roads dominated the area. During the late 20th century, electronic companies arrived in the area resulting in the term "Silicon Valley" (SVP 2002a, p. 8.3-10).

RESOURCES INVENTORY

Literature and Records Search

The records search and literature review for the Pico Power Project site and linear routes were performed in May of 2002 at the Northwest Center of the California Historical Resources Information System (CHRIS). They searched for potential cultural resources within 1 mile of the project and 0.25 miles of the linears and gas compressor station. They also consulted available survey reports, the National Register of Historic Places, California Inventory of Historic Resources, California Points of Historic Interest, California Landmark files, Santa Clara Heritage Resource Inventor, City of Santa Clara's Historical Landmarks Commission web page and the City of Santa Clara Historical Resources list were reviewed to locate historic archaeological sites within the project area (SVP 2002a, p. 8.3-18). Previously recorded archaeological sites within 1 mile of the project site and 1/4 mile of the project linears are identified in Table 1.

Field Surveys

A pedestrian field survey of the project site, compressor station, natural gas pipeline route and gas metering station, waste water discharge pipeline and construction laydown areas were surveyed by the applicant on July 9, 2001. The project site was surveyed in 10-meter transects. Along the gas line route a pedestrian survey was conducted on the east side of Basset Street to Aldo Avenue and on the west side of Lafayette Street adjacent to railroad tracks. The entire area of the proposed gas compressor station was surveyed. Areas adjacent to the proposed wastewater discharge pipeline were surveyed because a portion of the route of the line was paved. Three of the four proposed locations for construction laydown and worker parking were surfaced lots. At the fourth, on the corner of Layfayette and Comstock streets, a foundation that may have been associated with a fire station built in 1953 was observed and recorded on a Department of Parks and Recreation (DPR) form 523 (SVP 2002a, p. 8.3-19).

The applicant surveyed the Area of Potential Effects (APE) of the project site, the compressor station, linear facilities, gas metering station, construction laydown areas, and one lot deep adjacent to the linear routes to identify potential historic architecture (SVP 2002a, p. 8.3-19). This survey was conducted by consultants to the applicant, JRP Consulting Services. The survey identified several potential historic resources. They identified Lafayette Street, the Union Pacific Railroad, a quonset structure at 800 Laurelwood road and four structures at the corner of Lafayette and Comstock Streets. Agnews State Hospital (nominated to the NRHP) was also identified as being of potential concern.

Cultural Resources Table 1: Cultural Resources Located Within 1 Mile of the Project Site or 0.25 Miles of Project Linears

Record Number or Potential Resource	Description	Identified via Records Search or PPP Survey
CA-SCL-702	Archaeological Site	Record Search
CA-SCL-311H	Historic Road	Record Search
CA-SCL-762	Archaeological Site	Record Search
CA-SCL-828	Archaeological Site	Record Search
CA-SCL-430	Archaeological Site	Record Search
P-43-000900	Peninsula Commute Service	Record Search
P-2975	Historic Foundation	Survey
City Maintenance Yard	4 Buildings, 1 Structure	Survey
Union Pacific Railroad	Historic Railroad Segment	Survey
Lafayette Street	Historic Hwy.	Survey
Quonset Hut	Historic Bldg.	Survey
Agnews Insane Asylum	Historic District	Record Search NRHP Listed
115 kV transmission line	Historic Transmission Line	Survey
PI-01	Amethyst Glass Fragment	Survey

Native American Contacts

The applicant contacted the Native American Heritage Commission (NAHC) to obtain a list of Native Americans to be contacted for the project area. The NAHC provided names of contacts for Santa Clara County. On June 17, 2002, the applicant sent letters to individuals and groups identified on the list. On December 2, 2002, the applicant sent a second letter that included a description of the location of the gas compressor station and the wastewater pipeline. As requested by Gloria Sciara, Cultural Resources Coordinator for the City of Santa Clara, Ohlone Family Consulting was also sent a letter. The letter asked Native Americans who were concerned about the project to contact Jenna Farrell, Cultural Resources Specialist at Foster Wheeler Environmental. As of January 8, 2003, Foster Wheeler Environmental had not received any responses.

On December 17, 2002, Energy Commission staff sent a letter to Native American individuals and groups identified by the NAHC in Santa Clara County. A letter was also sent to Ohlone Family Consulting. This letter identified the project and asked Native Americans who were concerned regarding project related construction disturbances in their area to contact staff. As of February 3, 2002, staff has not received a response from anyone.

CATEGORIZATION OF IDENTIFIED CULTURAL RESOURCES

Various laws apply to the treatment of cultural resources. These laws require the Energy Commission to categorize resources by determining whether they meet several sets of specified criteria. These categories then in turn influence the analysis of potential impacts to the cultural resources, and the methods and consultation required to mitigate any such impacts.

The record and literature search, and the pedestrian surveys of the proposed project area and linears, were conducted to identify the presence of any cultural resource sites or materials. Where resources were identified, an evaluation was conducted to determine whether the resources were already listed on, or were potentially eligible for listing on, either the National Register of Historic Places (NRHP) or the CRHR. The determination of eligibility is made in compliance with the criteria for the CRHR. A resource is eligible for listing if it: (1) is associated with events that have made a significant contribution to the broad patterns of local, regional, state or national history; (2) is associated with the lives of persons important in local, state or national history; (3) embodies distinctive characteristics of a type, period, region or method of construction, or represents the work of a master or possesses high artistic values; or (4) has yielded or may yield important information in history or prehistory (Cal. Code Regs., tit. 14, § 4852).

Cultural resources that meet the eligibility criteria for the CRHR are “historical resources.” The CEQA Guidelines explicitly require the lead agency (in this case, the Energy Commission) to make a determination of whether a proposed project will affect “historical resources.” The guidelines provide a definition for historical resources and set forth a listing of criteria for making this determination. These criteria are the eligibility criteria for the CRHR and are essentially the same as the eligibility criteria for the NRHP. In addition, as with the NRHP, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. Resources eligible for the CRHR may have less integrity than the resources eligible for the NRHP. If the criteria are met and the resource is determined eligible for the CRHR, the Energy Commission must evaluate whether the project would cause a “substantial adverse change in the significance of the historical resource,” which the CEQA Guidelines define as a significant effect on the environment. If there is federal involvement in the project, the lead federal agency will ensure compliance with section 106 of the National Historic Preservation Act. The lead federal agency will also determine the eligibility of applicable sites for the NRHP in consultation with the State Historic Preservation Officer (SHPO).

CEQA also addresses “unique” archeological resources and provides a definition of such resources (Pub. Resources Code, § 21083.2). This section establishes limitations on analysis and prohibits imposition of mitigation measures for impacts to archeological resources that are not unique. However, the CEQA Guidelines state that the limitations in this section do not apply when an archeological resource has already met the definition of a historical resource (Cal. Code Reg., tit. 14, §15064.5). Most archaeological sites qualify as historical resources under criterion (4), as listed above. Where staff has determined that the sites for which it is recommending mitigation meet

the definition of historical resources, the prohibition does not apply to the mitigation discussed in this staff assessment.

Energy Commission staff make recommendations regarding known resources located within or adjacent to the project footprint regarding whether they meet the eligibility criteria of the CRHR. If an impact is anticipated, staff recommends mitigation measures for historical resources.

The applicant has identified 14 cultural resources that are more than 45 years old and are within 1 mile of the PPP site or within 0.25 miles of the project linears.

The cultural resources include four archaeological sites and one isolate. Nine cultural resources that are historic built-environment resources were also identified. None of these potential cultural resources were identified within the proposed boundaries of the PPP. However, staff concludes that due to the presence of these sites in the vicinity of the project, some very near to the PPP footprint, caution is warranted during ground disturbance.

POTENTIAL IMPACTS

Since project development and construction entails surface and subsurface disturbance, the proposed PPP has the potential to adversely affect unknown cultural resources. Staff has analyzed the potential direct, indirect, and cumulative impacts from the proposed project. Direct impacts are those that may result from the immediate disturbance of resources, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation or demolition. Indirect impacts are those that may result from increased erosion due to site clearance and preparation, or from inadvertent damage or vandalism due to improved accessibility. Cumulative impacts to cultural resources may occur if increasing amounts of land are cleared and disturbed for the development of multiple projects in the same vicinity as the proposed project.

The potential for the project to cause impacts to cultural resources is related to the likelihood that such resources are present and whether they are actually encountered during project development and construction activities. Although the existence of known cultural resources increases the potential for additional resources, the absence of known resources does not necessarily mean that unknown resources will not be encountered and that impacts will therefore not occur.

There are four previously identified archaeological sites within 1 mile of the project or 0.25 miles of the linears (CA-SCL-702, CA-SCL-762, CA-SCL-828 and CA-SCL-430). CA-SCL-702 consisted of human burials and associated artifacts. CA-SCL-762 and CA-SCL-828 are prehistoric shell middens. CA-SCL-430 is a large site that includes prehistoric lithics and ground stone (SVP 2002b, site records). The archaeological inventories for the project site and linear components did not identify any archaeological sites within the project footprint. Therefore, there would not be an impact to known archaeological resources.

Agnews Insane Asylum is listed on the NRHP. However, it is approximately 1 mile away from the project site, with considerable industrial development between it and the

project. It is within 0.25 miles of the proposed gas line route, but there will not be an impact to Agnews Insane Asylum from either the project site or the underground gas line.

Site P-43-000900, Peninsula Commute Service, is built on the historic route of San Francisco and San Jose Railroad, which is one of the oldest railroad lines in California. The line is approximately 1 mile away from the project in an area that includes substantial industrial development. It does not appear that the project will impact this cultural resource (SVP 2002a, site record).

Another historic linear, Trimbel Road, has been recorded as CA-SCL-311H. It is unclear whether anything remains of the location of this historic roadbed. It is also approximately 1 mile away from the project, and there will not be an impact (SVP 2002a site record).

Lafayette Street will be subject to trenching. It was originally called the Santa Clara-Alviso Road and dated to the 1850's. At present it is a four-lane paved road. Since its original construction it has been subject to numerous improvements, and portions of the road were realigned to accommodate the construction of Highway 101 (SVP 2002a, site record). Additional disturbance would be a minor impact. Although not formally evaluated, it does not appear that Lafayette Street would be recommended eligible to the CRHR because it lacks integrity of setting, feeling and location. Although the project would physically impact Lafayette Street, it does not appear that there would be a significant impact to a significant cultural resource. No mitigation is required to mitigate impacts to Lafayette Street.

The Union Pacific Railroad was originally built as the Southern Pacific Railroad in the 1870's. The tracks were entirely replaced in 1992 (SVP 2002a, site record). The line will be crossed by the project at two locations. Although not formally evaluated, impacts would be mitigated by jack and bore drilling under the railroad tracks (SVP 2002a, p. 8.3-21).

A quonset hut, built in 1956, is located at the corner of Laurelwood Road and Lafayette Street. The underground gas line would not impact this potential historic resource (SVP 2002a, site record).

An historic foundation was recorded at 2975 Lafayette Street. It was recorded as the foundation of a small storage building built in the 1950's. The original building has been demolished and all that remains is the foundation (SVP 2002a, site record). Construction of the gas compressor station would not cause an impact on the foundation.

A segment of an existing 115kV transmission line would be undergrounded either on the project site or within an easement just outside the project boundary. It is the Newark-Kifer 115 kV Transmission Line, constructed in approximately 1920. Since this potential historic resource would be impacted by the project, staff asked the applicant to formally evaluate the transmission line. The evaluation was conducted by JRP Consulting Services. JRP concluded that the transmission line would not be recommended eligible to the NRHP or CRHR because it would not be eligible under criterion A, B, C or D. It

had also been subject to realignments and upgrades that contributed to a loss of historic integrity. Staff concurs with this assessment. Although this historic resource would be impacted by the project, it would not be a significant impact requiring mitigation because the resource is not recommended eligible to the CRHR, therefore no mitigation is required (Pico 2002c, Evaluation).

PI-01 is an amethyst glass fragment. It is identified as an isolate and does not appear to be associated with additional historic resources. Construction and operation of the proposed PPP would not cause an impact to this resource (SVP 2002b, site record).

The City Maintenance Yard at Layfayette and Comstock consists of four buildings built in approximately 1950, and two modern structures. Although the addition of the gas compressor station in the vicinity of 1950's buildings would be an impact, the modern structures have already compromised the setting of the buildings so the impact would not be significant. The AFC was not clear as to whether any of the buildings would be demolished. If the buildings would be demolished, they would need to be evaluated to determine whether their destruction would cause a significant impact. However, information provided by the applicant confirmed that no buildings would be demolished by construction of the gas compressor station (Grenier 2003).

It appears that there will not be any impacts to previously identified archaeological sites. However, the Historic Resources Coordinator of the City of Santa Clara, Gloria Sciara has asserted that the possibility of encountering historic and archaeological resources is extremely high (SVP 2002a, Letter to Jenna Farrell). The applicant states that the project area is highly sensitive for buried prehistoric and historic remains based on the topography, archival research, historic maps, and documentation. It is also in an area of high alluvial deposition. Staff concurs with these assessments of the potential to encounter archaeological material (SVP 2002, p.8.3-23).

Ms. Sciara also expressed the City's desire to be sensitive to Native American concerns. She strongly recommended Native American monitoring for the project. She suggested that the applicant contact the Muwekma Band of Ohlone. Staff agrees that a Native American monitor with traditional ties to the area should monitor during project related ground disturbance.

Since buildings at The City Maintenance Yard would not be demolished, there is no need to evaluate them for eligibility to the CRHR. Layfayette Street would be affected, but it does not appear to be a historical resource eligible to the CRHR. It is also possible to contend that trenching along a street that has been widened, paved and realigned is a fairly minor impact. Apart from the potential impacts to buildings at the City Maintenance Yard and Lafayette Street, the project would not impact any other previously identified historic resources.

CUMULATIVE IMPACTS

Most of the land surrounding the project has been subject to industrial development or is designated to be used for industrial development in the future. Mitigation measures such as recordation of potential historic resources and avoidance or excavation and data recovery of archaeological resources appear feasible. If these mitigation

measures are conducted by all of the development projects, the potential cumulative impacts will be mitigated below a level of significance.

IMPACTS OF FACILITY CLOSURE

The anticipated lifetime of the Pico Power Project is approximately 30 years. Upgrades or modifications may be made prior to the facility's closure that might extend the life of the plant. Closure would be caused by either (1) a natural or manmade disaster or economic difficulty, or (2) planned orderly closure that will occur when the plant becomes economically non-competitive.

Planned Closure

At the time of planned closure, all then-applicable LORS will be identified and the closure plan required by the Energy Commission will address compliance with these LORS as discussed in the General Conditions section of this SA. Generally, if no additional ground disturbance occurs during closure activities and all conditions of certification have been met, no impacts to cultural resources would be expected. However, actual potential impacts are likely to depend upon the final location of project structures in relation to existing resources, and upon the procedures used for the removal of project structures. Since no impacts to cultural resources were identified, no impacts due to planned closure are expected. Should cultural resources be discovered, the closure plan, when created, will address impacts to cultural resources.

Temporary Closure

A temporary closure should have no impacts on cultural resources as long as no additional lands are needed for the closure. A contingency plan for temporary cessation of operation would be implemented that would ensure compliance with all applicable LORS as discussed in the General Conditions section of this FSA.

Unexpected Permanent Closure

If a site were abandoned, impact to cultural resources would be unlikely because there would be no immediate soil disturbances. Over time, depending on the need to disturb the ground to accomplish project closure and facility removal, some disturbance previously unknown cultural resources might result.

COMPLIANCE WITH APPLICABLE LORS

Implementation of the mitigation measures recommended in the conditions of certification will ensure compliance with state and local LORS.

MITIGATION

For cultural resources, the preferred method of mitigation is for project construction to avoid areas where cultural resources are known to exist, wherever possible. Often, however, avoidance cannot be achieved, or previously unknown cultural resources are encountered, and other measures such as surface collection, subsurface testing, and data recovery must be implemented for archaeological resources, and documentation

must be implemented for historical structures. Mitigation measures are developed to reduce the potential for adverse project impacts on cultural resources to a less than significant level.

APPLICANT'S PROPOSED MITIGATION

The applicant has proposed the following mitigation measures:

- **Preconstruction Assessment and Construction Training**
  A Cultural Resource Specialist should visit the project site to become familiar with the site conditions. The Cultural Resource Specialist would also conduct a worker training session.
- **Construction Monitoring**
  The project owner would conduct monitoring to mitigate for previously unidentified buried archaeological deposits.
- **Emergency Discovery**
  The project owner would also establish procedures in the event there are unanticipated discoveries of archaeological material or human remains.
- **Site Recording and Evaluation**
  Cultural Resources would be recorded on a Department of Parks and Recreation (DPR) form 523. The Cultural Resources Specialist would determine the significance of unanticipated discoveries
- **Mitigation Planning**
  If an unanticipated discovery is determined to be significant, the Cultural Resources Specialist would prepare and carry out a mitigation plan. The plan will emphasize avoidance.
- **Curation**
  The Cultural Resources Specialist would arrange for curation of archaeological materials collected during the monitoring and mitigation program.
- **Report of Findings**
  If buried archaeological materials are discovered the cultural resources specialist would prepare a report summarizing the monitoring and archaeological investigatory program.
- **Cultural Resource Specialist and Monitor Qualifications**
  Recommendations for qualifications are provided.

STAFF'S PROPOSED MITIGATION MEASURES

Because of the previously recorded archaeological sites in the project area, Commission staff recommends monitoring by an archaeologist and Native American monitor during ground disturbing activities during ground disturbance for the entire project. The recommended conditions of certification will ensure mitigation for potential impacts. In summary, **CUL-1** ensures that qualified specialists and monitors are obtained to conduct cultural resources activities at the project site. **CUL-2** provides the specialist with maps and drawings to enable timely planning and appropriate direction to cultural resources personnel. **CUL-3** requires preparation of a Cultural Resources Monitoring and Mitigation Plan (CRMMP) by the Cultural Resource Specialist (CRS).

The CRMMP is a document that explains to staff how the CRS will comply with the conditions of certification. It is intended to be a working document that may be changed or amended as the project progresses.

Condition **CUL-4** requires the preparation of a Cultural Resources Report (CRR) at the conclusion of the project. This document is intended to provide Energy Commission staff, the CHRIS, and the SHPO with a summary of cultural resources activities conducted as a result of the project. When archaeologists or historians obtain information from the CHRIS they sign an agreement that they will provide information in return. It is important to identify areas for the CHRIS where surveys or ground disturbance occurred and no cultural resources were found, as well as documenting discoveries.

Condition **CUL-5** provides for worker environmental training. The training serves to instruct workers that halting construction is necessary if a potential cultural resource is discovered. It also provides them with instruction regarding applicable laws, penalties and reporting requirements in the event something is discovered. Workers are also instructed that the CRS and other cultural resources personnel have the authority to halt construction in the event of a discovery.

Condition **CUL-6** ensures that cultural resources monitoring activities are conducted in a manner that will record cultural resources activities in a professional manner. Archaeological monitoring is recommended on this project because archaeological sites in the vicinity of the project raise concerns regarding the potential for encountering sites within the PPP footprint and along the project linears. **CUL-6** also ensures that unanticipated impacts to cultural resources are identified and any incidences of non-compliance with the conditions of certification are recognized, reported and compliance ensured in a timely manner.

Condition **CUL-7** ensures the project owner grants authority to halt construction to the cultural resource specialist, the alternate cultural resource specialist and cultural resource monitor(s) if there is a cultural resources find or if a previously identified cultural resource would be impacted in a previously unanticipated manner. It also requires notification of staff within 24 hours of a cultural resources find. Timely notification enables staff participation in determinations of significance, and the selection of appropriate mitigation to lessen impacts on cultural resources to a less than significant level.

CONCLUSIONS AND RECOMMENDATION

Although construction and operation of the PPP would not create an impact to known archaeological resources, the presence of previously recorded archaeological sites indicate any ground disturbance conducted as part of the project may cause an impact to buried historic and prehistoric archaeological resources. If the following conditions of certification are properly implemented, the project will comply with applicable laws, ordinances, regulations, and standards, and impacts will be reduced below a significant level.

Staff recommends that the Commission adopt the following proposed conditions of certification, which incorporate the mitigation measures discussed above.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance, the project owner shall obtain the services of a Cultural Resources Specialist (CRS), and one or more alternates, if alternates are needed, to manage all monitoring, mitigation and curation activities. The CRS may elect to obtain the services of Cultural Resource Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation and curation activities. The project owner shall ensure that the CRS evaluates any cultural resources that are newly discovered or that may be affected in an unanticipated manner for eligibility to the California Register of Historic Resources (CRHR). No ground disturbance shall occur prior to CPM approval of the CRS, unless specifically approved by the CPM.

CULTURAL RESOURCES SPECIALIST
The resume for the CRS and alternate(s) shall include information demonstrating 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:

1. The technical specialty of the CRS shall be appropriate to the needs of the project and shall include, a background in anthropology, archaeology, history, architectural history or a related field; and
2. At least three years of archaeological or historic, as appropriate, resource mitigation and field experience in California.

The resume of the CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS on referenced projects, and demonstrate that the CRS has the appropriate education and experience to accomplish the cultural resource tasks that must be addressed during ground disturbance, grading, construction and operation. In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the Compliance Project Manager (CPM), that the proposed CRS or alternate has the appropriate training and background to effectively implement the conditions of certification.

CULTURAL RESOURCES MONITOR
CRMs shall have the following qualifications:

1. a BS or BA degree in anthropology, archaeology, historic archaeology or a related field and one year experience monitoring in California; or
2. an AS or AA degree in anthropology, archaeology, historic archaeology or a related field and four years experience monitoring in California; or
3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historic archaeology or a related field and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS
The resume(s) of any additional technical specialists, e.g. historic archeologist, historian, architectural historian, physical anthropologist; shall be submitted to the CPM for approval.

Verification: The project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval at least 45 days prior to the start of ground disturbance.

At least 10 days prior to a 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.

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 of the CRM, at least five days prior to the CRM beginning on-site duties. At least 10 days prior to beginning tasks, the resume(s) of any additional technical specialists shall be provided to the CPM for review and approval.

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.

CUL-2 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 shall 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 review submittals and in consultation with the CRS approve those that are appropriate for use in cultural resources planning activities.

If construction of the project would proceed in phases, maps and drawings, not previously provided, shall be submitted prior to the start of each phase. Written notification identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

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

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless specifically approved by the CPM.

Verification: The project owner shall submit the subject maps and drawings at least 40 days prior to the start of ground disturbance. The CPM will review submittals in

consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

If there are changes to any project related footprint, revised maps and drawings shall be provided at least 15 days prior to start of ground disturbance for those changes.

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

A current schedule of anticipated project activity shall be provided to the CRS on a weekly basis during ground disturbance and also provided in each Monthly Compliance Report (MCR).

The project owner shall provide written notice of any changes to scheduling of construction phases within five days of identifying the changes.

CUL- 3 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 approval. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Copies of the CRMMP shall reside with the CRS, alternate CRS, each monitor, and the project owner's on-site manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures.

1. A proposed general research design that includes a discussion of 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.
2. The following statement shall be added to 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.)"
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, 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 would be implemented prior to the start of construction and how long they would be needed to protect the resources from project-related effects.
7. A discussion of the requirement that all cultural resources encountered shall 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 (survey, testing, data recovery) 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 shall be met. If archaeological materials are to be curated, the name and phone number of the contact person at the institution. This shall include information indicating that the project owner will pay all curation fees and state 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 designated specialist'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 (CRR) which shall be prepared according to Archaeological Resource Management Report (ARMR) Guidelines.

Verification: The project owner shall submit the subject CRMMP at least 30 days prior to the start of ground disturbance. Per ARMR Guidelines the author's name shall appear on the title page of the CRMMP. Ground disturbance activities may not commence until the CRMMP is approved, unless specifically approved by the CPM. A letter shall be provided to the CPM indicating that the project owner would pay curation fees for any materials collected as a result of the archaeological investigations (survey, testing, data recovery).

CUL-4 The project owner shall submit the Cultural Resources Report (CRR) to the CPM for approval. The CRR shall be written by the CRS and shall be provided in the ARMR format. The CRR shall report on all field activities including dates,

times and locations, findings, samplings and analysis. All survey reports, Department of Parks and Recreation (DPR) 523 forms and additional research reports not previously submitted to the California Historic Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as an appendix to the CRR.

Verification: 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 SHPO, the CHRIS and the curating institution (if archaeological materials were collected).

CUL-5 Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment. The training may be presented in the form of a video. The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;
3. Information that the CRS, alternate CRS, and CRMs have the authority to halt construction to the degree necessary, as determined by the CRS, in the event of a discovery or unanticipated impact to a cultural resource;
4. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery, and shall contact their supervisor and the CRS or CRM; and that redirection of work would be determined by the construction supervisor and the CRS;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. An acknowledgement form signed by each worker indicating that they have received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No ground disturbance shall occur prior to implementation of the WEAP program, unless specifically approved by the CPM.

Verification: 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.

CUL-6 The project owner shall ensure that the CRS, alternate CRS, or CRMs shall monitor ground disturbance full time in the vicinity of the project site, linears and ground disturbance at laydown areas or other ancillary areas to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner. In the event that the CRS determines that full-time monitoring is not necessary in certain locations, a letter or e-mail providing a detailed justification for the decision to reduce the

level of monitoring shall be provided to the CPM for review and approval prior to any reduction in monitoring.

CRMs 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.

The CRS and the project owner shall notify the CPM by telephone or e-mail of any incidents of non-compliance with the conditions of certification and/or applicable LORS upon becoming aware of the situation. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the conditions of certification.

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these conditions of certification.

A Native American monitor shall be obtained, to monitor ground disturbance in areas where Native American artifacts may be discovered. Informational lists of concerned Native Americans and Guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored. The Muwekma Ohlone Tribe meets this requirement.

Verification: During the ground disturbance phases of the project, if the CRS wishes to reduce the level of monitoring occurring at the project, a letter or e-mail 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. Documentation justifying a reduced level of monitoring shall be submitted to the CPM at least 24 hours prior to the date of planned reduction in monitoring.

During the ground disturbance phases of the project, the project owner shall include in the MCR to the CPM copies of the weekly summary reports prepared by the CRS regarding project-related cultural resources monitoring. Copies of daily logs shall be retained and made available for audit by the CPM.

Within 24 hours of recognition of a non-compliance issue with the conditions of certification and/or applicable LORS, the CRS and the project owner shall notify the CPM by telephone of the problem and of steps being taken to resolve the problem. The telephone call shall be followed by an e-mail or fax detailing the non-compliance issue and the measures necessary to achieve resolution of the issue. Daily logs shall include forms detailing any instances of non-compliance. In the event of any non-compliance issue, a report written no sooner than two weeks after resolution of the issue that describes the issue, resolution of the issue and the effectiveness or 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 artifacts, the project owner shall send notification to the CPM identifying the person(s) retained to conduct Native American monitoring. The project owner shall also provide a plan identifying the proposed monitoring schedule and information explaining how Native Americans who wish to provide comments will be allowed to comment. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor.

CUL-7 The project owner shall grant authority to halt construction to the CRS, alternate CRS and the CRMs in the event previously unknown cultural resource sites or materials are encountered, or if known resources may be impacted in a previously unanticipated manner (discovery). Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event cultural resources are found or impacts can be anticipated, the halting or redirection of construction shall remain in effect until all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the discovery (or changes in character or attributes), the action taken (i.e. work stoppage or redirection), a recommendation of eligibility and recommendations for mitigation of any cultural resources discoveries whether or not a determination of significance has been made;
2. The CRS, the project owner, and the CPM have conferred and determined what, if any, data recovery or other mitigation is needed; and
3. Any necessary data recovery and mitigation has been completed.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS and CRMs have the authority to halt construction activities in the vicinity of a cultural resource discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.

REFERENCES

City (City of Santa Clara) City of Santa Clara General Plan 1990-2005. 2002a. Available on City of Santa Clara Web Site.

Sciara, Gloria. Planner, City of Santa Clara. 2003a. Personal Conversation January 14, 2003.

SVP (Silicon Valley Power) 2002a. Application for Certification for the Pico Power Project, Vol and Vol II, No. 2-AFC-3. Submitted to the California Energy Commission, October 7, 2002.

SVP (Silicon Valley Power) 2002b. Confidential Cultural Resources Filing. Docketed October 10, 2002.

SVP (Silicon Valley Power) 2002c. Response to Data Requests 1 through 65. Docketed December 23, 2002.

Grenier (Andrea Grenier, Applicant Environmental Project Manager) 2003. Personal conversation between Matt Trask, CEC Siting Program Project Manager, and Andrea Grenier, Environmental Project Manager for SVP.

HAZARDOUS MATERIALS

Testimony of Geoff Lesh and Rick Tyler

INTRODUCTION

The purpose of this analysis is to determine if construction and operation of the proposed Pico Power Project (PPP) would result in the potential for a significant impact 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, in exchange for compensation, accept a higher level of risk than would be acceptable for general public exposure. Workers are therefore 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 (see the Worker Safety and Fire Protection section of the document).

The only hazardous material proposed for use at the PPP in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j), is aqueous ammonia. The choice to use aqueous ammonia significantly reduces the risk that would 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. Analysis of the potential for impact associated with aqueous ammonia deliveries is addressed in the Traffic and Transportation section of this document.

Other hazardous materials stored in smaller quantities, such as mineral and lubricating oils, corrosion inhibitors and water conditioners, would be present at the proposed facility. However, these materials pose no significant potential for off-site impacts because of the relatively low quantities on site, their relatively low toxicity, and/or their low environmental mobility. Although no natural gas is stored, the project also involves the construction and operation of short natural gas pipeline connections and handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials management, both for the proposed power plant site and the proposed off-site gas pipeline that would be constructed as part of the project. Staff's analysis examines the project's compliance with these requirements.

Power Plant Site

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 that store, handle, or produce significant quantities of extremely hazardous materials. The CAA section on Risk Management Plans - codified in 42 USC §112(r) - requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531 et seq

STATE

The California Accidental Release Prevention Program (Cal-ARP) - Health and Safety Code, section 25531 - 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).

Section 25503.5 of the California Health and Safety Code requires facilities that store or use hazardous materials to prepare and file a Business Plan with the local Certified Unified Program Authority (CUPA), in this case the Santa Clara County Health Department, Division of Environmental Health. This Business Plan must contain information on the business activity, the owner, a hazardous materials inventory, facility maps, an Emergency Response Contingency Plan, an Employee Training Plan, and other record-keeping forms.

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 anhydrous ammonia. These sections generally codify the requirements of several industry codes, including the American Society of Mechanical Engineers (ASME) Pressure Vessel Code, American National Standards Institute (ANSI) K61.1, and the National Boiler and Pressure Vessel Inspection Code. While

these codes apply to anhydrous ammonia, 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.”

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 adapted 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 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 **Geology, Mineral Resources and Paleontology** section of this document.

If not for Energy Commission jurisdiction, the Santa Clara City Fire Department would be the issuing agency for the Consolidated Hazardous Materials Permit. The permit review and mitigation authority covers hazardous materials, hazardous waste, compressed gases and tiered treatment, the Hazardous Materials Business Plan, and the Risk Management Plan for anhydrous ammonia. In regards to seismic safety issues, the site is located in Seismic Risk Zone 3. Construction and design of buildings and vessels storing hazardous materials must conform to the 1997 Uniform Building Code, the 1998 California Building Code, and the Santa Clara County Building Code.

Gas Pipeline

FEDERAL

The natural gas pipeline must be constructed and operated in accordance with the Federal Department of Transportation (DOT) regulations, Title 49, Code of Federal Regulations, sections 190, 191, and 192: The pipeline classes are defined as follows (Title 49, Code of Federal Regulations, Part 192):

A Class Location Unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline.

- Class 1: Pipelines in class location units with 10 or fewer buildings intended for human occupancy.
- Class 2: Pipelines in class location units 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 class location units 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).
- Class 4: Pipelines in class location units where buildings with 4 or more stories above ground are prevalent.

Other Federal LORS that apply to the planned natural gas pipeline include:

- Title 49, Code of Federal Regulations, section 190, outlines the pipeline safety program procedures.
- Title 49, Code of Federal Regulations, section 191, Transportation of Natural and Other Gas by Pipeline; Annual Reports, Incident Reports, and Safety-Related Condition Reports, 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, section 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, specifies minimum safety requirements for pipelines and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use, which characterize the surrounding land. This section contains regulations governing pipeline construction, which must be followed for Class 2 and Class 3 pipelines.

LOCAL AND REGIONAL

The safety requirements for pipeline construction vary according to the population density and land use, which characterize the surrounding land. The natural gas pipeline constructed for the PPP would be designed for Class 3 service and must meet California Public Utilities Commission General Order 112-D and 58-A standards, as well as various PG&E standards.

SETTING

SITE AND VICINITY DESCRIPTION

The City of Santa Clara proposes to design, construct, and operate the PPP within a portion of the City of Santa Clara, Santa Clara County, California. The proposed PPP site is located on approximately 2.86 acres at 850 Duane Avenue in the City of Santa Clara. A gas compressor station for the project would be located on the city of Santa Clara's maintenance yard, a 0.26-acre parcel at the corner of Lafayette and Comstock Streets in Santa Clara.

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 level of public exposure to such materials and the associated health risks. When wind speeds are low and 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 of the AFC (Silicon Valley Power, 2002, AFC). This data indicates that wind speeds below one meter per second and temperatures exceeding 100º F can occur in the project area. Therefore, staff suggested that the applicant use F stability (stagnated air, very little mixing), one meter/second wind speed and an ambient temperature of 100º F in its modeling analysis of an accidental release to reflect worst case atmospheric conditions. These conditions were reflected in the modeling used to estimate the potential worst case impacts associated with an accidental ammonia release.

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 affect high elevations before affecting lower elevations. The principal risk of accidental release at this facility is associated with aqueous ammonia. However, modeling of an accidental release of aqueous ammonia indicates that significant concentrations would be confined to the facility property. Thus, elevated terrain is not an important factor affecting the modeled results.

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 (Calabrese 1978). Also, the location of the population in the area surrounding a project site may have a large bearing on health risk. The nearest sensitive receptor location is about 0.50 miles from the proposed facility and the nearest residence is 0.39 miles from the facility (Silicon Valley Power, 2002).

IMPACTS

Public safety concerns may arise from the construction and operation of a proposed project, especially with respect to the handling, transportation, and storage of hazardous materials. Therefore, the Commission examines each power plant proposal to determine if the facility is designed to ensure the safe handling and storage of these

materials. (Related issues are also addressed in the Waste Management, Worker Safety, and Traffic and Transportation portions of this Preliminary Staff Assessment).

A variety of hazardous materials are proposed for storage and use during the construction of the PPP and for routine plant operation and maintenance. All hazardous materials to be used during operation of the facility are listed in the AFC in Tables 8.12-2. Most of the hazardous materials that will be present at the proposed facility, such as corrosion inhibitors and water conditioners, will be stored in relatively small quantities . However, these materials pose no significant potential for off-site impacts as a result of the relatively low quantities on-site, their relatively low toxicity, and/or their low environmental mobility. Large quantities of aqueous ammonia (19 percent solution), sulfuric acid, sodium hypochlorite, lubricating and mineral oils would be stored on-site. Of these, only aqueous ammonia has sufficient vapor pressure to potentially cause off-site impacts. Although no natural gas is stored, the project will also involve the construction and operation of a natural gas pipeline, and handling of large amounts of natural gas. The hazard characteristics of ammonia and natural gas and their proposed use during the operation of the plant pose the principle risk of off-site impacts. The potential threats from the other hazardous materials are not significant. In order to ensure the lack of potential for an off-site impact from these other hazardous materials, the applicant will be restricted to the use, strength, and quantity of the hazardous materials identified in the AFC (see Condition of Certification **HAZ-1**).

Additionally, the accidental mixing of sodium hypochlorite with acids or aqueous ammonia could result in toxic gases. Given the large volumes of both aqueous ammonia (10,000 gallons) and sodium hypochlorite (400 gallons) proposed for storage at this facility, the potential 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 a Safety Management Plan for delivery of aqueous ammonia (see condition of certification **HAZ-3**).

Approximately 2,000 gallons of 93 percent sulfuric acid would be used and stored on-site. This material does not pose a risk of off-site impacts, because it has 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 (see **HAZ-6**) will require the project owner to ensure that no combustible or flammable material is stored, used, or transported within 100 feet of the sulfuric acid tank.

Energy Commission staff has determined that aqueous ammonia and natural gas are the only hazardous materials to be handled that pose a risk of off-site impacts. The following is a project specific analysis of the potential impacts associated with the handling of each of these materials.

AQUEOUS AMMONIA

Selective Catalytic Reduction (SCR) is proposed to reduce emissions of oxides of nitrogen (NO_x) to meet the plant's air quality permit requirements. Aqueous ammonia reacts with a catalyst to convert NO_x into inert water vapor and nitrogen in the SCR process. The aqueous ammonia proposed for use is a solution of 19 percent ammonia and 81 percent water. Use of aqueous ammonia significantly reduces the risks that would otherwise be associated with use of the more hazardous anhydrous form of ammonia. The aqueous form eliminates the high internal energy associated with the more lethal anhydrous form, which is stored as a liquefied gas at elevated pressure. Spills associated with the aqueous form are also much easier to contain than those associated with the anhydrous form. In addition, relatively slow mass transfer from the free surface of the spilled aqueous solution limits emissions from a spill of aqueous ammonia. Indeed, evaporation of ammonia from a 19 percent solution is so slow, and thus presents a very small risk to off-site receptors, that aqueous solutions of ammonia concentrations less than 20 percent are exempt from the US EPA RMP regulation and the Cal-ARP regulation (under certain specified conditions). Thus, an RMP may not be required by LORS. Nevertheless, the Applicant conducted an Offsite Consequence Analysis (AFC section 8.5-B) and found no significant risk would be posed to the public due to a worst-case catastrophic release of 9,000 gallons of 19 percent aqueous ammonia. Because the facility will store no more than 10,000 gallons of a 19 percent solution, staff concurs with the applicant's analysis and conclusions.

Aqueous ammonia is typically transported and handled safely and without incident. However mishandling can result in impacts on public health, particularly during transfer from a delivery vehicle to a storage tank. It is during this transfer operation that the greatest risk of an accidental spill and release could occur. An RMP for the proposed aqueous ammonia storage tank and delivery vehicle transfer pad will be prepared (if required by the Cal-ARP regulations) and submitted to the US EPA and the Energy Commission Compliance Project Manager (CPM) for review and approval, and to the Santa Clara Fire Department for review and comment. A Hazardous Materials Business Plan will be prepared and submitted to the Energy Commission CPM and the City of Santa Clara Fire Department (see proposed Condition of Certification **HAZ-2**). The results of the off-site consequence analysis (AFC section 8.5-B) showed no significant impacts off-site. A significant number of modern power plants routinely use aqueous ammonia, and the California Energy Commission has licensed many such plants. Much of the risks associated with ammonia use are already reduced through PPP's proposed use of the aqueous form of ammonia and the use of engineering controls such as enclosure of the tank within a secondary containment structure.

However, the Alternate Case Modeling shows that an accidental aqueous ammonia spill of as little as 8 gallons can result in airborne concentrations of ammonia exceeding 75 ppm at the PPP fenceline. Moreover, it is more likely that a spill would occur during delivery of ammonia than from a failure of the storage tank. Therefore, Staff proposes that the delivery area be protected by a secondary containment tank under the truck unloading pad capable of containing an entire truck-tank volume of aqueous ammonia plus a quantity of wash water. The aqueous ammonia pump system would have a spill-containment drain to this tank as well (see proposed Condition of Certification **HAZ-5**).

The transportation of hazardous materials including aqueous ammonia, particularly on California freeways, is routinely regulated and controlled by various federal and state laws, ordinances, regulations, and standards as discussed in the **Traffic and Transportation** section of this document. A number of transportation accident studies support the fact that such incidents and corresponding incident rates are highly dependent on the type of roadway and surroundings. It has been reported that the truck accident frequency is highest for an undivided multilane road at 5.44 accidents per million miles, compared to 0.93 accidents per million miles for a freeway in rural California (Davies et al. 1992). Similarly, the accident rate in urban California is highest for a multilane that is undivided at 13.02 accidents per million miles, compared to 1.59 accidents per million miles on a freeway. A recent study went further by concluding that releases of hazardous materials on freeways rarely play a role in deaths or injuries (FMCSA, 2000). It is therefore reasonable to say that the likelihood of an accident involving a release of ammonia is probably higher on the local roads than on the freeways. This is supported by a report that observed that accident rates are typically much higher for two-lane rural roads compared to multi-lane highways (USDOT 1998).

Staff has evaluated the proposed route to be used for shipment of hazardous materials to the facility and concludes that the risk of significant, adverse health and safety impacts to the public from transportation of aqueous ammonia is not significant. The exact transportation route will not be determined until the shipper contacts the CHP and applies for a license. The **Traffic and Transportation** section suggests a route based upon analysis of patterns and LORS. The facility is located near U.S. Highway 101 (US 101), and Interstate 880 (I-880). These are multi-lane freeways;therefore it is very unlikely that a serious release would occur while transporting hazardous materials. To ensure against significant health and safety impacts to the public, Staff has proposed Conditions of Certification **HAZ-7** and **HAZ-8** addressing transportation of aqueous ammonia and other hazardous materials.

Staff therefore concludes that any potential adverse impacts from the transport of aqueous ammonia can be easily limited to a level of insignificance through the Applicant's conformance to applicable standards and laws, reinforced by staff's proposed mitigation.

NATURAL GAS

The primary fuel source for the proposed project is natural gas. Natural gas poses a fire and/or explosion risk as a result of its flammability. The risk of a fire and/or explosion from these gases can be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. The National Fire Protection Association (NFPA) Code 85A requires: 1) the use of double block and bleed valves for gas shut-off; 2) automated combustion controls; and 3) burner management systems (NFPA 1987). These measures will significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures will require air purging of the gas turbines prior to start-up, thus precluding the presence of an explosive mixture.

As proposed, a new 12-inch diameter pipeline, 3 miles in length, will be placed underground. The gas pipeline will connect to existing PG&E gas distribution Line 132.

The pipeline will start at a gas-metering site, proceed easterly beneath the Union Pacific Railroad (UPRR) tracks and south down Lafayette Street. The centerline of the pipeline will be approximately 12 feet east of the western curb line (i.e., the pipeline will be located in the outside southbound lane of Lafayette Street). The alignment will proceed south on Lafayette Street to the intersection of Lafayette Street and Aldo Street. The pipeline will then proceed to the west across the UPRR tracks and south on Bassett Street. The railroad crossing will be by bored-and-jacked casing. At Bassett Street and Laurelwood Road, the pipeline will cross under Highway 101 through a bored-and-jacked casing. The casing will extend from Laurelwood Road to Duane Avenue. The pipeline will then proceed south to the Pico Power Plant site and cross Lafayette Street to the gas compressor station. In the vicinity of the Pico Power Plant, a lateral pipeline will branch off to feed the duct burners. A 500-foot compressed gas pipeline will proceed from the compressor station to the Pico Power Plant. It is anticipated that the three pipeline crossings of Lafayette Street will be constructed in the same trench. The design of the natural gas pipeline is governed by laws and regulations that require use of and inspection with high quality arc welding techniques by certified welders[1].

The Applicant is required to design, construct, and operate PPP's 12-inch diameter natural gas pipeline in accordance with Title 49, Code Of Federal Regulations, Part 192 (49 CFRI92) and the California Public Utility Commission's General Order (G.O.) 112-E. Specifically, the pipeline will be designed in accordance with the standards required for gas pipelines in proximity to populated areas, based on actual population densities along the proposed pipeline route. The pipeline will be tested and designed for the appropriate pressure. 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 near the pipeline route. Staff has concluded however, that the probability of such an event is extremely low if the pipeline is constructed according to present standards.

According to Department of Transportation (DOT) statistics, the frequency of gas line 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). 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.

[1] Many failures of older natural gas lines have been associated with poor quality gas welds, and corrosion. Current codes address these issues 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 issue by requiring clear pipeline route marking. Existing codes also address seismic hazard in design criteria. Evaluations of pipeline performance in recent earthquakes demonstrate that pipelines designed to modern codes perform well in seismic events while older lines frequently fail.

Outside force 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[2]. 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.

Thus, the following safety features will be incorporated into the design and operation of PPP's natural gas pipeline:

(1) Butt welds will be X-rayed and the pipeline will be pressure-tested with water prior to the introduction of natural gas into the line;

(2) The pipeline will be surveyed for leakage annually;

(3) The pipeline will be marked to prevent rupture by heavy equipment excavating in the area; and

(4) Valves at the meter will be installed to isolate the line if a leak occurs (see Conditions of Certification **HAZ-9, 10 and 11**.)

CUMULATIVE IMPACTS

Although the presence of the PPP will increase the amounts of hazardous materials in the local project area, the quantities present and mitigating measures proposed will result in no expected significant cumulative impacts.

MITIGATION

Staff has determined that the proposed mitigation for the PPP is adequate to reduce the potential risk of public health impacts associated with accidental hazardous materials accidents to insignificant levels. However, staff proposes a condition requiring development of a safety management plan for delivery of aqueous ammonia, though the PPP is not required to develop and implement a Process Safety Plan pursuant to Title 8. 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 associated with the project.

[2] As seen in the October 1989 Loma Prieta earthquake affecting the Marina District of San Francisco, and the January 1995 quake in Kobe, Japan.

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, Santa Clara County Department of Health, 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).

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSION

Staff's evaluation of the proposed project (with staff's proposed mitigation measures) indicates that hazardous materials use will pose no 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 may be required to develop an RMP. The RMP, if required by the Santa Clara County Department of Health, will be submitted to EPA, the Santa Clara County Department of Health, and Energy Commission staff for evaluation. To insure adequacy of the RMP, staff's proposed conditions of certification require that the RMP, if required, be submitted for concurrent review by EPA, the Santa Clara County department of Health, and Energy Commission Staff. In addition, Staff's proposed conditions of certification also require Santa Clara County s acceptance of the RMP and Staff's approval of the RMP prior to delivery of any hazardous materials to the facility. With adoption of staff's proposed conditions of certification, the project will also comply with Health and Safety Code, section 41700, and it will not pose any potential for significant impacts to the public from hazardous materials releases.

RECOMMENDATION

Staff recommends the Energy Commission impose the proposed conditions of ceritification, 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 any quantity or strength not listed in AFC Table 8.5-3 unless approved in advance by the Compliance Project Manager (CPM).

Verification: The project owner shall provide to the CPM, in the Annual Compliance Report, a list of hazardous materials contained at the facility in reportable quantities.

HAZ-2 The project owner shall provide a Risk Management Plan RMP (if required by regulation) to the Certified Unified Program Authority (CUPA) and the CPM for review at the time the RMP is first submitted to the U.S. Environmental Protection Agency (EPA). A Hazardous Materials Business Plan (HMBP, which shall include the proposed building chemical inventory as per the UFC) shall also be submitted to the CUPA for review and to the CPM for review and approval prior to construction of hazardous materials storage and containment structures. The project owner shall include all recommendations of the CUPA and the CPM in the final HMBP. A copy of the final RMP, including all comments, shall be provided to the CUPA and the CPM once it gets EPA approval.

Verification: At least 30 days prior to the commencement of construction of hazardous materials storage and containment structures, the project owner shall provide the final plans (RMP and HMBP) listed above to the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan (SMP) for delivery of ammonia. The plan shall include procedures, protective equipment requirements, training and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of aqueous ammonia with incompatible hazardous materials.

Verification: At least 60 days prior to the first delivery of aqueous ammonia to the ammonia storage tanks, 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, the storage tank shall be protected by a secondary containment basin capable of holding 150 percent of the storage volume plus the 24-hour rainfall from the 25-year storm event.

Verification: At least 60 days prior to the first delivery of aqueous ammonia to the storage tanks, the project owner shall submit final design drawings and specifications for the ammonia storage tank, the secondary containment basin, and the secondary containment building to the CPM for review and approval.

HAZ-5 The project owner shall provide a covered secondary containment basin under the truck unloading pad capable of passively containing an entire truckload of aqueous ammonia plus wash water spilled during the delivery of aqueous ammonia to the storage facility.

Verification: At least 60 days prior to construction of the secondary containment basin described above, the project owner shall submit final design drawings and specifications for the secondary containment basin to the CPM for review and approval.

HAZ-6 The project owner shall ensure that no combustible or flammable material is stored or used within 100 feet of the sulfuric acid tank.

Verification: At least 30 days prior to the first delivery of sulfuric acid onsite, the Project Owner shall provide to the CPM for review and approval 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 material and the route by which such materials will be transported through the facility.

HAZ-7 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 30 days prior to the first delivery of aqueous ammonia onsite, 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-8 The project owner shall direct all vendors delivering any hazardous material to the site to use only the route approved by the CPM.

Verification: At least 60 days prior to any hazardous materials onsite, the project owner shall submit to the CPM for review and approval a copy of the letter to be mailed to the vendors. The letter shall state the required transportation route limitation.

HAZ-9 The project owner shall require that the gas pipeline undergo a complete design review and detailed inspection 30 years after initial startup and each 5 years thereafter.

Verification: At least 30 days prior to the initial flow of gas in the pipeline, the project owner shall provide an outline of a plan to accomplish a full and comprehensive pipeline design review to the CPM for review and approval. The full and complete plan shall be amended, as appropriate, and submitted to the CPM for review and approval, not later than one year before the plan is implemented by the project owner. For subsequent inspections, the project owner shall provide to the CPM for review and approval any plan amendments, or a letter indicating there are none, at least one year before implementing the subsequent inspections.

HAZ-10 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 CPM 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-11 The natural gas pipeline shall be designed to meet CPUC General Order 112-D&E and 58 A standards, or any successor standards, and will be designed to meet Class III service. The pipeline shall be designed to withstand seismic stresses and will be surveyed annually for leakage. The project owner shall incorporate the following safety features into the design and operation of the natural gas pipeline: (1) butt welds will be x-rayed and the pipeline will be pressure tested prior to the introduction of natural gas into the line; (2) the pipeline will be

surveyed for leakage annually; (3) the pipeline route will be marked to prevent rupture by heavy equipment excavating in the area; and (4) valves will be installed to isolate the line if a leak occurs.

Verification: Prior to the introduction of natural gas into the pipeline, the project owner shall submit design and operation specifications of the pipelines to the CPM for review and approval.

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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 gaging the significance of public exposures associated with potential accidental releases. Further, it is 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)

* 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.

** 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.

HAZARDOUS MATERIAL MANAGEMENT
APPENDIX C TABLE 1, PPP Chemical Inventory.

Trade Name	Chemical Name	CAS[1] Number	Maximum Quantity Onsite	Hazardous Characteristics	RQ[2]	TPQ[3]	Prop 65
Hazardous Materials:							
Aqueous Ammonia (19% solution)	Ammonium Hydroxide	1336-21-6	10,000-gal.	Corrosive Volatile	1000 lb.		No
Sulfuric Acid	Sulfuric Acid	7664-93-9	2,000 gal.	Corrosive	1,000 lb.	1,000 lb.	No
Bleach	Sodium Hypochlorite	7681-52-9	400 gal.	Corrosive	100 lb.		No
NALCO 7342	Sodium bromide	7647-15-6	200 gal.	Corrosive	(4)		No
NALCO TRASAR 23263		None	400 gal.	Non-hazardous	(4)		No
NALCO 7208	Sodium Hydroxide	1310-73-2	400 gal.	Toxic	(4)		No
NALCO 8305+	Sodium Tolyltriazole	64665-57-2	800 gal.	Toxic	(4)		No
NALCO 7396	Tetrapotassium Pyrophosphate	7320-34-5	400 gal.	Corrosive	(4)		No
NALCO 1336	Sodium Tolyltriazole	64665-57-2	400 gal.	Corrosive	()		No
Hydrochloric Acid	Hydrochloric Acid	7647-01-0	4,000 lbs.	Corrosive	5,000 lb.		No
Citric Acid	Hydroxy-propionic-tricarboxylic Acid	77-92-9	50 lbs.	Corrosive	(4)		No
Hydroxyacetic Acid	Gyrolic Acid	79-14-1	400 lbs.	Corrosive	(4)		No
Formic Acid	Methanoic Acid	64-18-6	250 lbs.	Corrosive	5,000 lb.		No
ELIMIN-OX	Carbohydrazide	497-18-7	400 gal.	Non-Hazardous			No
Sodium Bisulfite	Sodium Bisulfite (90-100%)	7631-90-5	200 gal.	Corrosive	5,000 lb.		No
Mineral Insulating Oil	Oil	None	25,000 gal. (total)	Combustible	42 gal.[5]		Yes

Appendix C Table 1 (continued).

Trade Name	Chemical Name	CAS[a] Number	Maximum Quantity Onsite	Hazardous Characteristics	RQ[b]	TPQ[c]	Prop 65
Lubrication Oil	Oil	None	2,800 gal. (all turbines)	Combustible	42 gal.[5]		Yes
Anti-freeze	Propylene glycol	57-55-6	20,000 gal.	Toxic	(4)		No
Detergents	Various	None	100 gal.	Toxic	(4)		--
Lab Reagents (liquid)	Various	None	10 gal.	Toxic	(4)		--
Lab Reagents (solid)	Various	None	50 lbs.	Toxic	(4)		--
Ammonium Bifluoride	Ammonium Bifluoride	1341-19-7	100 lbs.	Toxic, Corrosive	100		No
Sodium Carbonate	Sodium Carbonate	497-19-8	200 lbs.	Corrosive	(4)		No
Sodium Nitrate	Sodium Nitrate	7631-99-4	200 lbs.	Corrosive	(4)		No

1 Chemical Abstract Service.
2 Reportable Quantity per CERCLA. Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.
3 Threshold Planning Quantity. For hazardous materials, the TPQ is 10,000 lb.
4 No reporting requirement.
5 Must report if does or will reach California state waters, or if quantity released is a "harmful quantity."

[Source: SVP 2002, AFC Table 8.5-3]

LAND USE

Testimony of David Flores

INTRODUCTION

This land use analysis of the Pico Power Project (PPP) 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. These individual resource topics are discussed in separate sections of this Staff Assessment (SA).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

This section describes state, regional and local land use LORS applicable to the proposed 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.

CITY OF SANTA CLARA GENERAL PLAN

Land uses are controlled and regulated through a series of goals and policies contained in plans adopted by the local jurisdiction that has land use authority over the area (in this case, the City of Santa Clara). Local agencies with land use authority (i.e., cities and counties) are required to adopt a General Plan for the area within their jurisdiction that sets forth policies regarding land use and other planning topics. The General Plan is the broadest planning document applicable to the site, expressing overall goals and policies to guide local decisions on future growth, development, and conservation. Other local plans, as well as the zoning ordinance that regulates land use, must be consistent with the goals and policies expressed in the General Plan.

The City of Santa Clara General Plan was adopted in 1960 and was most recently revised on July 28, 1992. In its preface, the Santa Clara General Plan is described as an official policy document adopted as a guide for making decisions concerning the development of the community according to desired goals. When adopted in 1960, it was intended to shape the future physical development of the city, and subsequent amendments to the Plan have been adopted from time to time, reflecting important changes in City policy. The City of Santa Clara General Plan Land Use Element

designates the project site as Heavy Industrial (HI). The HI industrial land use designation is intended to provide the City of Santa Clara with enough land area for the most intense industrial uses and encourage a stable employment demand corresponding to the City's labor characteristics.

The Land Use Element of the General Plan has two major components that address the description of land uses and land use policies. First, the goals and policies state that the City will continue to encourage the development of a sound and diverse economic base to support public services. Second, the City will promote the best use of land through protection of desirable existing uses, orderly development and consideration of the City's future needs. The “HI” District permits a broad array of industrial uses, administrative and professional offices/services, automobile-related uses, trade schools, retail commercial uses, and service commercial uses.

Public Facilities and Services Element

Subsection 6.6.2: The City continues to investigate additional resources to provide low cost power for citizens and business customers as required. Current generation projects actively being pursued by the City are cogeneration, hydroelectric, out-of-state purchases, and natural gas-fired plants.

CITY OF SANTA CLARA ZONING ORDINANCE

Zoning is the specific administrative tool used by a jurisdiction to regulate land use and development, and is one of the primary tools for implementing the goals and policies of the General Plan. Zoning is typically more specific than the General Plan and includes detailed land use regulations and development standards. The City’s Zoning Ordinance divides the land in the city into zones that permit different types of uses and imposes development standards appropriate to the uses permitted in each zoning district. **LAND USE Figure 1** shows the zoning districts in the area of the proposed project site. The PPP project site is located in the Public/Quasi-public (B) zoning district.

The objective of the Zoning Ordinance in designating sites for public facilities is to preserve public amenities and necessary public facilities for which alternative sites would be difficult to procure. Permitted public facilities include educational uses, utilities, and other government buildings or open space areas.

The Zoning Ordinance (Article 26, Section 26-7 through 13) includes minimum design and performance standards applicable to the construction of industrial and commercial buildings in the “B” District. These include standards for building density, outdoor recreation facilities, storage requirements, parking spaces, and other design features.

SETTING

PROJECT LOCATION

The project site is located in the City of Santa Clara in Santa Clara County, and is surrounded by other cities (i.e., San Jose, Sunnyvale, Cupertino). The City of Santa Clara is developed to the point where acquisition of additional land for public facilities is not practical. The project would be situated in an established industrial belt defined by

Highway 101 (Bayshore Freeway) to the north and the Northern Pacific/CalTrain rail line to the south. The City of Santa Clara has a population of 104,600 (California Department of Finance, January 2002) within its land area of 826,050 acres.

The proposed PPP project site is located in an industrial belt of the city. This area contains a diverse mix of both small and large light industrial, heavy industrial, and office uses. Although some retail commercial uses and a few residences (caretaker facilities) are interspersed through the area, the vicinity of the project site is predominantly industrial in nature, characterized by manufacturing, processing, and public storage facilities; distribution and warehouse facilities; and miscellaneous industrial and business park developments.

SITE AND VICINITY DESCRIPTION

Proposed Project Site

The proposed PPP site is approximately 8.2 acres in size with the project requiring approximately 2.86 acres. Most of the site is undeveloped land that is part of the existing substation, maintenance yard, and parking area. Perimeter chain-link fences enclose the 8.2-acre parcel. A street right-of-way formerly known as Pico Way crosses the PPP site. This portion of Pico Way was abandoned to public use when Duane Avenue was extended to the east to make an intersection with Lafayette Street, but has not been legally abandoned and requires a City Council resolution. Under conditions of certifications (**LAND-7**), the applicant will be required to obtain necessary approvals from the City to complete the street right-of-way abandonment.

The applicant has identified four possibilities for construction laydown areas and off-site worker parking. These potential sites are:

- The northern portion (0.4 acres) of the Scott Receiving station on Space Park Drive approximately 0.2 miles west of the PPP. This site is entirely graveled, chip sealed, or paved.
- The southern portion of the Silicon Valley Power's (SVP) Kifer Receiving Station is immediately south of the project site (1.5 acres), extending northward along the western receiving station fence and boundary. This site is entirely graveled, chip-sealed, or paved.
- Vacant space at the City of Santa Clara maintenance yard at the corner of LaFayette and Comstock Streets (0.4 acres), approximately 400 feet southeast of the PPP site.
- A large vacant lot (1.9 acres) south of and adjacent to the Silicon Valley Power Brokaw Substation, located west of Brokaw Road, south of Coleman, and east of the De La Cruz Boulevard overpass to the Union Pacific railroad tracks. This site is entirely graveled, chip sealed, or paved.

All four of the potential staging, laydown, and parking areas are owned by the City of Santa Clara, and are zoned Heavy Industrial (HI) or Public/Quasi-public (B) with these uses permitted in the HI and B zones.

SURROUNDING LAND USE

LAND USE Figure 2 shows the existing general plan land uses in the project vicinity. As indicated above, the proposed PPP site is located in a predominantly industrial area. Land uses in the vicinity of the project site include:

- North: a public storage facility and Qwest Communications equipment facilities immediately north of the site, beyond which are several light industrial buildings;
- East: Allsafe Safe Storage facility across Lafayette Street to the east, beyond which is the San Jose International Airport, whose nearest runway is approximately 2,842 feet east from the project site;
- South: the SVP Kifer Receiving Station to the south, beyond which (southwest of the intersection of Central Expressway and Lafayette Street) is the large Owens Corning fiberglass installation manufacturing facility;
- West: Williams Communications equipment facility and Pacific Bell maintenance yard, beyond which lie a wide variety office buildings and retail spaces; and
- A 60-foot wide pedestrian /bicycle pathway located approximately two miles north of the site. It will be nominally affected by the proposed gas pipeline metering station, which is discussed below in **PROJECT FEATURES**.

PROJECT FEATURES

NATURAL GAS COMPRESSOR STATION

As proposed, the natural gas compressor station will be located on a city-owned parcel at the northeast corner of Comstock and Lafayette Streets. The lot contains a former fire station building, now used for office space, a paint booth, a storage building, a fenced area containing a foundation for electrical substation equipment that was removed in the 1970's, and a building formerly used as a police firing range. The substation equipment foundation will be removed prior to construction of the compressor station at the same location. This parcel is approximately 1.35 acres and all new development on it associated with the project will stay within the designated setbacks for this parcel and will meet all landscape

LAND USE Figure 1
City of Santa Clara Zoning Map

LAND USE Figure 2
General Plan Land Use Map

requirements. This parcel may also serve as a laydown area during construction of the PPP.

NATURAL GAS PIPELINE AND METERING STATION

The proposed 12-inch natural gas pipeline will deliver fuel to the PPP site from a point approximately two miles north of the project site at the PG&E main gas line located in Gianera Street. The gas pipeline will be placed within existing street right-of-ways with boring of the pipeline under State Route 101 at Duane Avenue to the project site.

The proposed gas metering station will be constructed within an existing bicycle/pedestrian walkway that connects Gianera Street and Wilcox Avenue with the Hetch Hetchy Aqueduct open space right-of-way to the north. The metering facility will be between the existing bicycle path to the east and the existing residential fence to the west.

WASTEWATER DISCHARGE PIPELINE

The 900-foot long wastewater discharge pipeline will be installed in an existing Public Utility Easement (PUE) that runs from the PPP project site directly southward to the northern edge of Central Expressway, where it will tie into the South Bay Regional Water Treatment Center 27-inch trunkline. Surrounding land uses are the public storage facility and various communication equipment facilities (i.e., Qwest, Pacific Bell, and Williams).

ELECTRICAL TRANSMISSION LINE RELOCATION

PPP is currently working with PG&E on relocating and undergrounding an electrical transmission line that currently crosses the project site. PPP originally proposed that the line route would remain on the Pico site, and would just be moved underground. However, PG&E has requested that the Applicant consider an alternate route for the undergrounded line.

As a possible alternate route, PPP is proposing to run the existing transmission line underground just outside the site boundary on the west. A server farm building, with paved access roads and parking lots between the building and the Pico site occupies that side of the site. The underground line would exit the Pico site right at the point where the line would go underground (as depicted in Figure 2.2-2a), travel about 200 feet along the west wall line under the paved access roads/parking area near the server farm building, and then back under the wall into the project site. The line would be about 5-10 feet outside and parallel to the wall. The applicant will be required to obtain a 30-35 foot wide easement from the server farm owner in order to run the line. Since the entire 200' route is paved, they would use traditional trenching to dig the 3-foot wide, 6-7 foot-deep trench. A condition of certification (**LAND-9**) has been proposed to require the applicant to secure the necessary 30-35 foot easement in the event that PG&E and the Applicant decide that the off-site alternative route is appropriate.

IMPACTS

According to Appendix G of the Guidelines to the California Environmental Quality Act (CEQA), a project may have a significant effect on land use if a proposed project would:

- disrupt or divide the physical arrangement of an established community;
- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;
- convert Prime Farmland, Farmland of Statewide Importance, or Unique Farmland to non-agricultural use.

A project may also have a significant impact on land use if it would create unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts or if it precludes or unduly restricts existing or planned future uses.

CONFORMITY WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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 meets and consults with applicable agencies to determine conformity and, when necessary, "to attempt to correct or eliminate any noncompliance" (§ 25523(d)(1)). The laws, ordinances, regulations, standards (LORS) and policies applicable to the project have been analyzed below to determine the extent to which the PPP is consistent or at variance with each requirement or standard.

Physical Division of an Existing Community

The proposed PPP project has no potential to physically divide an existing community. The site is located in an established industrial and mixed commercial area in the City of Santa Clara. The power plant would be located entirely on public property and neither the size nor nature of the project would result in a physical division of an established community. No new physical barriers would be created by the project (public access across the site is not currently allowed) and no existing roadways or pathways would be blocked. No new transmission lines, or transmission towers associated with the project would be constructed, therefore no such new physical barriers would be created. Given its location, the project would not alter existing residential, recreational, commercial, institutional, or other industrial land use patterns in the area. Therefore, the project would not cause an impact on land use patterns.

LORS Compliance

General Plan

The proposed PPP project site would comply with the City of Santa Clara's LORS. The proposed project is appropriately sited in an area designated for industrial development in the General Plan. The City's General Plan policies concerning industrially designated areas are generally supportive of new industrial projects for economic development reasons, rather than restrictive or prohibitive. Staff has concluded that the proposed project does not conflict with any of the relevant land use policies contained in the Santa Clara General Plan.

Zoning

Of the various zoning districts in the City's Zoning Ordinance, the Public/Quasi-public "B" zoning district, in which the project site is located, is the most appropriate zoning district for a power plant. Power plants are specifically listed as a compatible use in the "B" District, and are intended to provide for public utility facilities. The project complies with all of the applicable development standards (lot, and yard requirements) set forth in the Zoning Ordinance for the "B" District.

The proposed project also complies with the parking standards and minimum design and performance standards applicable to the construction of industrial buildings in the "B" District. Some standards are subject to interpretation in the B Zone (e.g., "design elements that are harmonious and in proportion to one another") and others involve details not specifically presented in the AFC (e.g., container size of trees used in landscaping). Staff has concluded that the project conforms to the architectural design principles included in the "B" District's design and performance standards.

However, to address different interpretations, Condition of Certification **LAND-1** is proposed to ensure the project's compliance with the City's industrial design and performance standards for those standards subject to interpretation. Also, Condition of Certification **LAND-2** is proposed requiring that the applicant comply with the City of Clara's parking standards. For a discussion of the project's effects on views and aesthetic resources, please see the **VISUAL RESOURCES** section of this SA.

With the natural gas and wastewater discharge pipelines being constructed within existing roadways and/or dedicated right-of-ways, no zoning issues or impacts to land use are expected to occur from the location of these pipelines.

General Plan and Zoning Conclusion

The City of Santa Clara has determined that the proposed PPP project would be consistent with the City's General Plan and Zoning Ordinance (City Planning Staff, 2002). This confirms staff's conclusion that the proposed project would comply with the City's LORS.

City of Santa Clara Administrative Items

Condition of Certification (**LAND-6)** would require the project owner to work with the City on merger of the nine underlying parcels that constitute the PPP project site in order to

avoid the construction of buildings across property lines. This action would ensure compliance with the Zoning Ordinance and Subdivision Map Act.

Pico Way was not formally abandoned in this area when Duane Avenue was extended to the east to make an intersection with Lafayette Street. Condition of Certification **LAND-7** would require that PPP work with the City to complete the abandonment of the formerly known Pico Way right-of-way that crosses through the proposed Pico Power Plant site.

Given the proposed project's consistency with the City of Santa Clara's applicable land use LORS, impacts will be less than significant if proposed Conditions of Certification **LAND-1, LAND-2, LAND-6** and **LAND-7** specifically are implemented.

Conversion of Farmland to Non-Agricultural Use

The proposed plant site is located in the City of Santa Clara. The site and vicinity are urbanized and fully developed with no history of farming within the last five years. There are no significant agricultural uses in the vicinity of the project site; therefore, there will be no impact on agriculture.

COMPATIBILITY WITH EXISTING AND PLANNED LAND USES

POWER PLANT SITE

The project would be constructed on a 2.86-acre portion of an 8.2-acre parcel of land located in the Public/Quasi-public Zone District, and the operation of a major utility is a permitted use in this zone.

The construction, operation and maintenance of the PPP would be consistent with existing and planned land uses in the immediate vicinity, which are primarily industrial and commercial. Construction and operation of the proposed project, therefore, would not conflict with either existing or planned land uses in the vicinity. The existing bicycle/pedestrian path at the intersection of Gianera Street and Wilcox Avenue will also need to be partially realigned to the east to accommodate the project's proposed gas line metering station. With an existing 60-foot right-of-way dedication, there is sufficient area within the right-of-way for the realignment of the bicycle/pedestrian path. The applicant will perform all relocation work.

The project would not divide an established community. Land uses in the immediate vicinity of the project include industrial, public storage facilities, distribution and warehouse facilities, and miscellaneous business park developments. The proposed project would not substantially alter the type or intensity of activity on the project site. Neither construction nor operation of the proposed facility would adversely affect these activities, unless the project created unmitigated environmental impacts. No such impacts have been identified for Land Use; other sections should be consulted with regard to the determination of impacts for other issue areas. See the sections for **Noise, Air Quality, Hazardous Materials Management, Worker Safety and Fire Protection, and Visual Resources**.

CUMULATIVE IMPACTS

The proposed project is consistent with the City of Santa Clara's long-range land use policies for this industrially designated area as expressed in the General Plan. Conformance with the General Plan is the primary consideration in determining a project's potential to contribute to adverse cumulative land use impacts. The General Plan sets forth the City's long-range vision for the physical development of the City, and other plans for infrastructure and public services are based on this long-range vision. The City is experiencing nearly a total buildout condition, meaning any new development is infill or redevelopment in nature. At this time, there are no project proposals in the vicinity of the PPP. Therefore, projects that are consistent with the City's long-range land use policies are not viewed as adverse from a cumulative impact perspective. Because the project is consistent with the City's long-range planning policies for industrial development in this area, cumulative land use impacts are not considered significant.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that indicates the minority population is greater than 50 percent within a six-mile radius of the proposed PPP (please refer to **Socioeconomics Figure 1** in this Staff Analysis). The data for the population income levels within six miles of the PPP indicates that the low-income population is less than 50 percent. Staff's Land Use analysis did not result in any identified unmitigated significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore 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 PPP 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 PPP.

CONCLUSIONS

The project would not physically divide an established community, would not conflict with any applicable land use plan, policy, or regulation, and would not conflict with any applicable habitat conservation plan. Staff has concluded that the PPP would be a compatible land use within the City of Santa Clara. The proposed use would be consistent with the policies of the City of Santa Clara's General Plan, and is considered a primary use permitted in the “B” District of the Zoning Ordinance. The project appears to conform to the development standards for the “B” District and such conformance can be assured with the implementation of proposed condition of certification **LAND-1**. Therefore, the project’s land use impacts are either less than significant or can be readily mitigated to a less-than-significant level.

Proposed Condition of Certification **LAND-2** would require that PPP comply with the City of Santa Clara's parking standards to ensure compliance with the Zoning Ordinance.

Condition of Certification **LAND-6** would require the merger of nine underlying parcels that constitute the PPP project site in order to avoid the construction of buildings across property lines and to ensure compliance with the Zoning Ordinance.

Condition of Certification **LAND-7** would require that PPP complete the abandonment of the formerly known Pico Way right-of-way that crosses through the proposed Pico Power Plant site. Pico Way was not formally abandoned in this area when Duane Avenue was extended to the east to make an intersection with Lafayette Street.

PROPOSED CONDITIONS OF CERTIFICATION

LAND-1 The project owner shall comply with the minimum design and performance standards for the Public/Quasi-Public (B) District set forth in the City of Santa Clara Zoning Ordinance (Article 26, Sec.26-1 through 13).

Verification: At least 30 days prior to site mobilization of the PPP, the project owner shall submit written evidence to the Energy Commission Compliance Project Manager (CPM) that the project conforms to all applicable design and performance standards for the Industrial (B) District set forth in the City of Santa Clara Zoning Ordinance (Section 26-1 through 13). The submittal to the CPM shall include evidence of review by the City.

LAND-2 The project owner shall comply with the parking standards established by the City of Santa Clara Zoning Ordinance (Article 26, Sec. 26-12).

Verification: At least 30 days prior to site mobilization, the project owner shall submit to the CPM, written documentation, including evidence of review by the City of Santa Clara, that the project conforms to all applicable parking standards.

LAND-3 The project owner shall ensure that any signs erected (either permanent or for construction only) comply with the outdoor advertising regulations established by the City of Santa Clara zoning ordinance (Article 40, Sec. 40-1 through 17).

Verification: At least 30 days prior to start of construction, the project owner shall submit to the CPM, written documentation, including evidence of review by the City/County, that all erected signs will conform to the zoning ordinance.

LAND-4 The project owner shall provide the Director of the City of Santa Clara Planning Department for review and comment and the CPM for review and approval, descriptions of the final lay down/staging areas identified for construction of the project. The description shall include:

a. Assessor's Parcel Number;
b. Addresses;
c. Land use designations;
d. Zoning;
e. Site plan showing dimensions;
f. Owners name and address (if leased);
g. Duration of lease (if leased); and,
h. if a discretionary permit was required, two copies of all discretionary and/or administrative permits necessary for use as laydown/staging areas.

Verification: The project owner shall provide the specified documents at least 30 days prior to the start of any ground disturbance activities.

LAND-5 The project owner shall provide to the CPM for approval, a site plan with dimensions showing the locations of the proposed buildings and structures in compliance with the minimum yard area requirements (setbacks) from the property line as stipulated in the City of Santa Clara Zoning Ordinance.

Verification: At least 30 days prior to the start of construction, the project owner shall submit a site plan showing that the project conforms to all applicable yard area requirements as set forth in the City of Santa Clara Zoning Ordinance.

LAND-6 Prior to the start of construction, the project owner shall obtain the necessary approval(s) from the City of Santa Clara and complete any lot merger or lot line adjustments necessary to ensure that the proposed project site, including associated on-site 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-7 Prior to the start of construction, the project owner shall obtain the necessary approval(s) from the City of Santa Clara and complete the street right-of-way abandonment of Pico Way that crosses the Pico power plant site.

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 roadway abandonment of Pico Way.

LAND-8 Prior to the start of construction, the project owner shall partially realign the pedestrian/bicycle pathway within the 60-foot dedicated right-of-way located at Gianera Street and Wilcox Avenue to accommodate the metering station.

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 realignment of the pedestrian/bicycle pathway.

LAND-9 If the off-site alternate route is chosen for relocating the existing PG&E 230kV transmission line on the PPP site, prior to the start of construction, the project owner shall obtain the necessary approval(s) for the 30-35 foot transmission line easement needed to run the existing transmission line underground (approximately 200 feet) just outside the project site's westerly boundary.

Verification At least 30 days prior to the start of construction, the project owner shall provide the CPM with evidence of the final easement dedication for the underground transmission line, or confirm that the line will be undergrounded entirely within the proposed PPP site.

REFERENCES

SVP (Silicon Valley Power) 2002a. Application for Certification, Volume 1 & Appendices, Pico Power Project (02-AFC-3).

City of Santa Clara. 1992. City of Santa Clara General Plan, Volume 1.

City of Santa Clara 1995. City of Santa Clara Comprehensive Zoning Ordinance.

City of Santa Clara, Planning Division. Personal conversation with Kevin Riley on January 9, 2003

Foster Wheeler Environmental Corp. Personal conversation with Douglas Davy, Project Manager on January 10, 2003

NOISE AND VIBRATION

Testimony of Steve Baker

INTRODUCTION

The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances, and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices, such as blasting or pile driving. The ground-borne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the Pico Power Project (PPP), and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations, and standards (LORS). For an explanation of technical terms employed in this testimony, please refer to **NOISE Appendix A** immediately following.

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. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **NOISE Appendix A, Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

There are no federal laws governing off-site (community) noise.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of perception is 65 VdB, which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

California Government Code section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its General Plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are listed in **NOISE Table 1**.

The State of California, Office of Noise Control, prepared a Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. The Model also contains a definition of a simple tone, or "pure tone," in terms of one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by five dBA.

Other State LORS include the California Environmental Quality Act (CEQA) and the California Occupational Safety and Health Administration (Cal-OSHA) regulations.

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:

a) 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;

b) exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;

c) a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

d) a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying item 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 dBA L_{90} or more at the nearest sensitive receptor.

NOISE Table 1
Land Use Compatibility for Community Noise Environment

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE - Ldn or CNEL (dB)													
	50		55		60		65		70		75		80	
Residential - Low Density Single Family, Duplex, Mobile Home														
Residential - Multi-Family														
Transient Lodging – Motel, Hotel														
Schools, Libraries, Churches, Hospitals, Nursing Homes														
Auditorium, Concert Hall, Amphitheaters														
Sports Arena, Outdoor Spectator Sports														
Playgrounds, Neighborhood Parks														
Golf Courses, Riding Stables, Water Recreation, Cemeteries														
Office Buildings, Business Commercial and Professional														
Industrial, Manufacturing, Utilities, Agriculture														

	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA is clearly significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of a case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level [1];
2. the duration and frequency of the noise;
3. the number of people affected;
4. the land use designation of the affected receptor sites; and
5. public concern or controversy as demonstrated at workshops or hearings, or by correspondence.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

1 the construction activity is temporary;

2 use of heavy equipment and noisy activities is limited to daytime hours; and

3 all industry-standard noise abatement measures are implemented for noise-producing equipment.

Cal-OSHA

Cal-OSHA has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards (see **NOISE Appendix A, Table A4**).

LOCAL

City of Santa Clara General Plan

Chapter 5.8 of the City's General Plan (Santa Clara 1992) deals with noise. The applicable noise standards for various uses are expressed in Figure 5-G: Noise and Land Use Compatibility, summarized below in **NOISE Table 2**. These standards declare that noise impacts on a neighboring residential receptor no greater than 55 dBA

NOISE Table 2
City of Santa Clara General Plan Noise Standards

Zone	Noise Limit, dBA CNEL
Residential	55
Public – Educational	55
Recreational	65
Commercial	65
Industrial	70
Open Space	76

CNEL are compatible with that use, and impacts on an industrial receptor no greater than 70 dBA CNEL are compatible with that use. When the noise source is constant, as

[1] For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments, and with industrial noise regulations adopted by European jurisdictions. If the project would create an increase in ambient noise no greater than 10 dBA at nearby sensitive receptors, and the resulting noise level would be 40 dBA or less, the project noise level would likely be insignificant.

is a typical power plant, 55 dBA CNEL is equivalent to 48.3 dBA L_{eq}, and 70 dBA CNEL is equivalent to 63.3 dBA L_{eq}.

City of Santa Clara Noise Ordinance

The City's Noise Ordinance (Santa Clara 1988) limits are expressed in *Schedule A: Exterior Sound or Noise Limits*, and summarized in **NOISE Table 3** below. The noise that may be received at a neighboring residential property line is restricted to 55 dBA L_{eq} during the daytime, and to 50 dBA L_{eq} at night. Noise at a neighboring light industrial use is restricted to 70 dBA L_{eq} at any time.

NOISE Table 3
City of Santa Clara Noise Ordinance

Zone	Time of Day	Hourly Limit, dBA L_{eq}
Single Family & Duplex Residential	7 a.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
Multiple Family Residential, Public Space	7 a.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
Commercial, Office	7 a.m. to 10 p.m.	65
	10 p.m. to 7 a.m.	60
Light Industrial	Anytime	70
Heavy Industrial	Anytime	75

This ordinance also addresses vibration, stating that, "It shall be unlawful… to operate or cause… any fixed source of vibration or disturbing, excessive, or offensive vibration… such that the vibration… is above the vibration perception threshold… at the closest property line point to the vibration source…." (Santa Clara 1988, § 18-26.5) "Vibration perception threshold" is further defined as, "The minimum ground or structure-borne vibrational motion necessary to cause a reasonable person of average sensitiveness to be aware of the vibration, including by… touch or visual observation of moving objects. The perception threshold shall be presumed to be a motion velocity of 0.01 inch/second over the range of 1 to 100 Hz…." (Santa Clara 1988, § 18-26.2(p))

City of Santa Clara Construction Regulation

The City's Construction Regulation ordinance restricts the times of day, and the days of the week and the year, that construction may occur near residentially-zoned property (Santa Clara 1996). Construction is permitted:

- Weekdays between 7 a.m. and 6 p.m., and
- Saturdays between 9 a.m. and 6 p.m.

Construction is prohibited on Sundays and on eight specified annual holidays.

This ordinance, however, applies only to construction on privately-owned land within 300 feet of residentially-zoned property. Specifically exempted from the provisions of this ordinance is work that is preempted from local regulation by state law, and the construction and maintenance of utility-type services.

SETTING

PROJECT BACKGROUND

The Pico Power Project involves the construction and operation of a nominal 122 MW combined cycle power plant. The PPP would include two General Electric LM6000PC Sprint gas turbine generators with heat recovery steam generators (HRSGs), and one steam turbine generator with a plume abated evaporative cooling tower. Also included in the project would be a natural gas compression station, located about 500 feet from the power plant site in the City's maintenance yard on the east side of Lafayette Street (SVP 2002a, AFC §§ 1.1, 2.1, 2.2.1).

The equipment that has the greatest potential to generate significant noise levels includes the gas turbines, steam turbine, pumps, motors, main transformers, natural gas fuel compressors and a wet cooling tower (SVP 2002a, AFC § 8.7.2.2).

Power Plant Site

The project site is located within the City of Santa Clara, on land owned by the City. It is zoned Public/Quasi-Public, and is surrounded by light and heavy industrial uses. The site lies 0.6 miles northwest of the end of the runway of San Jose International Airport, and 0.1 miles south of US Highway 101. The natural gas compressor station that supplies fuel to the plant would be located on City-owned property approximately 500 feet south of the power plant site. Nearby industry includes the Owens Corning fiberglass manufacturing plant 0.25 miles south of the site, and the LSI Logic manufacturing facility 0.35 miles west (SVP 2002a, AFC §§ 1.1, 2.2.1, 8.7.1).

Linear Facilities

Linear facilities included in the project would consist of:

1 a connection to an existing tertiary treated recycled wastewater pipeline, located within the site boundaries;

2 a 115 kV switchyard and approximately 0.25 miles of electrical interconnection line to the Scott Receiving Station;

3 approximately two miles of 12-inch diameter underground natural gas pipeline from the existing PG&E gas distribution line to the gas compressor station;

4 500 feet of natural gas pipeline connecting the gas compressor station to the power plant; and

5 approximately 900 feet of 18-inch diameter underground wastewater discharge pipeline (SVP 2002a, AFC §§ 1.1.1, 2.2.6, 2.2.7).

EXISTING NOISE LEVELS

In order to predict the likely effects of project noise on adjacent sensitive receptors, the applicant commissioned an ambient noise survey of the area. The survey was conducted on Tuesday and Wednesday, June 11 and 12, 2002, using acceptable equipment and techniques. The noise survey monitored existing noise levels at the following four locations, shown on **NOISE Figure 1**:

[Insert **NOISE Figure 1** here; use AFC Figure 8.7-1]

1. Location 1: Adjacent to residences at 3501 Lafayette Street, 0.5 miles north of the project site and north of US Highway 101. Existing noise is due chiefly to jet aircraft traffic into and out of San Jose International Airport; traffic on Lafayette Street, 150 feet south of the monitoring site; and air conditioning equipment on the roofs of commercial buildings.

2. Location 2: At the northeast corner of the plant site. Existing noise is due to the same sources as at Location 1, plus noise from the Owens Corning insulation plant to the south.

3. Location 3: At the Granada Islamic School, 0.4 miles west of the project site. Existing noise includes aircraft noise, local and US Highway 101 traffic noise, and air conditioning equipment on commercial buildings.

4. Location 4: At the apartments at 1425 Laurelwood Road, 0.4 miles north of the site on the north side of US Highway 101. Existing noise consists chiefly of aircraft and freeway traffic noise, plus commercial air conditioners at night.

NOISE Table 4 summarizes the ambient noise measurements (SVP 2002a, AFC § 8.7.1.2, Table 8.7-1).

NOISE Table 4
Summary of Measured Noise Levels

Measurement Sites	Measured Noise Levels, dBA		
	Average During Nighttime Hours		Community Noise Equivalent Level (CNEL)
	L_{eq}	L_{90}	
1 – Lafayette Street Residences	54.8	47.6	71.5
2 – Site Boundary	57.5	55.1	67.9
3 – Granada Islamic School	55.8	52.6	65.3
4 – Laurelwood Road Apartments	58	55.3	68.4

Source: SVP 2002a, AFC Table 8.7-1 and staff calculations

In general, the noise environment in the vicinity of the project site is dominated by traffic and aircraft noise during the day, and by traffic noise and commercial building air conditioning equipment at night. The neighborhood is rather noisy during the day, and noise levels subside to levels typical of a noisy urban environment at night.

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 usually considered a temporary phenomenon. Construction of the PPP is expected to last approximately 18 to 21 months (SVP 2002a, AFC §§ 1.2, 8.7.2.2). Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances. The City of Santa Clara places no limit on the level of construction noise, but limits such noise to certain hours (Santa Clara 1988, § 18-26.6(e)).

The City's Construction Regulation ordinance (Santa Clara 1996), however, applies only to construction on privately-owned land, within 300 feet of residentially-zoned property, and specifically exempts work on utilities, and work performed under a state permit. As such, this ordinance restricting construction hours would not apply to work on the power plant site itself, since this is City-owned property, and the work would be done under a state (Energy Commission) permit. The only project work that might be construed as subject to this ordinance would be installation of any linear facilities that pass within 300 feet of residential property; see **Linear Facilities**, below.

The applicant has predicted construction noise impacts, listing expected noise levels at the project site (SVP 2002a, AFC Table 8.7-3) and at the sensitive receptors (SVP 2002a, AFC Table 8.7-4). These predicted construction noise impacts are summarized in **NOISE Table 5**.

NOISE Table 5
Construction Noise Impact Predictions

Location	Distance from Noise Source (miles)	Loudest Predicted Sound Level, dBA*
Lafayette Street Residences	0.51	54
Granada Islamic School	0.42	56
Laurelwood Road Apartments	0.34	58

Source: SVP 2002a, AFC Table 8.7-4
*Does not include steam blows

The loudest predicted sound levels at these receptors vary from 54 to 58 dBA. Yet the ambient levels at these locations range from 55 to 58 dBA L_{eq} during the nighttime, when noisy construction work is typically not performed. During the daytime, L_{eq} levels at these locations range from 62 dBA to as high as 72 dBA (SVP 2002a, AFC Table 8.7-1). Construction noise will be effectively inaudible during the day. If nighttime work were required, it would represent an increase in noise levels of only 3 to 4 dBA, a barely noticeable intrusion.

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. Traditionally, high pressure steam was then raised in the heat recovery steam generator or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow, was quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, was performed several times daily over a period of two or three weeks. At the end of this procedure, the steam line was connected to the steam turbine, which was then ready for operation.

These high-pressure steam blows could produce noise as loud as 110 dBA at a distance of 100 feet. In order to reduce disturbance from steam blows, the steam blow piping could be equipped with a silencer that would reduce noise levels by 20 to 30 dBA to about 80 to 90 dBA, which is still an annoying noise level.

In recent years, a new, quieter steam blow process, variously referred to as QuietBlow™ or Silentsteam™, has become popular. This method utilizes lower pressure steam over a continuous period of 36 hours or so. Resulting noise levels reach about 80 dBA at 100 feet. Noise levels at nearby receptors are typically similar to the ambient background noise level, and thus barely noticeable. Even more recently, compressed air has been substituted for steam in the continuous blow process, with resulting noise levels that are similar.

The applicant has predicted steam blow noise levels at the nearest sensitive receptors; see **NOISE Table 6**. Comparing to ambient L_{eq} noise levels, it is seen that noise from high pressure steam blows would at least equal normal daytime L_{eq} ambient noise at all three receptors, or exceed it by as much as 10 to 15 dBA (see **NOISE Table 4**). The short-term nature of such steam blows, and its restriction to daytime hours, would likely render such noise levels tolerable to residents. It is possible that noise from steam blow operations heard at the Granada Islamic School would be more noticeable than aircraft noise from Santa Clara International Airport, but likely not significantly so. Staff believes that high pressure steam blows, performed with the appropriate silencers in place, could be employed at PPP without presenting significant unmitigated impacts on sensitive receptors.

NOISE Table 6
Steam Blow Noise Impact Predictions

Location	Distance from Source (miles)	Predicted Sound Level, dBA	
		High Pressure Steam Blow	Low Pressure Steam Blow
Lafayette Street Residences	0.51	71	45
Granada Islamic School	0.42	73	47
Laurelwood Road Apartments	0.34	75	49

Source: SVP 2002a, AFC Table 8.7-4

Low pressure steam blows would create noise levels, at sensitive receptors, equal to or less than nighttime ambient L_{90} (background) noise levels (see **NOISE Table 4**). Such noise would range from unobtrusive to unnoticeable, and would therefore present no significant impact on either residences at night, or the school in the daytime.

In order to ensure minimal annoyance due to steam or air blows, staff proposes Conditions of Certification to limit noise from the short duration, high-pressure steam blows by requiring the use of a temporary silencer to achieve the noise level cited above, to implement a notification process to make neighboring land uses aware of impending steam blows (see proposed Conditions of Certification **NOISE-4** and **NOISE-5** below), and to restrict such work to daytime hours (see proposed Condition of Certification **NOISE-8**). If a low-pressure, continuous steam or air blow process is used, the proposed Condition of Certification **NOISE-4** will ensure that the resulting continuous noise levels do not exceed the LORS nighttime noise standards, or cause a significant increase in nighttime ambient noise levels. This should ensure the process is tolerable to residents and adjacent land uses.

Linear Facilities

New off-site linear facilities would include a wastewater discharge pipeline, an electrical interconnection line to an existing substation, and approximately two miles of natural gas pipeline.

Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than two or three days. Further, the City's Construction Regulation ordinance (Santa Clara 1996) restricts construction on privately-owned land, within 300 feet of residentially-zoned property, to certain hours of the day and days of the week; see **NOISE Table 7**.

NOISE Table 7
Restriction of Construction Hours

Day	Permissible Hours of Construction
Monday – Friday	7 a.m. to 6 p.m.
Saturday	9 a.m. to 6 p.m.
Sunday	Not Permissible
Holidays[2]	Not Permissible

Source: Santa Clara 1996

Although this ordinance specifically exempts work on utility facilities, and work done under a state (e.g., Energy Commission) permit, staff believes it would be prudent to limit work on linear facilities that pass within 300 feet of residential property to these hours. To ensure compliance with these restrictions, staff proposes Condition of Certification **NOISE-8**.

Vibration

The only construction operation likely to produce vibration that could be perceived off-site would be pile driving. The applicant anticipates no pile driving will be required for construction of the PPP; therefore, no vibration impacts are likely.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards, and has recognized those applicable LORS that would protect construction workers (SVP 2002a, AFC §§ 8.7.5.1, 8.7.5.2) To ensure that construction workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-3**.

PROJECT SPECIFIC IMPACTS — OPERATION

Community Effects

Power plant noise is unique. A power plant operates as essentially a steady, continuous noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or remove the impact.

In most cases, a power plant will be intended to operate around the clock for much of the year. Nighttime ambient noise levels are typically lower than the daytime levels; differences in background noise levels of 5 to 10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise level values to arrive at a reasonable baseline for comparison with the project's projected noise level. This

[2] Holidays are defined as: January 1st, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, Thanksgiving Day and the day after, and December 25th.

assumes the potential for annoyance due to power plant noise is greatest at night when residents are trying to sleep. The Granada Islamic School, on the other hand, is not expected to be in use at night; noise impacts on the school should be evaluated during normal school hours.

In addition, staff compares the projected project noise with applicable LORS, in this case, the City of Santa Clara General Plan and Noise Ordinance.

Power Plant Operation

During its operating life, the PPP would represent 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 shudown as the plant transitions to and from steady-state operation. At other times, such as when the plant would be shut down for lack of dispatch or for maintenance, noise levels would decrease.

The primary noise sources of the project will include the gas turbine generators, the steam turbine generator, gas turbine air inlets, HRSG exhaust stacks, the natural gas fuel compressors, electrical transformers, and various pumps. The noise emanating from a power plant during normal operation is generally broadband, steady state in nature.

The applicant performed acoustical calculations to determine the project's noise impacts on sensitive receptors, and to identify any necessary mitigation measures. Calculations were based on typical manufacturer noise data for the major equipment (SVP 2002a, AFC Table 8.7-5). These projections are shown in **NOISE Table 8**.

NOISE Table 8
Applicant's Plant Operational Noise Impacts (dBA)

Receptor	Ambient Nighttime Background (L_{90})	Projected Power Plant Noise Level	Increase over Ambient
Lafayette Street Residences	47.6	41.3	-6.3
North Site Boundary	Not applicable*	78 unmitigated 60 mitigated	Not applicable
Granada Islamic School	52.6	42.5	-10.1
Laurelwood Road Apartments	55.3	45.3	-10

*This location is not a sensitive receptor
Source: SVP 2002a, AFC Table 8.7-5

The applicant's ambient nighttime background values (see **NOISE Table 4**) were an average of all nine nighttime hours. Inspection of the individual graphs of one-hour statistical measured sound levels (SVP 2002a, AFC Tables 8.7-3 through 8.7-6), however, shows that the background levels are relatively low for a period of four or five hours centered around 2 a.m., with increasing levels before and after this time span. This is to be expected where late evening and early morning commute traffic influence the background noise, as is certainly the case here, with the proximity of

US Highway 101. In such case, Energy Commission staff commonly averages background noise levels of the four quietest hours of the night, to exclude effects of commute traffic. With this adjustment figured in, staff's predicted operational noise impacts are summarized in **NOISE Table 9**.

NOISE Table 9
Staff's Plant Operational Noise Impacts (dBA)

Receptor	4-hour Ambient Nighttime Background (L_{90})	Projected Power Plant Noise Level	Resultant Noise Level	Increase over Ambient
Lafayette Street Residences	44.4	41.3	46.4	+2
North Site Boundary	Not applicable*	78 unmitigated 60 mitigated	Not applicable	Not applicable
Granada Islamic School	56.2**	42.5	56.2	0
Laurelwood Road Apartments	48.7	45.3	50.7	+2

*This location is not a sensitive receptor
**Nighttime noise is not a factor at this receptor; figure is for school hours, 8 a.m. to 3 p.m.
Source: SVP 2002a, AFC Tables 8.7-1 and 8.7-5 and staff calculations

Even with staff's more conservative evaluation of nighttime ambient noise levels at the two residential receptors, it is seen that power plant noise would be lower than the existing ambient noise level by 3 dBA, resulting in a net increase in background noise of 2 dBA. Such an increase is practically undetectable, and should not be annoying to residents.

Since the school is only in use during daytime, staff compared projected plant noise to the daytime average ambient during (assumed) school hours. Since plant noise would be 14 dBA less than ambient, the plant would be inaudible at the school.

Plant noise at the project site boundary would not affect any sensitive receptors, as all the plant's neighbors are in an industrial zone. Therefore, noise at the site boundary need only comply with LORS. The City of Santa Clara's General Plan limits noise at the site boundary to 70 dBA CNEL, or 63.3 dBA L_{eq}, while the City's Noise Ordinance limits this noise to 70 dBA L_{eq}. In order to meet the more stringent General Plan limit, the plant's projected noise level of 78 dBA would require mitigation. The applicant proposes to apply appropriate mitigation measures to reduce plant noise to this level. These measures could include any or all of the following, as needed:

1 noise barrier walls on the north, west and northeast site boundaries;

2 a noise barrier wall east and south of the steam turbine generator;

3 a noise barrier wall north, east and south of the circulating water pumps;

4 splash baffles, closed ends and closable louvers on the cooling tower;

5 purchase of quieter equipment; and

6 a building enclosing the natural gas compressors.

To ensure that the plant would not exceed these projected noise levels at the site boundary or at any sensitive receptor, staff has proposed Condition of Certification **NOISE-6**.

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. Intermittent noises would include steam relief valves venting during startup, shutdown or unplanned unit trips. The applicant plans to pay attention to overall noise in design, and to install appropriate vent silencers to eliminate these factors as possible sources of annoyance (SVP 2002a, AFC § 8.7.2.3).

Linear Facilities

All water and gas piping will lie underground, and will be silent during operation. Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line, and will thus be inaudible to any receptors.

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration), and through the air (airborne vibration).

The operating components of a combined cycle power plant consist of high-speed gas and steam turbines, compressors, and various pumps. All of these pieces of equipment must be carefully balanced in order to operate; permissible vibration levels are on the order of 0.06 inches/second. The applicant calculates that, given normal attenuation through the soil, any equipment vibration would be reduced to less than 0.004 inches/second at the site boundary (SVP 2002a, AFC § 8.7.1.3). This is approximately the threshold at which an individual could detect the vibration, and is much less than the City Noise Ordinance limit of 0.01 inches/second (Santa Clara 1988, § 18-26.2(p)). Energy Commission staff agrees with this estimate, and agrees with the applicant that groundborne vibration from the PPP will be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves, and can rattle the walls of lightweight structures. The PPP's chief source of airborne vibration would be the gas turbines' exhaust. In a combined cycle plant such as the PPP, however, the exhaust must pass through the HRSGs before it reaches the atmosphere. The HRSGs act as extremely efficient mufflers; it would be exceedingly rare for such a plant to cause perceptible airborne vibration effects at receptors located as far away (approximately one-third to one-half mile) as the PPP's nearest sensitive receptors.

Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance workers from noise hazards, and has committed to comply with applicable LORS (SVP

2002a, AFC §§ 8.7.5.1, 8.7.5.2). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. The applicant would also implement a comprehensive hearing conservation program. To ensure that plant operating and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-7**.

CUMULATIVE IMPACTS

Section 15130 of the CEQA Guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, are considerable or that compound or increase other environmental impacts. The CEQA Guidelines require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the project alone.

Pursuant to CEQA, a cumulative impacts analysis can be performed by either 1) summarizing growth projections in an adopted general plan or in a prior certified environmental document, or 2) compiling a list of past, present, and probable future projects producing related or cumulative impacts. The second method has been utilized for the purposes of this Staff Assessment.

Neither the applicant nor Energy Commission staff is aware of any other similar projects in the immediate area. Since noise impacts from two projects can only accumulate if the projects are relatively near each other, i.e., within less than half a mile, staff believes no cumulative noise impacts are likely for the PPP.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the population of people of color is greater than 50 percent within a six-mile radius of the proposed Pico Power Project (please refer to **Socioeconomics Figure 1** in this document), and Census 2000 information that shows the low-income population is less than 50 percent within the same radius. Based on this **Noise and Vibration** analysis, staff has identified no significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no **Noise and Vibration** environmental justice issues related to this project.

FACILITY CLOSURE

In the future, upon closure of the PPP, all operational noise from the project would cease, and no further adverse noise impacts from operation of the PPP would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment, and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction of the PPP, it can be treated similarly. That is, noisy work could be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that were in existence at that time would apply. Applicable Conditions of Certification included in the Energy Commission Decision would also apply unless modified.

CONCLUSIONS AND RECOMMENDATIONS

Energy Commission staff concludes that the PPP, constructed and operated with the applicant's proposed mitigation measures, can be built to comply with all applicable noise laws, ordinances, regulations and standards. Staff further concludes that if the PPP is built as described above, it is not expected to produce significant adverse noise impacts. Analysis further shows that there will be no cumulative impacts with another project, and no significant direct or cumulative noise impacts to an environmental justice population.

To ensure compliance with all applicable noise LORS and mitigation of noise impacts to less than significant levels, staff recommends adoption of the following Conditions of Certification.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one-half mile of the site and the linear facilities, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the Compliance Project Manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed, and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- If the noise is project related, take all feasible measures to reduce the noise at its source; and

- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts; and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form, with the local jurisdiction and the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a 3-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program. The project owner shall make the program available to Cal-OSHA upon request.

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 80 dBA measured at a distance of 100 feet. The project owner shall conduct steam blows only during the hours specified in Condition of Certification **NOISE-8**, 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 49 dBA L_{eq} measured at the apartments at 1425 Laurelwood Road. 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, school principals 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, schools 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 the residents, schools and businesses 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 operation of the project will not cause noise levels due to plant operation to exceed 45 dBA L_{eq} measured at the apartments at 1425 Laurelwood Road, and that the noise due to plant operation will comply with the noise standards of the City of Santa Clara General Plan, or 63.3 dBA L_{eq} at the site boundaries.

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.

A. When the project first achieves a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at the monitoring site near the apartments at 1425 Laurelwood Road. This survey during power plant operation 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.

B. If the results from the noise survey indicate that the power plant noise level (L_{eq}) at the affected receptor exceeds the above value for any given hour during the 25-hour period, or that the noise standards of the LORS have been exceeded, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.

C. If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: The survey shall take place within 30 days of the project first achieving a sustained output of 80 percent or greater of rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the City of Santa Clara Planning Department, and to the CPM. Included in the survey report will be a description of any additional mitigation measures necessary to achieve

compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

NOISE-7 Following the project first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

CONSTRUCTION TIME RESTRICTIONS

NOISE-8 Heavy equipment operation and noisy construction work relating to any project features that lie within 300 feet of residentially zoned property shall be restricted to the times of day delineated below:

Monday through Friday	7 a.m. to 6 p.m.
Saturday	9 a.m. to 6 p.m.
Sunday and Holidays	Not permissible

Noise due to high pressure steam blows shall be restricted to the times of day delineated below:

Monday through Friday	7 a.m. to 6 p.m.
Saturday	9 a.m. to 6 p.m.
Sunday and Holidays	Not permissible

Holidays are defined as January 1st, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, Thanksgiving Day and the day after, and December 25th.

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

Pico Power Project (02-AFC-3)
NOISE COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number: _____
Date complaint received: _____ Time complaint received: _____
Nature of noise complaint:
Definition of problem after investigation by plant personnel: Date complainant first contacted: _____
Initial noise levels at 3 feet from noise source _____ dBA Date: _____ Initial noise levels at complainant's property: _____ dBA Date: _____ Final noise levels at 3 feet from noise source: _____ dBA Date: _____ Final noise levels at complainant's property: _____ dBA Date: _____
Description of corrective measures taken: Complainant's signature: _____ Date: _____
Approximate installed cost of corrective measures: $ _____ Date installation completed: _____ Date first letter sent to complainant: _____ (copy attached) Date final letter sent to complainant: _____ (copy attached)
This information is certified to be correct: Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

REFERENCES

Santa Clara (City of Santa Clara). 1988. Noise Ordinance, “Regulation of Noise and Vibration,” Ordinance No. 1588, dated June 14, 1988.

Santa Clara (City of Santa Clara). 1992. General Plan, Chapter 5.8, Noise, dated July 28, 1992.

Santa Clara (City of Santa Clara). 1996. Santa Clara City Code, Regulation of Off-Street Operation of Certain Construction Sites, section 18-32, dated February 1, 1996.

SVP (Silicon Valley Power). 2002 a. Application for Certification, Pico Power Project (02-AFC-3). Submitted to the California Energy Commission, October 7, 2002.

NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (Effects of Noise on People, U.S. Environmental Protection Agency, December 31,1971).

In order to help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** has been provided to illustrate common noises and their associated sound levels, in dBA.

Noise Table A1 Definition of Some Technical Terms Related to Noise	
Terms	**Definitions**
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

Noise Table A2 Typical Environmental and Industry Sound Levels			
Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

SUBJECTIVE RESPONSE TO NOISE

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1 Except under special conditions, a change in sound level of one dB cannot be perceived.

2 Outside of the laboratory, a three dB change is considered a barely noticeable difference.

3 A change in level of at least five dB is required before any noticeable change in community response would be expected.

4 A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, 1970)

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

Noise Table A3
Addition of Decibel Values

When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Architectural Acoustics, M. David Egan, 1988

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by six dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

Noise Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 C.F.R. § 1910.95

PUBLIC HEALTH

Testimony of Obed Odoemelam, Ph.D.

INTRODUCTION

Operating the proposed Pico Power Project (PPP) would produce combustion products and other operations-related air pollutants to which the general public and workers might be exposed. Such exposures can produce specific health symptoms in humans and are the focus of federal and state requirements for specific technological and operational controls. The issue of possible worker exposure is addressed in the **Worker Safety and Fire Protection** section, while the health significance of exposure to the project-related electric and magnetic fields (EMF) is addressed in the **Transmission Line Safety and Nuisance** section. Potential impacts from waste generation and disposal are discussed in the **Waste Management** section.

The air pollutants of specific concern for PPP and similar gas-fired facilities are categorized as criteria pollutants and non-criteria pollutants. The non-criteria pollutants are also known as air toxics or toxic air contaminants (TACs) to reflect the nature of their biological interactions. The criteria pollutants differ from the air toxics in that the former have specific federal and state air quality standards, which were established to protect against significant health impacts in humans. The health impacts of criteria pollutants are discussed in **Public Health: Attachment A**, while the potential for air quality violations is addressed in the **Air Quality** section. When a project is proposed for an area incurring violations of air quality standards, specific mitigation might be necessary to prevent significant additions to existing levels of the pollutants involved. Because this project is proposed for an air basin that is in violation of specific air quality standards as noted by the applicant, Silicon Valley Power (SVP 2002, pages 8.1-7 through 8.1-11), and discussed in the **Air Quality** section, specific mitigation is recommended in that section.

The purpose of this **Public Health** analysis is to determine if the noted emissions from the proposed PPP would have the **potential** to cause significant adverse public health impacts or violate standards set for the protection of the public health. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to levels of insignificance.

METHOD FOR ASSESSING THE CANCER AND NON-CANCER IMPACTS OF TOXIC AIR POLLUTANTS

Any air toxics-related health risks from operating the proposed PPP and similar projects would mainly be associated with emissions from the natural gas-fired combustion turbines, duct burners, and cooling towers. An additional health-related concern relates to the potential for Legionella bacteria dispersed from cooling towers (see below).

For the surrounding population, the risk of cancer or non-cancer effects is assessed from exposure estimates obtained from dispersion modeling. According to present knowledge, cancer begins with specific impacts at the genetic level, suggesting a specific (if theoretical) risk from every exposure to a carcinogen. The aim of present

regulations is to eliminate all such exposures to the extent feasible for the source in question. This non-threshold concept is recognized as sharply contrasting with assumptions about non-cancer effects, which are assumed to result only from exposure above specific levels (referred to as thresholds), meaning that significant non-cancer health impacts would be prevented by maintaining exposures below the applicable exposure standards.

The procedure used for assessing both cancer and non-cancer impacts is known as a health risk assessment, which consists of the following steps:

- Hazard identification, in which each pollutant of concern is identified along with possible health effects;
- Dose-response assessment, in which the relationship between the magnitude of exposure and the probability of effects is established;
- Exposure assessment, in which the possible extent of pollutant exposures from a project is established for all possible pathways by dispersion modeling; and
- Risk characterization, in which the nature and the magnitude of the possible human health risk is assessed.
-

As discussed further below, the health risk assessment process is purposely designed to be intentionally biased toward the protection of public health. 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 an individual's exposure to cancer-causing agents occurs for 70 years.

Health Effects Assessed

The risk assessment process addresses three categories of health impacts: acute non-cancer health effects from short-term, usually high-level exposure; chronic non-cancer effects from long-term, usually low-level exposure; and cancer, also from long-term, usually low-level exposure. The carcinogenic pollutants can also induce specific non-cancer effects in addition to their cancer-causing effects.

Acute health effects usually manifest themselves within one hour of exposure and caused by the high-level exposure that might result, for example, from accidental chemical spills or failure of emission control equipment. (Although the acute effects

analysis in this section is concerned with routine emissions, accidental emissions are examined in the **Hazardous Materials** section). Acute effects are usually temporary in nature, and include symptoms such as eye, skin, or respiratory tract irritation.

Chronic health effects are those arising from long-term exposures such as those from normal project operations. The exposure period in this case is considered to be one that is greater than 12 percent of a lifetime of 70 years. Thus, human exposures of greater than eight years are categorized as chronic exposures. Chronic health effects include diseases such as cancer, reduced lung function, and heart disease. The types of health impacts in question are presented in **Public Health Table 1** together with the applicable exposure routes and the pollutants most commonly involved.

Public Health Table 1
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions from Natural Gas Fired Combined Cycle Projects

Substance	Oral Cancer	Oral Non-cancer	Inhalation Cancer	Non-cancer (Chronic)	Non-cancer (Acute)
Acetaldehyde			✔	✔	
Acrolein				✔	✔
Ammonia				✔	✔
Arsenic	✔	✔	✔	✔	✔
Benzene			✔	✔	✔
1,3-Butadiene			✔	✔	
Cadmium		✔	✔	✔	
Chromium			✔	✔	
Copper				✔	✔
Ethylbenzene				✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Lead	✔	✔	✔	✔	
Mercury		✔		✔	✔
Napthalene		✔		✔	
Nickel			✔	✔	✔
Polynuclear Aromatic Hydrocarbons (PAHs)	✔	✔	✔	✔	
Propylene				✔	
Propylene oxide			✔	✔	✔
Toluene				✔	✔
Xylene				✔	✔
Zinc				✔	

Source: SVP 2002 as prepared using reference exposure levels and cancer unit risks from CAPCOA Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines, October 1993, and SRP 1998.

Estimating The Risk Of Non-Cancer Effects

The method used by regulatory agencies to quantify the likelihood of acute or chronic impacts of air toxics is the hazard index method. In the current assessment approach, a hazard index is calculated as a numerical representation of the likelihood of significant health impacts at the exposure levels expected for the source being considered. This index is calculated by dividing the exposure estimate by the applicable reference exposure level (the amount of a toxic substance to which even sensitive people can be exposed and suffer no adverse health effects). After calculating the hazard indices for the individual pollutants, these indices are added together for all those that affect the same part of the body or target organ, to obtain a total hazard index for the source. Total hazard indices of 1.0 or less are regarded by most regulatory agencies as indicating an insignificant addition to the non-cancer effects being considered. An index of more than 1.0 would reflect a potential for significant impacts.

Estimating The Risk Of Cancer

The risk of cancer is assumed to increase with the exposure level and exposure duration, meaning for example that the risk from longer exposures to a carcinogen would be higher than the risk from shorter exposures. Theoretically, however, a single exposure to such a carcinogen could induce the cancer, which could further develop without additional exposure. Therefore, the potential for cancer is considered to be more sensitive than the potential for non-cancer symptoms in assessing the probability of a significant health risk from a source of carcinogens and non-carcinogens.

For any source of specific concern, the risk of operations-related cancer is obtained by multiplying the exposure estimate by the potency factors for the individual carcinogens to be emitted. These potency factors are numerical values conservatively established to represent the cancer-causing potential of one carcinogen as compared to the others. After calculating these individual risk values, they are added together to obtain the total incremental cancer risk estimate from operating the project over a period conservatively assumed to span the 70-year lifetime of the average individual. Given the conservative nature of this risk calculation process, these numerical estimates are regarded by scientists as only representing the upper bounds on the project-related cancer risk at issue. The actual risk will likely be lower and could indeed be zero. The significance of these estimates as indicators of a real cancer hazard is assessed according to specific evaluative criteria as discussed below.

STAFF'S SIGNIFICANCE CRITERIA

Various state and federal agencies specify different cancer risk levels as levels of significance for specific action. For example, a risk of 10 in a million is mostly considered significant under the Air Toxics "Hot Spots" (AB 2588) and the Proposition 65 programs and, therefore, used as a threshold for public notification in cases of air toxics emissions from existing sources.

In current regulatory practice, most health risk assessments are conducted in two phases. In the first phase (which is the screening-level phase), risk calculations are made using conservative, simplifying assumptions, which tend to overestimate rather than underestimate the risk. If the estimate from this screening-level analysis is below

one in a million, staff would regard the suggested cancer risk as insignificant and not warranting further analysis for specific action. If the estimate is more than 10 in a million, a more refined analysis (using more situation-specific assumptions) might be necessary to more fully assess the need for mitigation. In such a refined analysis, staff would recommend specific mitigation only when the risk estimate is 10 in a million or more. This limit-based regulatory approach is intended to reduce the rate of addition to the previously noted high (approximately 1 in 4, or 250,000 in a million) background cancer risk of the average individual. While the causes of some types of cancers are well known, the causes of most of human cancers remain largely unknown. What has become increasingly clear to scientists, however, is that environmental pollutants are responsible for only a small fraction of human cancers in general. The South Coast Air Quality Management District (SCAQMD 2000, page 2) estimated this fraction as only about 2 percent of cancer cases.

For non-carcinogenic pollutants, staff considers significant health impacts to be unlikely when the total hazard index is 1.0 or less. If more than 1.0, staff would regard the related emissions as potentially significant from an environmental health perspective but would recommend specific mitigation only after further considering how the calculated value was influenced by the uncertainties in the assessment process.

LAWS ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The following LORS were established to protect against the impacts of the noted criteria pollutants and the air toxics-related impacts of specific concern in this analysis.

FEDERAL

Clean Air Act section 112 (42 U.S. Code section 7412)

This section 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 section 41700

This section of the code states that “[n]o 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 business or property.”

California Health and Safety Code section 39650 et seq.

This section of the code mandates that the California Environmental Protection Agency (Cal-EPA) establish safe exposure limits for toxic, non-criteria air pollutants and identify the best available methods for controlling their emission. These laws also require that the new source review rules for each Air District include regulations establishing procedures for controlling the emission of these pollutants. The toxic emissions from

natural gas combustion are listed in ARB's Toxic Emissions Factors (CATEF) database for natural gas-fired combustion turbines to allow for uniform assessment of toxic emissions from combustion and non-combustion sources in the state. Cal-EPA has developed specific cancer potency estimates for assessing any cancer risk that these air toxics may pose at specific exposure levels. For toxic air pollutants that do not cause cancer, Cal-EPA established specific no-effects levels (known as reference exposure levels or RELs) for assessing the likelihood of producing health effects at specific exposure levels. Such health effects would be considered significant only when exposure exceeds these reference levels. Staff uses these Cal-EPA potency estimates and reference exposure values in its health risk analyses.

California Code of Regulations, Title 22, Section 60306

This section requires that, whenever a cooling system uses recycled water in conjunction with an air conditioning facility and a cooling tower that creates a mist that could come into contact with employees or members of the public, a drift eliminator shall be used and chlorine or other biocides shall be used to treat the cooling system recirculating water to minimize the growth of Legionella and other micro-organisms.

LOCAL

Bay Area Air Quality Management District (BAAQMD) Rule 2-1-316

This rule specifies the procedures necessary to minimize the emission of air toxics from specific sources as required by the Health and Safety Code section 44300.

BAAQMD Regulation 1, Section 301, "Public Nuisance" (Amended 10/98).

Requirements of this regulation allow for implementation of the emission control measures necessary for compliance with provisions of the Health and Safety Code, section 41700.

SETTING

EXISTING AIR QUALITY

The proposed project site is within the jurisdiction of the BAAQMD, which includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, the western portion of Solano, and the southern portion of Sonoma counties). BAAQMD conducts ambient monitoring of 13 gaseous toxic air contaminants at 17 locations throughout the district. By combining average toxic concentration levels from all monitoring sites with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. When other exposure pathways are also considered significant, their potential contribution will have to be included in the calculation. Many of the carcinogens from the proposed PPP and similar sources belong to the group for which the non-inhalation pathways might be significant, and these are included in the project-specific discussion below.

The BAAQMD uses the same risk assessment approach referred to above to estimate the air toxics-related background cancer risks in the Bay area in order to assess the effectiveness of its district-wide risk reduction programs. The calculated background inhalation cancer risk for the Bay area for 2000 is approximately 167 in a million (BAAQMD 2001, p.24), which can be compared with the average individual lifetime cancer risk of about 1 in 4, or 250,000 in a million. The two highest contributors to this risk were 1,3-butadiene and benzene (which are emitted primarily from mobile sources) , accounting for about 55 in a million and 44 in a million, respectively. Formaldehyde (which is emitted directly from motor vehicles and other combustion sources) was identified as accounting for about 8.5 percent of this risk.

The use of reformulated gasoline (which began in the second quarter of 1996), together with other toxics reduction measures, has been significantly responsible for the continuing success of the BAAQMD at reducing this air toxics-related background cancer risk. The Air District has noted in this regard, that the risk from the1992 data was calculated as 342 in a million while the risks for 1994 and 1995 were calculated as 315 in a million and 303 in a million, respectively. Minimizing the risks from sources such as the proposed PPP is an important part of this continuing reduction effort.

SITE AND VICINITY DESCRIPTION

According to the information from the applicant (SVP 2002, pages 8.1-1, 8.6-2, 8.9-1, and 8.14-1), the proposed project site is a 2.86-acre parcel located west of the intersection of Lafayette Street and Duane Avenue in the City of Santa Clara, in Santa Clara County, California. The site is in an area of light industrial uses and is currently vacant, with the western two-thirds utilized as a parking area, street-sweeper wash station, and equipment storage area by the City of Santa Clara. The site is relatively flat with an average elevation of 32 feet above sea level and is crossed by several 115 kV lines and one 60 kV line as they extend into the adjacent SVP Kifer Substation. The nearest residences are located approximately 0.39 miles to the west-northwest with US Highway 101 located approximately 415 feet to the north.

The applicant (SVP 2002, pages 8.9-2 and 8.9-3) has provided a listing of the locations with sensitive receptors within a six-mile radius of the site. A sensitive receptor location, for purposes of a public health analysis, is an establishment that houses sensitive individuals such as children, the elderly, and individuals with respiratory diseases. The institutions in this case were identified as convalescent homes, hospitals and schools. Since these sensitive individuals are more sensitive than the average individual to the effects of environmental pollutants, their response is specifically considered in establishing the safe exposure limits for such pollutants. When many sensitive receptor locations are in a project area, the probability of health complaints might increase when the pollutant exposure of concern begins. However, staff holds all projects to the same health standards whether proposed for a major population center with many sensitive receptors or a sparsely populated area with relatively few.

The health effects of the air toxics of specific concern in this analysis are assessed individually by staff according to their potential to induce cancer or effects other than cancer. Staff would not recommend certification if any potential health impacts were

determined to be significant. Such a determination is made using the method discussed below.

IMPACTS

POTENTIAL IMPACTS OF PROJECT'S NON-CRITERIA POLLUTANTS

The health impacts of PPP's non-criteria pollutants of specific concern in this analysis can be assessed separately as construction-phase impacts and operational-phase impacts.

Construction Phase Impacts

Possible construction-phase health impacts, as noted by the applicant (PPP 2002, Appendix 8.1E), are those from human exposure to (a) the windblown dust from site excavation, and grading, and (b) emissions from construction equipment. The dust-related impacts may derive from exposure to the dust itself as PM_{10} (particulate matter less than 10 microns in size), or exposure to any toxic contaminants that might be adsorbed onto it. Specific conditions of certification are proposed in the **Waste Management** section to prevent worker or public exposure to soil-bound contaminants. Since, as more fully discussed in the **Waste Management** Section, the results from Phases I and II Site assessments for the proposed site (SVP 2002, Appendix 8.14-A, and 2003) did not identify any significant contamination, staff does not expect a significant health risk from soil-bound contaminants in the construction phase. The only soil-related construction impacts of potential significance would derive from the possible impacts of PM_{10} as a criteria pollutant (as fugitive dust). As mentioned earlier, the potential for significant impacts from criteria pollutants is assessed in the **Air Quality** section.

The exhaust from diesel-fueled construction and other equipment has been established as a potent human carcinogen. Thus, construction-related emission levels should be regarded as possibly adding to the carcinogenic risk of specific concern in this analysis. AFC Appendix 8.1E presents the diesel emissions from the different types of equipment to be used in the construction phase. The emission rates for the generated fugitive dust was also presented. The maximum cancer risk from the use of diesel-fueled equipment for PPP's construction was calculated by the applicant to be 1.38 in a million for the maximally exposed individual located near the project property line (SVP 2002, Appendix 8.1-D). As noted by the applicant, this screening-level calculation was made to reflect the effectiveness of the applicant's proposed emission control measures referred to below. Such a screening-level risk estimate is not considered by staff as warranting more mitigation than specified in the applicant's Construction Mitigation Plan (SVP 2002, Appendix 8.1E). Specific conditions of certification (**AQ-SC3 and AQ-SC4**) are recommended in the **Air Quality** section to ensure implementation. Staff considers these requirements as adequate for preventing the cancer and non-cancer risks of concern.

Operational Impacts

As noted in a publication by the South Coast Air Quality Management District (SCAQMD 2000, page 6), one property that distinguishes the air toxics of concern in

this analysis from the criteria pollutants is that the impacts from air toxics tend to be highest in close proximity to the source and quickly drop off with distance. This means that the levels of PPP's air toxics would be highest in the location established by air dispersion modeling to constitute the maximum impact and would decrease rapidly with distance. One main focus of this analysis, as previously noted, is to establish whether or not such exposures would be at levels of possible health significance as established using existing assessment methods.

The applicant's estimates of the PPP's potential contribution to the area's carcinogenic and non-carcinogenic pollutants were obtained from a screening-level health risk assessment conducted according to procedures specified in the 1993 California Air Pollution Control Officer's Association (CAPCOA) guidelines. The results from this assessment (summarized in Staff's **Public Health Table 2**) were provided to staff along with documentation of the assumptions used (SVP 2002, pages 8.1-40, 8.1-41,8.9-9 through 8.9-12, and Appendix 8.1-D). This documentation included:

- Pollutants considered;
- Emission levels assumed for the pollutants involved;
- Dispersion modeling estimates of potential exposure levels;
- Exposure pathways considered;
- The cancer risk estimation process;
- Hazard index calculation; and
- Characterization of project-related risk estimates.

Staff has found these assumptions to be acceptable and has validated the applicant's findings with regard to the numerical public health risk estimates expressed either in terms of the hazard index for each non-carcinogenic pollutant, or a cancer risk for estimated levels of the carcinogenic pollutants. These analyses were conducted to establish the maximum potential for acute and chronic effects on body systems such as the liver, central nervous system, the immune system, kidneys, the reproductive system, the skin and the respiratory system.

Public Health Table 2
Operation Hazard/Risk

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
ACUTE NONCANCER	0.205	1.0	No
CHRONIC NONCANCER	0.014	1.0	No
INDIVIDUAL CANCER	0.133×10^{-6}	10.0×10^{-6}	No

Source: SVP 2002 pages 8.9-9 through 8.9-12

As shown in **Public Health Table 2**, the chronic hazard index for the maximally exposed individual is 0.014, while the maximum hazard index for acute effects is 0.205. These values are well below staff's significance criteria, suggesting that the pollutants in

questions are unlikely to pose a significant risk of chronic or acute health effects anywhere in the project area.

The cancer risk to the maximally exposed individual is shown as 0.133 in a million, which is well below staff's significance criterion of 10 in one million for this screening level assessment, thus showing that any project-related cancer risk would be insignificant for all the individuals in the project area.

The conservatism in the cancer risk calculation is reflected in the previously noted fact that (a) the individual considered is assumed to be exposed at the highest possible levels to all the carcinogenic pollutants from the project for a 70-year lifetime, (b) all the carcinogens are assumed to be equally potent in humans and experimental animals, even when their cancer-inducing abilities have not been established in humans, and (c) humans are assumed to be as susceptible as the most sensitive experimental animal, despite knowledge that cancer potencies often differ between humans and experimental animals. Only a relatively few of the many environmental chemicals identified so far as capable of inducing cancer in animals have been shown to also cause cancer in humans.

Cooling Tower-Related Risk of Legionnaire's Disease

In addition to toxic air contaminants, the possibility (however remote) exists for bacterial growth to occur in the cooling tower, including Legionella. Any project-related risk of Legionnaires' disease (Legionellosis) would result from inhalation exposure to the causative agent, Legionella pneumophila, a bacterium that is common in the general environment. According to the available literature, any significant risk of specific outbreaks is related to uncontrolled growth in standing water followed by exposure at an infective dose, which differs according to the individual's susceptibility to microbial infection in general. The available information shows that most outbreaks in the United States occur in cases of either high-level exposure from uncontrolled growth and multiplication in inadequately treated cooling system water, or relatively low-level exposure to individuals with reduced resistance to microbial infections. Such individuals are most commonly found in hospitals, nursing homes or other institutions housing individuals with weak immune systems. Outbreaks are most commonly associated with microbial growth-enhancing conditions in commercial building heating, ventilating, and air conditioning (HVAC) systems, but are possible from growth in industrial cooling towers. The main risk from PPP and similar sources is the possibility of Legionella emission and transport into the surrounding areas where related disease outbreaks may be primary (that is from direct inhalation of the emitted organism) or secondary (being to secondary growth and multiplication in microbial growth-facilitating environments).

The U.S. Environmental Protection Agency (U.S. EPA) has published a review of the Legionellosis issue in a criteria document (EPA 1999) where it noted that Legionella's survival is enhanced by symbiotic interactions with other microorganisms in cases of nutrient availability. Its dispersion after growth and multiplication could occur from being transported within the aerosols or water droplets from the source in question. The available information has shown that outbreaks most commonly result from growth and multiplication in cooling towers and evaporative condensers in hospitals, hotels, and public buildings, thus, establishing these sources as suitable habitats for the bacterium. Kool et al (2000) reported in this regard that Legionella was detected in water systems

of 11 of 12 hospitals examined in San Antonio, TX. They found, interestingly, that the number of Legionnellosis cases in each of these hospitals was better correlated with the proportion of water-system sites that tested positive for Legionella than with the concentration of the bacterium in water systems. This suggests that outbreaks may not always be related to excessively high Legionella concentration in the system waters involved. While most outbreaks have resulted from indoor exposure, the U.S. EPA has established that they are also possible from outdoor exposures at distances of up to 200 meters from the source the bacterium.

The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to allow for the type of dose-response evaluation necessary for quantitative risk assessments. The present practice among regulators is to conservatively regard every exposure, no matter how small, as posing a specific risk of disease in exposed humans. However, staff would caution against assumptions that would lead to an overestimation of the risk to the individual with normal immunity to bacterial infection. Such individuals are not easily infected from encounter at normal environmental levels.

The U.S. EPA has also published a Legionella Drinking Water Health Advisory (EPA 2001) noting that there are several effective methods for controlling Legionella growth and multiplication in cooling water systems. These disinfection procedures might involve back flushing, hyperchlorination, copper-silver ionization, ultraviolet light-based sterilization, ozonation, and steam-based sterilization.

As noted in the LORS section above, the State of California regulates recycled water that is used for cooling towers operations according to requirements in Title 22, California Code of Regulations, section 60303. These requirements mandate the use of chlorine or other biocides to the extent necessary for adequate sterilization against Legionella and other microorganisms.

The appropriateness of staff's concern for this project regarding this issue is reflected in the reports of Addiss, David, et al. (1989), and Bhopal et al. (1991) who linked the outbreak of Legionellosis around specific cooling towers to failure to properly disinfect the utilized water. Since the conditions that facilitate the requisite growth and multiplication are well established, all current preventive measures are aimed at factors that prevent such conditions. However, such control efforts might be hampered if growth of bio-film affects the bactericidal action of the biocides being used. This means that the biocides that may be effective against other common bacteria may not be relied upon to effectively control Legionella survival and growth.

Since specific nutrients are necessary for Legionella growth, effective mitigation measures should include a cleaning and maintenance program to minimize the accumulation of needed nutrients. ASHRAE (1998) emphasizes the need for such programs in its specifications for Legionellosis prevention. Preventive maintenance in this regard includes having effective drift eliminators (which serve to minimize the widespread transport of the aerosols or droplets containing the bacterium), periodically cleaning the system as appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling and not necessarily to control Legionella.

Staff's recommended condition of certification **(Public Health-1**) is intended to ensure the effective maintenance and bactericidal action necessary during the operation of PPP's cooling tower.

In assessing the appropriateness of the proposed condition of certification, staff would note for example that the County of San Diego Department of Environmental Health (2001) recommends that when using recycled water in cooling towers, drift eliminators should be used, and a chorine or other biocide should be used to treat the cooling system water to minimize growth of Legionella and other microorganisms. Although Legionella is not specifically regulated by either the San Diego Air Pollution Control District nor the BAAQMD, BAAQMD's regulations include suggestions to follow guidelines and recommendations made by the Cooling Technology Institute in their February 2000 report entitled "Legionellosis, Guideline: Best Practices for Control of Legionella" (CTI 2000).

The following ASHRAE control strategies (ASHRAE 1998 and 2000) are specifically intended to minimize bacterial growth and multiplication in potentially problem sources:

- Avoiding piping that is capped and/or has restricted water flow (dead legs).
- Controlling the input water temperature to avoid temperature ranges where Legionella grow best. The temperature of cold water should be kept below 25° C (77° F) and hot water above 55° C (131° F).
- Biocide application in accordance with label specifications necessary to control the growth of other bacteria, or algae, and protozoa that may contribute to nutritional needs of Legionella. Different anti-microbial microbial approaches should be applied at specific intervals. These should include thermal shocks, oxidizing biocides, chlorine-based oxidants and ozone treatment.
- Conducting routine periodic "back-flushes" to remove bio-film buildup on the inside walls of the pipes.

Staff's recommended requirements are specifically intended to minimize Legionella growth through common antibacterial measures. The proposed condition would specifically require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. Staff believes that with the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growth and dispersal and associated health effects would be reduced to insignificance.

CUMULATIVE IMPACTS

As previously noted, the maximum impact location would be the spot where pollutant concentrations for the proposed PPP would theoretically be highest. Even at this location, staff does not expect any significant change in lifetime risk to any person, given the calculated incremental cancer risk of 0.133 in a million, which staff regards as not potentially contributing significantly to the previously noted average lifetime

individual cancer risk of 250,000 in a million. Modeled facility-related residential risks are much lower for more distant locations. Given the previously noted conservatism in the utilized calculation method, the actual risks would likely be much smaller. Therefore, staff does not consider the incremental impact of the additional risk posed by the PPP as pointing to a potentially significant contribution to the area's cancer risk.

The worst-case long-term non-cancer health impact from the project (represented as a hazard index of 0.014) is well below staff's significance level of 1.0 at the location of maximum impact. At this level, staff does not expect any cumulative health impacts to be significant. 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.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the area's minority population as more than 50 percent within a six-mile radius of the proposed PPP (please refer to **Socioeconomics Figure 1**). The available data also shows the low-income population to be less than 50 percent within the same radius. Since (a) environmental injustice is encountered in cases of pollutant emissions at levels of potential health significance and (b) the health risk from the project's operations were established as potentially insignificant, staff has determined that the project's operation would not result in a disproportionate adverse impact on minority or low-income populations.

COMPLIANCE WITH LORS

Since the cancer and non-cancer risks from PPP construction and operation reflect the effectiveness of the control measures required by the applicable LORS, staff concludes that the proposed construction and operational plan would comply with these LORS.

FACILITY CLOSURE

As noted in the introduction section, the toxic pollutants of primary concern in this analysis are those from routine operation of the proposed project. During temporary or permanent closure, the main concern would be over the non-routine releases of hazardous materials or wastes on site. Such releases are discussed respectively in the **Hazardous Materials** and **Waste Management** sections. Since project operations would be stopped during forced temporary closures, any hazardous releases would not be in significant amounts. During permanent closure, the only emissions of potential significance would derive from demolition or dismantling activities and the equipment used. Such emissions would be subject to controls according to requirements in conditions adopted by the Energy Commission after a closure plan is received from the project owner.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the toxic air emissions from the operation of the proposed natural gas-burning PPP would be at levels that do not require mitigation beyond that already proposed by the applicant. The conditions for ensuring compliance with all

applicable air quality standards are specified in the **Air Quality** section for the area's problem criteria pollutants. The potential impacts from construction-related toxic exposures would be minimized through compliance with related conditions in the **Air Quality** and **Waste Management** sections. Implementation of staff's proposed condition of certification in this section to reduce the likelihood of Legionella growth would ensure that the risk of Legionella growth dispersion is reduced to levels of insignificance.

If the proposed project is approved, staff would recommend the following condition of certification to address the Legionella problem of concern for the cooling tower.

PROPOSED CONDITION OF CERTIFICATION

Public Health-1 The project owner shall develop and implement a cooling tower Biocide Use, Bio-film Prevention, and Legionella Monitoring Program to ensure that the potential for bacterial growth is kept to an absolute minimum. This Program shall include weekly monitoring of biocide and chemical bio-film prevention agents, periodic maintenance of the cooling water system on a quarterly basis to remove bio-film buildup, and quarterly testing to determine the concentrations of the Legionella bacterium in the cooling water.

Verification: At least 60 days prior to the commencement of cooling tower operations, the project owner shall submit the Biocide Use, Biofilm Prevention, and Legionella Monitoring Program to the CPM for review and approval.

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ATTACHMENT A - CRITERIA POLLUTANT HEALTH EFFECTS

OZONE (O_3)

Ozone is not directly emitted from specific sources but is formed when reactive organic compounds (VOCs) interact with nitrogen oxides in the presence of sunlight. Heat speeds up the reaction, typically leading to higher concentrations in the relatively hot summer months. Ozone is a colorless, reactive gas with oxidative properties that allow for tissue damage in the exposed individual. The effects of such damage could be experienced as respiratory irritation that could interfere with normal respiratory function. Ozone can also damage plants and other materials susceptible to oxidative damage.

The U.S. EPA revised its federal ozone standard on July 18, 1997 (62 Fed. Reg. 38856), based on health studies that had became available since the standard was last revised in 1979. These new studies showed that adverse health effects could occur at ambient concentrations much lower than reflected in the previous standard, which was based on acute health effects experienced during heavy exercise. In proposing the new standard, the U.S. EPA identified specific health effects known to have been caused by short-term exposures (of one to three hours) and prolonged exposure (of six to eight hours) (61 Fed. Reg. 65719). The 8-hour ozone standard is currently in the process of being implemented.

Acute health effects from short-term exposures include a transient reduction in pulmonary function, and transient respiratory symptoms including cough, throat irritation, chest pain, nausea, and shortness of breath with associated effects on exercise performance. Other health effects of short-term or prolonged O_3 exposures include increased airway responsiveness (which predisposes the individual to bronchoconstriction induced by external stimuli such as pollen and dust), susceptibility to respiratory infection (through impairment of lung defense mechanisms), increased hospital admissions and emergency room visits, and transient pulmonary inflammation.

Generally, groups considered especially sensitive to the effects of air pollution include persons with existing respiratory diseases, children, pregnant women, and the elderly. However, controlled exposure data on people in clinical settings have indicated that the population at greatest risk of acute effects from ozone exposures as children and adults engaged in physical exercise. Children are most at risk because they are active outside, playing and exercising, during summer when ozone levels are highest. Adults who are outdoors and engaging in heavy exertion in the summer months are also among the individuals most at risk. This happens because such exertion increases the amount of O_3 entering the airways and can cause O_3 to penetrate to peripheral regions of the lung where lung tissue is more likely to be damaged. These individuals, as well as those with respiratory illnesses, such as asthma, can experience a reduction in lung function and increased respiratory symptoms, such as chest pain and cough, when exposed to relatively low ozone levels during periods of moderate exertion.

CARBON MONOXIDE (CO)

Carbon monoxide is a colorless, odorless gas, which is a product of inefficient combustion. It does not persist in the atmosphere, being quickly converted to carbon dioxide. However, it can reach high levels in localized areas, or "hot spots."

CO reduces the oxygen carrying capacity of the blood, thereby disrupting the delivery of oxygen to the body's organs and tissues. Persons sensitive to the effects of carbon monoxide include those whose oxygen supply or delivery is already compromised. Thus, groups potentially at risk to carbon monoxide exposure include persons with coronary artery disease, congestive heart failure, obstructive lung disease, vascular disease, and anemia, the elderly, newborn infants, and fetuses (CARB 1989, p. 9). In particular, people with coronary artery disease were found to be especially at risk from carbon monoxide exposure (CARB 1989, p. 9). Tests conducted on patients with confirmed coronary artery disease indicated that exposure to low levels of carbon monoxide during exercise can produce significant cardiac effects. These effects include chest pain (angina) and electrocardiographic changes indicative of effects on the heart muscle (CARB 1989, p. 6). Such changes can limit the ability of patients with coronary artery disease to exert themselves even moderately. Therefore, the statewide carbon monoxide one-hour and eight-hour standards were adopted in part to prevent aggravation of chest pain. Additionally, however, the standards are intended to prevent decreased exercise tolerance in persons with peripheral vascular disease and lung disease, impaired central nervous system functions, and effects on the fetus (Cal. Code Regs. Tit. 17, sec∋70200).

PARTICULATE MATTER (PM)

Particulate matter is a generic term for particles of various substances, which occur as either liquid droplets or small solids of a wide range of sizes. Particles with the most potential to adversely affect human health are those less than 10 micrometers (millionths of a meter) in diameter (or PM_{10}), which may be inhaled and deposited within the deep portions of the lung (PM_{10}). PM may originate from anthropogenic or natural sources such as stationary or mobile combustion sources or windblown dust. Particles may be emitted directly to the atmosphere or result from the physical and chemical transformation of gaseous emissions such as sulfur oxides, nitrogen oxides, and volatile organic compounds. PM_{10} may be made up of elements such as carbon, lead, and nickel; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and soil fragments. The size, chemical composition, and concentration of ambient 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 with 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.

Coarse-mode PM_{10} is formed by crushing, grinding, and abrasion of surfaces, and in the course of reducing large pieces of materials to smaller pieces. Coarse particles consist mainly of soil dust containing oxides of silicon, aluminum, calcium, and iron; as well as fly ash, particles from tires, pollen, spores, and plant and insect fragments. Coarse particles normally have shorter lifetimes (minutes to hours) and only travel over short distances (of less than tens of kilometers). They tend to be unevenly distributed across urban areas and have more localized effects than the finer particles.

$PM_{2.5}$ is derived both from combustion by-products, which have volatilized and condensed to form primary $PM_{2.5}$, and from precursor gases reacting in the atmosphere to form secondary $PM_{2.5}$. Components include nitrates, organic compounds, sulfates, ammonium compounds, and trace elements (including metals) as well as elemental carbon such as soot. Major sources of $PM_{2.5}$ are fossil fuel combustion by electric utilities, industry and motor vehicles, vegetation burning, and the smelting or other processing of metals. Dry deposition of fine mode particles is slow allowing such particles to often exist for long periods of time (of from days to weeks) in the atmosphere and travel hundreds to thousands of kilometers. They tend to be uniformly distributed over urban areas and larger regions and are removed from the atmosphere primarily by forming cloud droplets and falling out within raindrops.

The health effects of PM_{10} from any given source usually depend on the toxicity of its constituent pollutants. The size of the inhaled material usually determines where it is deposited in the respiratory system. Coarse particles are deposited most readily in the nose and throat area while the finer particles are more likely to be deposited within the bronchial tubes and air sacs, with the greatest percentage deposited in the air sacs. Until recently, PM_{10} particles had been considered to be the major fraction of airborne particulates responsible for various adverse health effects. The PM_{10} fraction is known to be capable of penetrating the thoracic and alveolar regions of the human and animal lungs. The $PM_{2.5}$ fraction, however, was found to pose a significantly higher risk for health. This is due to their size and associated deposition and retention characteristics in the respiratory tract, enabling it to penetrate and deposit within the deeper alveolar regions of the lung. The following aspects of $PM_{2.5}$ deposition all contribute to the more serious health effects attributed to smaller particles:

- The deposition of $PM_{2.5}$ favors the periphery of the lungs, which is especially vulnerable to injury for anatomical reasons.
- Clearance of the $PM_{2.5}$ from within the deeper reaches of the lungs is a much slower process than from the upper regions. Consequently, the residence time is longer, implying longer exposure, and hence greater risk.
- The human anatomy further allows the penetration of the superficial tissues by $PM_{2.5}$ and entry into the bodily circulation without much effort in the periphery of the lungs.

Many epidemiological studies have shown exposure to particulate matter capable of inducing a variety of health effects, including premature death, aggravation of respiratory and cardiovascular disease, changes in lung function and increases in existing respiratory symptoms, effects on lung tissue structure, and impacts on the body's respiratory defense mechanisms. The underlying biological mechanisms are still poorly understood. Based on their review of a number of these epidemiological studies (as published after 1987 when the federal standards were revised), together with suggestion of $PM_{2.5}$ concentrations as a more reliable surrogate for the health impacts of the finer fraction of PM than PM_{10}, the U.S. EPA concluded that the then-current standards were not sufficiently stringent to protect against significant effects in exposed humans. Therefore, federal PM standards were revised on July 18, 1997 (62 Fed. Reg. 38652) to add new annual and 24-hour $PM_{2.5}$ standards to the existing annual and 24-hour PM_{10} standards. Taken together, these new standards were meant to provide additional protection against a wide range of PM-related health effects, including

premature death, increased hospital admissions and emergency room visits, primarily among sensitive individuals such as the elderly, children and individuals with cardiopulmonary diseases such as asthma. Other impacts include decreased lung function (particularly in children and asthmatics), and alterations in lung tissue and structure.

California has also had 24-hour and annual standards for PM_{10} (CARB 1982, pp. 81,84). These studies were aimed at establishing the PM_{10} levels capable of inducing asthma, premature death and bronchitis-related symptoms. They were set to protect against such impacts in the general population as well as sensitive individuals such as patients with respiratory disease, declines in pulmonary function, especially as related to children (Tit. 17, Cal. Code Regs., sec. 70200). These standards were set to be more stringent than the federal standard, which the ARB regarded as inadequate for the protection desired (CARB 1991, p. 26).

On June 20, 2002, the ARB approved the adoption of a lower annual state standard for PM10, as well as a new annual standard for $PM_{2.5}$ (CARB 2002). The 24-hour PM10 standard was not changed. The standards were established to prevent excess death, illnesses such as respiratory symptoms, bronchitis, asthma exacerbation, and cardiac disease, and restrictions in activity from short- and long-term exposures (Title 17, Cal. Code Regs., sec. 70200).

NITROGEN DIOXIDE (NO_2)

Nitrogen dioxide is formed either directly or indirectly when oxygen and nitrogen in the air combine together during the combustion. It is a relatively insoluble gas, which can penetrate deep into the lungs, its principal site of toxicity. Its toxicity is thought to be due to its capacity to initiate free radical-mediated reactions while oxidizing cellular proteins and other biomolecules (CARB 1992, Appendix A, p. 4).

Sub lethal exposures in animals usually produce inflammations and varying degrees of tissue injury characteristic of oxidant damage (Evans in CARB 1992, Appendix A, and p 5). The changes produced by low-level acute or sub chronic exposures appear to be reversible when the animal study subject is allowed to recover in clean air.
Health effects of particular concern in relation to low-level nitrogen dioxide exposure include: (1) effects of acute exposure on some asthmatics and possibly on some persons with chronic bronchitis, (2) effects on respiratory tract defenses against infection, (3) effects on the immune system, (4) initiation or facilitation of the development of chronic lung disease, and (5) interaction with other pollutants (CARB 1992, Appendix A, p. 5).

Several groups, which may be especially susceptible to nitrogen dioxide-related health effects have been identified from human studies (CARB 1992, Appendix A, and p. 3). These include asthmatics, persons with chronic bronchitis, infants and young children, cystic fibrosis and cancer patients, people with immune deficiencies, and the elderly.

Studies involving brief, controlled exposures on sensitive individuals have shown an increase in bronchial reactivity or airway responsiveness of some asthmatics, as well as decreased lung function in some patients with chronic obstructive lung disease (CARB 1992, Appendix A, p. 2). In general, bronchial hyper reactivity (an increased tendency

of the airways to constrict) is markedly greater in asthmatics than in non-asthmatics upon exposure to initiating respiratory irritants (CARB 1992a, p. 107). At exposure concentrations of specific relevance to the current one-hour ambient standard, there appears to be little, if any, effect on respiratory symptoms of asthmatics (CARB 1992a, p. 108).

SULFUR DIOXIDE (SO_2)

Sulfur dioxide is formed when any sulfur-containing fuel is burned. SO_2 is highly soluble and consequently absorbed in the moist passages of the upper respiratory system. Exposure to SO_2 can lead to 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 SO_2 can produce both short- and long-term health effects. Therefore, California has established SO_2 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 SO_2 (CARB 1994, p. V-1).

The primary short-term effect is bronchoconstriction, a narrowing of the airways, which results in labored breathing, wheezing, and coughing. The short-term (one-hour) standard is based on bronchoconstriction and associated symptoms (such as wheezing and shortness of breath) in asthmatics and is designed to protect against adverse effects from five to ten minute exposures. In the opinion of the California Office of Environmental Health Hazard Assessment, the short-term ambient standard is likely to afford adequate protection to asthmatics engaged in short periods of vigorous activity (CARB 1994, Appendix A, p. 16).

Longer-term exposure is associated with increased incidence of respiratory symptoms (such as coughing and wheezing) or respiratory disease, decreases in pulmonary function, and an increased risk of premature mortality (CARB 1991a, p. 12). The long-term (24-hour) standard is based upon increased incidence of respiratory disease and premature mortality. The standard includes a margin of safety based on epidemiological studies, which have shown adverse respiratory effects at levels slightly above the standard. Some of the studies indicate a sulfur dioxide threshold for effects, suggesting that no significant effects are expected from exposures to concentrations at the state standard (Ibid.).

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SOCIOECONOMICS

Testimony of Amanda Stennick

INTRODUCTION

The California Energy Commission (Energy Commission) staff's socioeconomics impact analysis evaluates several areas in which the project may induce changes, including community services and/or infrastructure and related community issues such as environmental justice and facility closure. Direct, indirect, and cumulative impacts are included in the evaluation. This analysis discusses the potential impacts of the proposed Pico Power Project (PPP) on local communities, community resources, and public services, pursuant to Title 14, California Code of Regulations, Section 15131, and examines the project's compliance with applicable laws, ordinances, regulations and standards.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

STATE

California Government Code, sections 65995-65997

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. The relevant provisions restrict fees for the development of commercial and industrial space to a maximum of $0.34 per square foot of "chargeable covered and enclosed space." However, because the applicant is a municipal government, the City of Santa Clara is not required to pay school impact fees.

SETTING

The project is located within an established industrial belt in the City of Santa Clara in Santa Clara County. Santa Clara County is a highly urbanized county within the South Bay sub-region of the San Francisco Bay. The nearest residential area in proximity to the site is about 0.5 miles to the north on Haig Street. Two city parks, Montague Park and Memorial Park are within 1 mile of the site.

POPULATION

The estimated population growth in the project area and statewide are shown in **SOCIOECONOMICS Table 1**.

HOUSING

In 2000, the City of Santa Clara and Santa Clara County, respectively, had estimated totals of 37,873 housing units with a vacancy rate of 3.5 percent, and 579,329 housing units with a vacancy rate of 2.3 percent. These vacancy rates were lower than the Bay Area average of 5.22 percent. In the City of Santa Clara, there are 29 motels and hotels with about 3,792 rooms (SVP 2002).

SOCIOECONOMICS Table 1
Estimated Population Growth

	Estimated Population Growth			
AREA	**1990**	**2000**	**2005**	**2010**
City of Santa Clara	93,613	102,361	108,600	115,700
City of San Jose	782,224	894,943	956,800	1,010,700
County of Santa Clara	1,497,577	1,709,500	1,867,400	1,987,800
California	29,942,397	34,480,300	37,473,500	40,262,400

Source: U. S. 2000 Census; City of Santa Clara 2002; City of San Jose 2002

LABOR FORCE

The PPP will require a pool of skilled laborers. As shown in **SOCIOECONOMICS Table 2**, the labor pool area, which includes the counties of Alameda, Santa Clara, Contra Costa, San Mateo, San Francisco, Santa Cruz, and San Joaquin, has a substantial skilled labor force from which to draw.

SOCIOECONOMICS Table 2
Available Labor By Skill for PPP

	Annual Averages		Percent Change
Occupational Title	**1999**	**2002**	
Boilermakers	120	100	-16.7
Bricklayers/Cement Masons	3,640	4,340	19.2
Carpenters	13,360	15,260	14.2
Electricians	9,020	10,440	15.7
Insulators	830	1,120	34.9
Ironworkers	310	350	12.9
Laborers	102,240	123,490	20.8
Millwrights	480	130	-10.4
Operating Engineers	2,600	3,130	20.4
Painters	5,920	7,080	19.6
Pipefitters	5,680	6,850	20.6
Sheetmetal Workers	3,590	3,870	7.8
Supervisors	5,690	6,650	16.9
Surveyors	1,610	1,590	-1.2
Truck Drivers	20,310	21,840	7.5
Welders	4,330	4,990	15.2
Mechanical Engineers	7,240	9,190	26.9
Electrical Engineers	41,200	53,720	30.4
Plant and System Operators	5,600	5,710	2
Total	233,770	280,150	19.8

Source: Employment Development Department 2002

SCHOOLS

The Santa Clara Unified School District (SCUSD) serves the project site. The SCUSD operates 14 elementary schools, two junior high schools, and two high schools. For

school year 2000-2001, the total number of students in the K-12 system was 13,555, with a student to teacher ratio of 24.9:1. This ratio is similar to Santa Clara County and California pupil-teacher ratios, which were 20.7:1 and 20.9:1, respectively. Average class size for the district was 26.7 and 26.3 for the state (California Dept. of Education). Some of the schools within the district are operating at capacity (SCUSD 2003).

PUBLIC SERVICES

Law Enforcement

The Santa Clara Police Department is the agency responsible for providing law enforcement in the City of Santa Clara. The department has 144 sworn officers and 38 support personnel. It is the policy of the Police Department to respond to all emergency calls in less than three minutes.

Emergency Medical Services

The Santa Clara Fire Department provides emergency medical services for the City of Santa Clara. The department has 10 fire stations and is staffed by 180 paid fire service personnel and about 60 Volunteer Reserve Division and clerical staff. The closest station to the proposed project site is Fire Station No. 2, at 1900 Walsh Avenue, about 1 mile from the PPP site. The Fire Department's Emergency Medical Services include rescue, first aid, resuscitation, cardio-pulmonary resuscitation and evacuation.

Medical Facilities

The City of Santa Clara has one general hospital with 337 beds and 237 physicians and nurses. The nearest emergency medical facility to the site is the Kaiser Permanente Medical Center, located at 900 Kiely Boulevard, about 4 miles from the proposed site.

Utilities

Electricity in the City of Santa Clara is provided through Silicon Valley Power, which is the City of Santa Clara's municipal electric utility. Natural gas is supplied by Pacific Gas & Electric Company. Wastewater treatment services are provided by the City of Santa Clara, with the effluent sent to the San Jose/Santa Clara Water Pollution Control Plant. The capacity of the sewage treatment plant is 167 million gallons per day and the service has facilities for non-recoverable industrial wastewater. Wastewater generated by the proposed project will be discharged to the City of Santa Clara sewer system. Potable water service to the proposed project site is provided by the City of Santa Clara. The city presently has a maximum pumping capacity of 80 million gallons per day potable water and 15 million gallons per day recycled water capacity. The proposed project intends to obtain recycled water through an existing recycled water pipeline on the PPP site from the San Jose/Santa Clara Water Pollution Control Plant for cooling water makeup (SVP 2002). Please refer to the sections on **SOIL AND WATER** and **WASTE MANAGEMENT** for further discussion in these areas.

IMPACTS

Staff reviewed the PPP Application of Certification (AFC), Vol. I, October 2002, Section 8.10, Socioeconomics regarding potential impacts to community services and infrastructure (i.e., employment, housing, schools, utilities, emergency and other

services), and environmental justice. Staff conducted an independent assessment of the socioeconomic impact on the community associated with the proposed PPP. For housing, staff considers a percentage of 5 percent or less of available permanent housing as an indicator that insufficient area housing may be available for incoming construction workers. Impacts on the school system, medical services, law enforcement, and emergency medical services are based on subjective judgements or input from local and state agencies. Staff's initial screening analysis shows a minority population within the project's six-mile radius that is greater than 50 percent.

HOUSING

Staff does not expect permanent relocation of construction or operations workers, therefore staff does not anticipate an impact on housing. Please refer to **SOCIOECONOMICS Table 2** for availability of construction workers in Santa Clara and surrounding counties.

EMPLOYMENT

The applicant expects project construction to begin in June 2003 (PPP2002). Construction activity is estimated to last between 18 and 20 months and will provide short-term job opportunities for up to 114 construction workers, based on monthly averages. Construction personnel requirements will peak at 206 workers on site during the two most active months of construction, which are April and May, 2004.

The labor force required for project construction is listed in **SOCIOECONOMICS Table 3**. Based on occupational employment projections by the California Employment Development Department, staff believes adequate labor is available within the larger regional area. Staff expects most of the workforce to reside within a one-hour commute time from the plant site. Therefore, the demand for skilled laborers should not result in a regional labor shortage that could result in relocation of outside labor into the area.

During operation of the project, about 15 permanent workers would be needed to maintain and operate the project (eight operating technicians, five maintenance technicians, and two administrators). The applicant expects to hire operation workers from the larger regional workforce. **SOCIOECONOMICS Table 3** shows project construction personnel by craft and month.

SCHOOLS

Although some of the schools within the district are currently operating at capacity, staff does not expect any permanent construction or operation workers to relocate to the local area. Therefore, staff does not expect the schools to be adversely affected by construction or operation of the proposed project.

SOCIOECONOMICS Table 3
PEP Estimated Construction Staffing

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total
Boilermaker	2	2	2	15	15	15	15	15	15	20	20	20	10	10	10	2	2	2	2	194
Carpenter	10	10	10	12	12	12	12	12	12	5	5	5	5	5	5	2	2	2	2	140
Cement Mason	2	2	2	5	5	5	5	5	5	2	2	2	0	0	0	0	0	0	0	42
Electricians	5	5	5	15	15	15	15	15	15	30	30	30	12	12	12	3	3	3	3	243
Iron Worker	5	5	5	20	20	20	20	20	20	10	10	10	5	5	5	2	2	2	2	188
Labor	10	10	10	15	15	15	15	15	15	10	10	10	5	5	5	2	2	2	2	173
Millwright	0	0	0	15	15	15	15	15	15	10	10	10	5	5	5	2	2	2	2	143
Operator	5	5	5	8	8	8	8	8	8	6	6	6	3	3	3	2	2	2	2	98
Pipefitter	4	4	4	25	25	25	25	25	25	52	56	56	22	22	22	8	8	8	8	424
Teamster	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	31
Insulation Worker	0	0	0	0	0	0	0	0	0	10	10	10	4	4	4	4	4	4	4	58
Painter	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	4	28
Sheet Metal	0	0	0	0	0	0	0	0	0	10	10	10	4	4	4	3	3	3	3	54
Total Craft	45	45	45	132	132	132	132	132	132	167	171	171	80	80	80	35	35	35	35	1816
Field Start-up	0	0	0	0	0	0	0	0	0	10	10	10	10	10	10	10	10	10	10	100
Field Non-Manual	5	5	5	18	18	18	18	18	18	25	25	25	10	10	10	5	5	5	5	276
On-Site Total	**50**	**50**	**50**	**150**	**150**	**150**	**150**	**150**	**150**	**202**	**206**	**206**	**100**	**100**	**100**	**50**	**50**	**50**	**50**	**2192**

Source: SVP 2002a, AFC, Table 8.10-8

PUBLIC SERVICES

Law Enforcement, Emergency and Medical Services, and Utilities

Staff does not expect construction or operation of the proposed project to have a significant effect on law enforcement. During project construction, the applicant has proposed a safety plan for workers that should diminish the need for public services, such as law enforcement, fire protection, and medical services, should there be an incident requiring emergency response. Please refer to the section on **WORKER SAFETY** for further discussion of the proposed worker safety plan. Please refer to the sections on **SOIL AND WATER** and **WASTE MANAGEMENT** for further discussions about capacity, and potential impacts and mitigation in these areas.

FINANCIAL

Santa Clara County and the City of Santa Clara receive revenues from a variety of sources. These sources include property, sales and franchise taxes, licenses and permits, fines and penalties, charges for use of service and property, and transfer from other governments. The City of Santa Clara, as the proposed project applicant, is a municipal government and is not required to pay property tax.

Wages and salaries paid to construction workers would generate an estimated $61.7 million in total income in the local and regional economy based on an income multiplier of 1.59 (SVP 2002).

The project will generate sales tax from local purchases during construction. The applicant estimates that $38.8 million as wages, salaries, and benefits would be paid out during construction. A portion of this $38.8 million would be spent locally, generating expenditures in local industries and additional income in the local economy (PPP2002). The sales and use tax rate in Santa Clara County is 8.25 percent. The applicant estimates that $5 million to $10 million would be purchased from local suppliers during construction. **SOCIOECONOMICS Table 4** shows the estimated sales tax from the project's local expenditures.

SOCIOECONOMICS Table 4
Estimated Sales Tax Revenues from Project Expenditures

Sales Tax Rate	Distribution	$5 Million Local Purchases	$10 Million Local Purchases
8.25% county-wide	State 6%	$300,000	$600,000
	County 2.25%	$112,500	$225,000
	Totals	$412,500	$825,000

Thus, local expenditures during the 18- to 20-month construction period would generate between $412,500 and $825,000 in sales tax for the State of California and Santa Clara County.

ENVIRONMENTAL JUSTICE

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

Minority populations, as defined by USEPA's guidance document, 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.

In 1997, the President's Council on Environmental Quality issued Environmental Justice Guidance that defines minorities as individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black not of Hispanic origin; or Hispanic. Low-income populations are identified with the

Socioeconomics Figure 1

annual statistical series poverty thresholds from the Census Bureau's Current Population Reports, Series P-60 on Income and Poverty.

Energy Commission staff has determined the potential affected area as a six-mile radius of the proposed site. As shown in **SOCIOECONOMICS FIGURE 1**, the percentage of minority populations is 63.08 percent. In addition, there are multiple census blocks with greater than 50 percent minority populations within the six-mile radius. Because the screening analysis shows a greater than 50 percent minority population within the six-mile radius, staff conducted a focused environmental justice analysis in several technical areas, including Land Use, Noise and Vibration, Public Health, Soil and Water, Traffic and Transportation, Transmission Line Safety and Nuisance, Visual Resources, and Waste Management.

Census 2000 data show that the category Population for Whom Poverty Is Determined totals 635,469 persons within the six-mile radius. Of these, 56,409 persons, or 8.9 percent, are below the poverty level. Based on the screening analysis, the minority population and low-income population within the six-mile radius are 63.08 percent and 8.9 percent, respectively. Based on the socioeconomic analysis, there are no significant, adverse socioeconomic impacts to any population. Therefore, there are no environmental justice issues in the area of socioeconomic resources.

CUMULATIVE IMPACTS

Any large industrial construction project may contribute to cumulative impacts on the construction trade and result in a shortage of skilled construction workers. During the timeframe from July 2002 through September 2002, four projects were approved by the City of Santa Clara: a church, two theme park rides, and a new restaurant (City of Santa Clara). Staff does not know when construction on these projects would begin or the duration of construction.

The applicant expects project construction to begin in June 2003 and last about 20 months (SVP 2002). The labor force required for project construction is listed in **SOCIOECONOMICS Table 3**. Based on occupational employment projections by the California Employment Development Department, staff believes adequate labor is available within the larger regional area for the proposed project and other industrial, commercial, and residential projects. Therefore, the demand for skilled laborers should not result in a labor shortage or contribute to a significant cumulative impact on construction in the area. Because staff expects that no operation or construction workers will relocate because of the project, no significant cumulative impacts to housing, schools, or public services are expected.

FACILITY CLOSURE

PLANNED PERMANENT CLOSURE

The socioeconomics impacts of permanent facility closure will be evaluated at the time of the closure under the Energy Commission's facility closure process.

UNEXPECTED TEMPORARY CLOSURE

Any unexpected, temporary closure would not likely cause any significant socioeconomic impacts on the affected area, because the likely result of a temporary closure would be reactivation of the power plant by the same or a new owner within a relatively short period of time. Personnel changes may occur if there is an ownership change, but socioeconomics impacts would not change significantly because the number of operating personnel would remain relatively the same.

UNEXPECTED PERMANENT CLOSURE

Any unexpected, permanent closure of the PPP is not likely to cause any significant socioeconomics impacts on the affected area, because facility closure impacts (i.e., dismantling) would be similar to construction impacts, and staff has found no significant socioeconomics impacts due to the construction of the project.

MITIGATION

The proposed project is not expected to result in any significant adverse socioeconomic effects, thus no mitigation is proposed. Because the applicant is a municipal government, the City of Santa Clara is not required to pay school impact fees.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The PPP should result in gross benefits for the affected area from increased sales taxes, and a higher employment base. The community should also benefit from the economic activity generated by the purchase of services, manufactured goods and equipment from local businesses.

The PPP should not cause a significant adverse impact on the affected area's housing, schools, police, fire, emergency services, or hospitals, during construction and operation. The PPP will comply with all applicable policies in the Economic Development Element of the City of Santa Clara's General Plan.

Although the minority population in the six-mile radius is greater than 50 percent, based on this socioeconomic analysis, staff does not expect the project to result in any significant adverse socioeconomic impacts. Therefore, staff concludes that there are no environmental justice issues related to socioeconomics for the proposed PPP.

RECOMMENDATIONS

For the area of socioeconomics, staff recommends that the PPP be approved without any conditions of certification.

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SOIL AND WATER RESOURCES

Testimony of Linda Bond and Tony Mediati

INTRODUCTION

This section analyzes potential impacts to soil and water resources by the Pico Power Project (PPP) proposed by the City of Santa Clara's electric utility department, Silicon Valley Power (Applicant). This analysis incorporates information available to staff as of February 5, 2003. Specifically, this report focuses on the following areas of concern:

- whether the project would affect surface water supplies;
- whether the project's demand for groundwater would cause direct adverse impacts to existing groundwater users or to local groundwater quality;
- whether the project's demand for groundwater would adversely contribute to regional overdraft, land subsidence, or groundwater degradation;
- whether construction or operation could lead to accelerated wind or water erosion and sedimentation;
- whether the project's wastewater management practices will lead to degradation of surface or groundwater quality;
- whether project construction or operation could lead to degradation of surface water quality or drainage; and
- whether the project will comply with all applicable laws, ordinances, regulations and standards.

Where the potential for impacts is identified, mitigation and conditions of certification have been proposed.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

Clean Water Act

The Clean Water Act (33 USC § 1257 et seq.) requires states to set standards to protect water quality through the regulation of point source and certain non-point source discharges to surface water. These discharges are regulated through requirements set forth in specific or general National Pollutant Discharge Elimination System (NPDES) permits. Storm water discharges during construction and operation of a facility, and incidental non-storm water discharges associated with pipeline construction also fall under this act, and are addressed through a general NPDES permit. In California, requirements of the Clean Water Act regarding regulation of point source discharges and storm water discharges are delegated to, and administered by, the nine Regional Water Quality Control Boards (RWQCB). In the case of the PPP, water quality is administered by the San Francisco Bay RWQCB.

Resource Conservation and Recovery Act

The Resource Conservation Recovery Act (RCRA) of 1976 (40 CFR Part 260 et seq.) seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes.

STATE

California Constitution, Article X, Section 2

This section requires that the water resources of the State be put to beneficial use to the fullest extent possible. It states, in part, "The waste, unreasonable use, or unreasonable method of use of water is prohibited. The conservation of such waters is to be exercised with a view to the reasonable and beneficial use in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in the State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use, or unreasonable method of use, or unreasonable method of diversion of water."

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. 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 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 the waste disposal site, including injection wells and evaporation ponds for waste disposal.

California Water Code

California Water Code 13550 requires the use of reclaimed water, where available. 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 as determined by the SWRCB.

Recycling Act of 1991

The California Legislature's Water Recycling Act of 1991 (Water Code § 13575 et seq.) makes the following findings and declarations:

- the State is subject to periodic drought conditions;

- the development of traditional water resources in California has not kept pace with the State's population, which is growing at the rate of over 700,000 per year and is anticipated to reach 36 million by the year 2010;
- there is a need for a reliable source of water for uses not related to the supply of potable water to protect investments in agriculture, green belts, recreation, to replenish groundwater basins, and to protect and enhance fisheries, wildlife habitat, and riparian areas;
- the environmental benefits of reclaimed water include a reduced demand for water in the Sacramento-San Joaquin Delta, reduced discharge of waste into the ocean, and the enhancement of groundwater basins, recreation, fisheries, and wetlands;
- the use of reclaimed water has proven to be safe, and the State DHS is updating regulations for its use;
- the use of reclaimed water is a cost-effective, reliable method of helping to meet California's water supply needs;
- the development of the reclaimed water infrastructure will provide jobs and enhance the economy of the state;
- retail water suppliers and reclaimed water producers and wholesalers should promote the substitution of reclaimed water for potable and imported water in order to maximize the appropriate cost-effective use of reclaimed water in California;
- reclaimed water producers, retail water suppliers, and entities responsible for groundwater replenishment should cooperate in joint technical, economic, and environmental studies, as appropriate, to determine the feasibility of providing reclaimed water service;
- retail water suppliers and reclaimed water producers and wholesalers should be encouraged to enter into contracts to facilitate the service of reclaimed and potable water by the retail water suppliers in their service areas in the most efficient and cost-effective manner; and
- reclaimed water producers, wholesalers and entities responsible for groundwater replenishment should be encouraged to enter into contracts to facilitate the use of reclaimed water for groundwater replenishment if reclaimed water is available and the authorities having jurisdiction approve its use.
- Wholesale prices set by reclaimed water producers and reclaimed water wholesalers should reflect an equitable sharing of the costs and benefits associated with the development and use of reclaimed water.

Water Well Standards

The California Department of Water Resources (DWR) has responsibility for developing standards for wells for the protection of water quality under California Water Code Section 231. Statewide standards for water wells were first formally published in 1968 as DWR Bulletin 74, *Water Well Standards: State of California*. Well standards contained in Bulletin 74-81 together with well standards in Bulletin 74-90 are recommended minimum statewide standards for the protection of groundwater quality.

State Water Code Section 13801 was implemented on January 15, 1990, and requires that all counties and cities, and water agencies where appropriate, adopt a well ordinance that meets or exceeds DWR well standards. DWR's Water Well Standards specifies that "local enforcing agencies may need to adopt more stringent standards for local conditions to ensure groundwater quality protection."

The California Safe Drinking Water and Toxic Enforcement Act (*California Health & Safety Code Section 25249.5et seq.*).

This Act prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The requirements of the Act are administered by the RWCQB.

POLICIES

State Water Resources Control Board

The SWRCB has also adopted a number of policies that provide guidelines for water quality protection. The principal policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976 by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. 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 wastewaters of low total dissolved solids, and other inland waters. This policy also addresses cooling water discharge prohibitions.

State Water Resources Control Board Resolution No. 68-16 (the "Anti-Degradation Policy") declares the State's policy that, among other things, the discharging of wastes will not pollute or result in a nuisance.

SWRCB Resolution 77-1

State Water Resources Control Board Resolution 77-1 encourages and promotes reclaimed water use for non-potable purposes.

SWRCB Resolution 68-16

The SWRCB has adopted a policy for maintaining existing high quality waters to the maximum extent possible. The existing high water quality must be maintained until demonstrated to the State that any proposed change will be consistent with the maximum benefit to the people of the state and will not unreasonably affect present or future beneficial uses. Any activity that discharges a waste to existing high quality waters must provide the best practicable treatment necessary to assure that pollution or nuisance will not occur and that the highest water quality, consistent with maximum benefit to the people of the State, will be maintained.

LOCAL

Santa Clara County

Ordinance NS1203.35 and NS517.55 establish permitting requirements for grading land and activities that can cause the discharge of pollutants into storm water systems or watercourses.

Santa Clara Valley Water District

Santa Clara Valley Water District (SCVWD) is the local agency authorized under State Water Code (Section 13801) to manage the water resources for the Santa Clara Valley Groundwater Basin. SCVWD requires well permits under Ordinance 90-1 for all classification, construction, modification and destruction of wells within the District boundaries. Ordinance 90-1 requires a well permit for any well or excavation deeper than 45 feet.

City of Santa Clara

The City of Santa Clara Planning and Public Works Department sets forth grading, drainage and erosion control requirements.

The City requires a sewer permit for cooling tower blowdown and plant wastewater sent to the San Jose/Santa Clara Water Pollution Control Plant (WPCP). The City of Santa Clara Code, Rules and Regulations, 1996 regulates discharges to the Santa Clara/San Jose sanitary sewer system and the WPCP.

REGIONAL AND SITE VICINITY DESCRIPTION

The PPP site is located within an industrial land use area in the City of Santa Clara. The proposed PPP site is a previously disturbed but undeveloped industrial property. The area immediately surrounding the site is predominantly industrial. The primary source of cooling and process water for the PPP would be reclaimed water from the San Jose/Santa Clara WPCP provided by South Bay Water Recycling (SBWR) through a new connection to an existing 24-inch line. Potable water would be supplied by the City of Santa Clara through a new connection to an existing 12-inch water supply line. A new industrial groundwater supply well is proposed to be used as emergency back-up water for the plant when reclaimed water is unavailable. Wastewater would be discharged via a new 18-inch diameter, 900 foot pipeline to an existing 27-inch sanitary pipeline. Storm water would be discharged to the existing 54-inch storm water drainage system through new drainage facilities designed to convey at a minimum the 10-year storm event flow in accordance with the City of Santa Clara design criteria. Natural gas would be supplied by a new 2-mile, 12-inch pipeline and a new gas compressor station. The preferred routes for the new linear facilities are shown on AFC Figure 1.1-2 and are described in section 1.1.1 of the AFC. Construction laydown and worker parking areas are currently gravelled or paved. They are described in section 2.2.19 and are shown on figure 2.2-5 of the AFC (SVP 2002a).

The City of Santa Clara occupies part of an alluvial plain. Ground elevations vary from near sea level at the north end of the plain to 175 feet above mean sea level (msl) at the

south end of the plain. The project site is approximately 32 feet above mean sea level. Average monthly temperatures range from 46°F to 71°F. The 10-year average precipitation is 17.19 inches

SOILS

The proposed PPP site and its related linear facilities consist of poorly drained soils formed from alluvial clay derived from periodic flooding. This land is not designated by the California Department of Conservation as Prime Farmland, Farmland of Statewide Importance, nor Unique Farmland. The soils of the PPP site and linear facilities are characterized as follows:

SOIL & WATER TABLE 1
Soil Types Affected & Characteristics

Project Element	Soil Name	% Slope	Depth (inches)	USDA Texture	USCS Classifi-cation (1)	Permeability	Drainage	Erosion Hazard Rating
Project Site	Sunnyvale clay	0-1	0-72	Clay	Sx	Slow	Poorly drained	None
Linear Features	Pescadero clay	0-1	0-60	Clay	Pd	Slow	Poorly drained	None
	Pescadero clay (adobe)	0-1	0-72	Clay	Pc	Slow	Poorly drained	None
	Sunnyvale clay	0-1	0-72	Clay	Sx	Slow	Poorly drained	None

(SVP 2002a, Section 8.11.1 & Table 8.11-1)
(1) Unified Soil Classification System

Construction of the project site would temporarily affect 2.86 acres. Since the construction laydown and parking areas are currently gravelled or paved, the soils will not be adversely affected on these areas. The soils at the PPP site are not very erosive**.**

PROJECT WATER SUPPLY

The primary source of cooling and process water for the PPP would be reclaimed water from the San Jose/Santa Clara WPCP provided by SBWR. A new industrial groundwater supply well is proposed to be used as emergency back-up water for the plant when reclaimed water is unavailable (discussed later in this text). Potable water would be supplied by the City of Santa Clara.

Staff has received a copy of a Will-Serve letter from the City of Santa Clara, Water & Sewer Utilities stating they will be able to serve the project's potable water demand for domestic water and fire protection needs. Staff has also received a copy of a Will-Serve letter from the City of San Jose, Environmental Services Department, administering the SBWR with the City of Santa Clara, stating they expect to be able to serve the projects request for reclaimed water (SVP 2002a, Appendix 7).

The PPP would require an average of 0.94 million gallons per day (mgd),or 655 gallons per minute (gpm), during average operating conditions. A maximum of 1.8 mgd (1,260 gpm) would be required during peak demand. The PPP would require an average of 1,057 acre-feet of process water per year

The PPP facility water requirements are shown in Soil & Water Table 2 below. The table shows the average and maximum amount of water required for equipment in the PPP and the total required for the PPP in gallons per minute based on the worst case scenario of 3 cycles of concentration, which would be the operational mode that uses the most water.

SOIL & WATER TABLE 2
Water balance at 3 cycles of concentration

	Stream Description	Condition 1 CTG Base Load Unfired Annual Average (gpm)	Condition 1 CTG Base Load Unfired Summer (gpm)	Condition 2 CTG Base Load Full Fired Summer (gpm)
1	Plant total reclaimed water supply	655	914	1,260
2	Reclaimed water to demineralization system filter inlet	190	190	190
3	Filtered reclaimed water to RO system inlet	170	170	170
4	Filter system backwash to cooling tower	20	20	20
5	Leased demineralization system supply water	120	120	127
6	RO system reject to cooling tower	50	48	48
7	Combined filter/RO wastewater to cooling tower	70	68	68
8	Total demineralized water to plant services	120	120	127
9	Demineralized water to HRSG makeup	11	11	17
10	Demineralized water to CTG (NOx & Sprint)	110	110	110
11	CTG NOx water @ base load chilled1	93	93	93
12	CTG sprint water @ base load chilled	17	17	17
13	DI water to atmosphere (contained in CTG exhaust)	110	110	110
14	HRSG blowdown to cooling tower	11	11	17
15	Reclaimed water supply to cooling tower	465	724	1,070
16	Cooling tower evaporation to atmosphere	364	535	770
17	Cooling tower blowdown (plant wastewater to sewer)	182	268	385
	Domestic Water Uses	2		
	Tower Cycles of Concentration = 3			
	HRSG BD Rate % = 1.0			

[1]25 ppm Nox

(SVP 2002a, Section 7.1 & Table 7.1-1)

Water Quality

The quality of the water supply proposed from the primary and backup supplies are characterized as follows:

SOIL & WATER TABLE 3
Water Quality

Water Quality Parameter [a]	South Bay Recycled Water (Primary Supply)	On-Site Industrial Well (Backup Supply)	Drinking Water Standard [b,c]
General Parameters			
Alkalinity, Total (mg/L)	184	215	None
Bicarbonate (mg/L)	184	N/A	None
Hardness (as $CaCO_3$) (mg/L)	245	246	200
Nitrate (as NO_3) (mg/L)	40	15	45[b]
pH	7	7.6	6.0 – 9.0
Total Dissolved Solids (mg/L)	749	317	1,000[c]
Chemical Parameters			
Arsenic (ug/L)	1.17	N/A	50[b]
Boron (ug/L)	525	157	None
Cadmium (ug/L)	0.5	N/A	5[b]
Calcium (mg/L)	48.3	66	None
Chloride (mg/L)	208	32	500[c]
Chromium, Total (ug/L)	1	<MDL	50[b]
Copper (ug/L)	3	<MDL	1,000[c]
Lead (ug/L)	1	N/A	Action Level = 15
Magnesium (mg/L)	28.7	19	None
Mercury (ug/L)	0.0026	N/A	2[b]
Nickel (ug/L)	7	<MDL	100[b]
Potassium (mg/L)	14.9	<MDL	None
Silver (ug/L)	1	N/A	100[c]
Sodium (mg/L)	161	27	None
Sulfate (mg/L)	107	40	500[c]
Zinc (ug/L)	51.9	<MDL	5,000[c]

[a] For common inorganic water quality constituents
[b] Maximum contaminant level as specified in Table 64431-A of Section 64431, Title 22, of the California Code of Regulations
[c] Secondary maximum contaminant level as specified in Table 64449-B of Section 64449, Title 22, of the California Code of Regulations
mg/L = milligrams per liter
ug/L = micograms per liter
<MDL = below method detection limit

(SVP 2002a, Table 8.15-3)

GROUNDWATER

The PPP site is located in the Santa Clara Valley Groundwater Basin, which is encompassed by Santa Clara County. Groundwater development and past overuse caused significant lowering of groundwater levels and overdraft in the basin. The Santa Clara Valley Water District supplies water to local water retail agencies in Santa Clara County and manages water resources of the County for the benefit of all water users including agricultural and other independent groundwater users. SCVWD has addressed the problem of overdraft primarily through the importation of surface water

and secondarily through use of recycled water and conservation. Surface water imports are now used to meet over half of the regional water demands and to replenish groundwater supplies through artificial recharge. The conjunctive use of groundwater and imported surface water has restored groundwater levels, largely halted other impacts of overdraft, and maintains reliable groundwater reserves in the basin.

Hydrogeology

The Santa Clara Valley occupies the southern end of a northwest trending, alluvial-filled structural depression within the central Coast Ranges of California. The San Francisco Bay, which occupies the central portion of this structural depression, forms the northern geographic boundary of the Santa Clara Valley Groundwater Basin (the Groundwater Basin). The Groundwater Basin is flanked by the Coast Ranges and pinches to a 0.5 mile-wide narrows to the south, where it connects to the Coyote Valley Groundwater Basin. The Groundwater Basin is approximately 22 miles long and 15 miles wide at its widest point with a surface area of approximately 225 square miles (SCVWD, 2001b).

The structural depression was formed by numerous northwest-trending faults, including the San Andreas and the Hayward faults. The depression has been filled with unconsolidated sediments that have eroded and been washed from the surrounding bedrock mountains to form a thick succession of permeable layers. The deepest deposits of the alluvial fill in the basin are over 1,500 feet thick. The sediments deposited near the basin-mountain boundary are coarse, unstratified, and poorly sorted. This outer portion of the basin, which contains unstratified deposits, is called the forebay. The interior portion of basin contains sediments that are deposited in layers, which were sorted by streams and runoff as they carried sediments from the mountains towards the center of the basin. The central portion of the basin contains thick, continuous clay layers that comprise the Major Aquitard; these clay layers separate and confine water-yielding aquifer layers consisting of sand and gravel. The central portion of the basin is divided into an Upper Aquifer Zone and a Lower Aquifer Zone.

The forebay, which is unconfined, is the primary recharge area for the groundwater system, particularly the Lower Aquifer Zone. The forebay is recharged by rainfall, percolation from local streams, surface irrigation, and artificial recharge projects. Because the forebay has no continuous clay layers to impede vertical flow, recharge in the forebay can percolate through the entire sedimentary column and transmits groundwater flow to both the Upper and Lower Aquifer Zones in the interior of the basin.

The Upper Aquifer Zone is semi-confined, capped by basin and shallow marine clays. The overlying clays are discontinuous, poorly consolidated and perforated with poorly constructed or abandoned wells that transmit water between the surface and the lower layers of the Upper Aquifer Zone. Consequently, water quality in the Upper Aquifer Zone is poor in many areas, containing brackish water and chemical contamination. The Upper Aquifer Zone roughly occupies the upper 150 feet of the interior portion of the Groundwater Basin. The Upper Aquifer Zone is recharged by rainfall, local streams, surface irrigation and inflow from the forebay.

The Major Aquitard separates the Upper and Lower Aquifer Zones in the interior portion of the basin. It is composed of continuous, compacted clay layers. These clay layers

become discontinuous and thin near the forebay. Within the forebay, clays are intermixed with sands and gravels. In the interior portion of the basin, the Major Aquitard is located approximately 150 to 250 feet below land surface and historically controlled the exchange of water between the Upper and Lower Aquifer Zones.

The Lower Aquifer Zone is comprised of aquifer layers that are at least150 feet below land surface or deeper and is subdivided by numerous dense clay layers. The Lower Aquifer Zone is confined and recharged by inflow from the forebay. The Lower Aquifer Zone contains high-quality water and provides most of the groundwater for the public water supply, as well as water for industry. The Lower Aquifer Zone has historically been protected by the Major Aquitard from poorer quality water in the Upper Aquifer Zone. However, poorly constructed deep wells that are perforated or gravel packed from the upper aquifer zone through the Major Aquitard and into the Lower Aquifer Zone have created potential conduits for downward vertical transmission of poor quality water (Iwamura, 1995).

Groundwater Budget

Prior to development of groundwater in the Santa Clara Valley, natural recharge in the forebay was sufficient to produce high water pressures in the confined aquifers, positive gradients towards the Bay, and groundwater discharges that fed the base flows in the local streams. Deep wells in the Lower Aquifer Zone historically produced flowing artesian wells. Positive gradients towards boundaries, discharges to streams and flowing wells are typical conditions for a groundwater basin in which recharge exceeds groundwater withdrawal. Overdraft occurs when these conditions are reversed.

Groundwater development, beginning at the turn of the last century, led to overdraft conditions in the Santa Clara Valley Groundwater Basin. The adverse impacts of overdraft conditions included significant decline of groundwater pressure in the aquifers, seawater intrusion into the shallow aquifer, contaminant transport from land surface to aquifers, and land subsidence. However, the SCVWD began to reverse overdraft conditions beginning in 1965 with the importation of surface water to meet the area's water demands and to provide artificial recharge to the groundwater basin. The new surface water supply has reduced groundwater use and increased groundwater recharge, which has produced a significant recovery of groundwater levels.

The operational storage capacity of the Santa Clara Valley Groundwater Basin is 350,000 acre-feet (AF). The operational storage capacity (which is less than the total storage capacity of the basin) is limited by operational constraints, including available pumping capacity, high groundwater levels and avoidance of subsidence. The maximum annual rate of withdrawal is a further operational constraint. Based on SCVWD groundwater modeling analyses, pumping should not exceed 200,000 AF for any one year given the current level of water imports, defining the maximum annual safe yield of the basin.

Recent groundwater use has been significantly below 200,000 acre-feet per year (AFY). For example, SCVWD reports that in 2001 groundwater withdrawals were approximately 115,400 AF with 114,600 AF used for municipal and industrial uses and less than 800 acre-feet for agriculture. Approximately 90,700 AF of water were

imported to recharge the Groundwater Basin through artificial recharge projects. In addition, rainfall and streamflows contributed approximately 37,200 AF to groundwater recharge in 2001. The total amount of groundwater stored in the basin increased by approximately 12,500 AF in 2001.

It is important to note that natural recharge will vary from year to year. However, the SCVWD analysis concludes that as long as water imports for both groundwater recharge and water supply are maintained and, correspondingly, annual pumping does not exceed 200,000 AFY, serious regional impacts, such as subsidence, will be avoided.

SOIL & WATER TABLE 4
Santa Clara Valley Groundwater Budget for 2001
(acre-feet)

Total Groundwater Withdrawal	115,400
Natural Recharge	37,200
Artificial Recharge	90,700
Total Recharge	127,900
Net Change in Stored Groundwater	+12,500

Source: SCVWD, 2002

The SCVWD has also developed an Integrated Water Resources Plan (IWRP) to meet the County's long-term water needs through 2020. SCVWD recently developed a statistical analysis of the risk of water shortages under the plan. The analysis shows that the IWRP would be effective in meeting water demands during long drought events but that very severe, short-duration events could result in significant shortages. Development of additional management strategies to respond to critical shortages was recommended in the IWRP.

The City of Santa Clara, in which the PPP will be located, also monitors groundwater use. During fiscal year 2000/01, groundwater production by the city was 5,800 million gallons per year (17,932 AF). The city projects that the future firm yield for the city's groundwater supply is 8,000 million gallons per year (24,533 AFY). The city supplements its groundwater supply with three sources of surface water, including water imported by the SCVWD, recycled water from the Rinconada Water Treatment Plant, and surface water supplies from the San Francisco Public Utility Commission's Hetch Hetchy system (City of Santa Clara, 2002).

Project Backup Water supply

The applicant proposes to use well water for backup water needs. The applicant proposes to install an industrial groundwater well (backup well) dedicated to the PPP to provide a backup water supply for PPP operational needs, including cooling, in the event of an interruption in recycled water supplies. The project well would meet all project water requirements during any short-term service outages that may occur in the primary water supply provided by SBWR.

The Applicant proposes to construct the project well at the southeast corner of the PPP site. The PPP site is located within the interior portion of the Santa Clara Valley Groundwater Basin, the area in which Major Aquitard isolates the Lower Aquifer Zone from the Upper Aquifer Zone. The well would be 600 to 800 feet in depth and would draw from the Lower Aquifer Zone. The well would be sealed through the Upper Aquifer Zone and the Major Aquitard and would have a perforated screen within the Lower Aquifer Zone.

The maximum period of operation of the project backup well would be limited to 45 days per year, although the anticipated annual use is much briefer. The Applicant reports that the SBWR system's typical operating conditions include only one or two brief (less than 72-hour) outages each year. Groundwater extraction rates would be equal to the anticipated project water demand of 0.94 million gallons per day (mgd) during average water supply demand conditions and 1.26 mgd during hot summer days. Water demand is expected to peak at 1.8 mgd but only under the hottest summer conditions, which would persist for 2 to 3 days at the most. Therefore, maximum "worst-case" annual groundwater use would be 57 million gallons (45 days per year times 1.26 mgd) for a period of no more than 45 days each year, which is equivalent to 140 acre feet per year (SVP 2002c, DR 54). As used in this Staff Assessment, the "worst-case" groundwater use assumes that the maximum annual groundwater use of 57 million gallons per year would continue for the life of the project.

Local Groundwater Use

The Applicant reported that 65 active wells are located within 0.5 miles of the PPP site, based on a SCVWD database search. There is limited information on completion depth and capacity of these wells. The database lists three active wells over 100 feet in depth. Two of these wells are only 100 feet and 120 feet in depth. The third well, Well 06S01W34H048, has a reported depth of 672 feet and a yield of 1,339 gallons per minute (1.9 mgd), equivalent to the proposed PPP backup well. This well, identified as a well for a fiberglass manufacturing facility, is located about 0.5 miles from the PPP site and is probably associated with the local Owens-Corning Fiberglass facility. Three other active municipal or industrial production wells are within 0.5 miles of the PPP site, but no depth information was available. Two of these wells, 06S01W26P002 and 06S01W34A001, are approximately 1,600 feet and 2,100 feet from the PPP site, respectively. The third well, 06S01W35F001, is located about 0.5 miles from the PPP site. The remaining wells near the site are listed as extraction wells associated with groundwater contamination for primarily municipal or industrial groundwater sites. These are probably shallow wells because they are designed for remediation, which is confined to the Upper Aquifer Zone in this area.

Land Subsidence

Land Subsidence is one of the primary negative impacts of groundwater overdraft in the Santa Clara Valley Groundwater Basin. When overdraft in a basin lowers groundwater levels, hydrostatic pressures within the groundwater system are correspondingly reduced. This reduction of hydrostatic pressure often causes land subsidence in many sedimentary aquifer systems, as was the case in the Santa Clara Valley Groundwater Basin before the SCVWD took action to halt subsidence.

Aquifers, composed of rigid, coarse-grained sands and gravels, can be repeatedly drained and refilled. However, clay aquitards, which normally do not release water, begin to compress and produce a one-time water discharge when depressurized. In contrast to aquifers, clay aquitards cannot refill and the compression is permanent. This compression of aquitards causes land subsidence.

Land subsidence in the Santa Clara Valley was documented by Tolman and Poland in 1940 and again by Poland in 1969. Subsidence along the bayshore was particularly damaging because land surface sank below sea level, causing seawater encroachment of the land, streams and aquifers. In addition to subsidence adjacent to the Bay, Poland estimated in 1969 that land had subsided inland almost 13 feet in the San Jose area.

The SCVWD took two actions that have halted subsidence. Initially, water conservation reservoirs constructed to provide artificial recharge in the forebay caused a short-term recovery of water levels and a halt to subsidence between 1937 to 1948. However, groundwater use continued to increase, so in 1965, the SCVWD began to import surface water that was used to restore groundwater levels through artificial recharge and reduced demand on groundwater supplies. This effort brought another halt to land subsidence by 1980 (Iwamura, 1995).

Seawater Intrusion

Seawater intrusion is another adverse impact of groundwater overdraft in the Santa Clara Valley Groundwater Basin. Seawater intrusion from the San Francisco Bay into the Upper Aquifer Zone became a recognized water quality problem in the basin as early as 1920. Prior to the development of groundwater extraction wells in the basin, groundwater levels were higher than water levels in the Bay and a positive gradient towards the Bay prevented saline water from intruding inland. However, groundwater pumping and stream diversions reversed groundwater gradients and stream discharge, causing seawater seep through the clay cap overlying the Upper Aquifer Zone along the bayshore and along the lower portions of streams that terminated at the Bay. Land subsidence exacerbated seawater intrusion by lowering streambed elevations, allowing Bay water tidal intrusion of streams farther inland (Iwamura, 1980).

In addition, seawater intrusion also affected the Lower Aquifer Zone. Although the Major Aquitard provides a barrier to groundwater flow between the Lower and Upper Aquifer Zones in the central and bayside portion of the system, interaquifer transfer has degraded small localized areas in the Lower Aquifer Zone along the bayshore. Seawater degradation of the Lower Aquifer Zone was caused by transmission of saline water through deep wells that were abandoned, deteriorated, or poorly-constructed (gravel packed or perforated through both aquifer zones). Degradation occurs through these defective wells when pumping in the Lower Aquifer Zone created downward groundwater gradients, causing water in the upper aquifers to be drawn into the lower aquifers.

Along with land subsidence, seawater intrusion was arrested by 1980, in part by groundwater-level recovery due to artificial recharge and use of surface water to supplement groundwater use. In addition, the SCVWD has taken other actions to specifically address the problem of seawater intrusion. Initially, the district built levees

along the bayshore to prevent inland incursion of Bay water caused by land subsidence. Secondly, the district destroyed and properly sealed defective wells within the baylands that served as conduits for seawater degradation of the aquifers (Iwamura, 1995).

Although seawater intrusion has been halted, degradation of the shallow aquifers persists. The San Francisco Bay Regional Water Quality Control Board (RWQCB) recently reported that the chloride concentrations (indicator of seawater intrusion) of 500 to over 2,000 milligrams per liter (mg/L) in the Upper Aquifer Zone affects a 1-mile strip along the bayshore. The tidal interface between the bay and local streams also moved farther upstream. Saline water in the in Guadalupe River and Coyote Creek has seeped through the streambeds causing a tongue of saline groundwater beneath these streams. Seawater intrusion also extends 5.5 miles from the Bay beneath Guadalupe River and 4 miles beneath Coyote Creek with chloride concentrations of 100 to 500 mg/L (RWQCB, 2001).

Groundwater Contamination

In addition to seawater intrusion, groundwater quality has also been affected by manmade chemicals. High nitrate concentrations have been identified in agricultural areas in the baylands. Localized contamination and plumes of organic solvents and motor fuels have been detected throughout the basin and are associated with industrial, manufacturing and disposal facilities since the 1970's when cities and industry began to replace agriculture in the valley.

Chemical contamination is primarily confined to the Upper Aquifer Zone because contamination originates with land-surface activities or shallow underground tanks. However, when contamination occurs either in the forebay or near deep defective wells, contamination can migrate to the Lower Aquifer Zone when pumping in the deeper aquifers cause downward gradients. Low concentrations of volatile organic contaminants (VOCs) and trihalomethanes (THMs) that are below the drinking water standards have been detected in the Lower Aquifer Zone in 24 active water supply wells in the Santa Clara Valley Groundwater Basin (SCVWD, 2002).

Chemical contamination poses a threat to the public drinking supply because of the harmful health effects of many manmade chemicals. Accordingly, many remediation projects, both completed and ongoing, have been implemented in the region to contain and remove contamination from the groundwater system (Iwamura, 1995).

SURFACE HYDROLOGY

The PPP site is within the Guadalupe River watershed, which drains from the Santa Cruz Mountains into the wetland of southern San Francisco Bay. The Guadalupe River channel begins at the confluence of Guadalupe and Alamitos Creeks and flows northward approximately 14 mile through heavily urbanized portions of Santa Clara County before discharging into San Francisco Bay. The Guadalupe River is one of several water bodies in the Santa Clara Basin that is designated under Section 303(d) of the Clean Water Act as impaired due to certain pollutants. Water bodies in the Guadalupe River watershed (Guadalupe River, Alamitos Creek, Guadalupe Creek,

Calero Reservoir and Guadalupe Reservoir) have been designated as impaired because of mercury contamination (SVP 2002a).

No natural surface water drainage features are on the PPP site, and no wetlands are present on the PPP site. The surface water feature closest to the PPP site is the Guadalupe River. The project site is not mapped within the 100-year flood zone (SVP 2002a).

Storm Water

Surface water at the site currently drains to the north and south, with an indistinct ridge splitting the area west of Pico Way toward the neighboring (improved) sites located north and west of the property, and to the Kifer Receiving Station to the south. A localized high point also directs runoff to the northeast and east, toward Duane Avenue and the Pico easement (Pico Way). The wooded/grassed area east of the easement drains toward Duane Avenue and Lafayette Street.

ANALYSIS OF PROJECT RELATED IMPACTS

DIRECT AND INDIRECT IMPACTS

Soil

Effects that construction can have on soil resources include increased soil erosion, soil compaction, loss of soil productivity, and disturbance of saturated soils. Accelerated wind and water-induced erosion may result from earthmoving activities associated with construction of the proposed project. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Soil erosion results in the loss of topsoil and increases sedimentation of surface waters downstream of the site. The magnitude, extent and duration of this impact would depend on several factors, including the proximity of the site to surface water, the soils affected, and the method, duration, and time of year of activities. Prolonged periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities can result in on-site erosion, eventually increasing the sediment load within nearby receiving waters. Implementing appropriate erosion control measures will help conserve soil resources, maintain water quality, protect property from erosion damage, and prevent accelerated soil loss.

Approximately 4 acres of land will be disturbed during construction of the Pico Power Plant. Approximately 2.86 acres will be used for permanent facilities. During construction activities the site surface would be void of vegetation and would have a high potential for erosion. The applicant intends to grade the site to approximate elevation of 32 feet above msl. The erosion factor for the clay type soils for the PPP and linear facilities is very low.

The applicant has proposed discharge of all non-contact storm water to the City of Santa Clara's existing stormwater conveyance system. This design will require the project owner to develop and abide by a Storm Water Pollution Prevention Plan

(SWPPP) for Construction and Industrial Activities under the National Pollution Discharge Elimination System (NPDES).

The PPP must comply with the general NPDES storm water permit requirements that regulate storm water effluent limitations and specify monitoring and reporting requirements for both construction activities and industrial (operational) activities. Conditions of Certification SOIL & WATER 2 and 3 require the applicant to gain coverage under both General NPDES Permits prior to site mobilization and prior to operation, respectively. Best Management Practices (BMP) for erosion control will be implemented during construction and will be further described in the applicant's site specific Sediment and Erosion Control Plan and the Storm Water Pollution Prevention Plan. These plans shall be approved by the Energy Commission Compliance Project Manager (CPM) prior to any earthmoving activities. Approval and implementation of these plans will mitigate erosion and sedimentation impacts to less than significant levels and will be consistent with the Clean Water Act, San Francisco RWQCB and Santa Clara LORS.

Water Supply

The primary process water for the PPP would be tertiary treated wastewater provided by SBWR. Soil & Water Table 5 lists the SBWR customers and their present or projected treated wastewater use. More than100 mgd of this tertiary treated wastewater is currently discharged to San Francisco Bay. The discharge of the WPCP's tertiary treated wastewater into the Bay was believed to be endangering the salt marsh habitat by converting the saltmarsh to fresh water or brackish water marsh. The WPCP now diverts water to the recycled water system, thereby keeping discharges to the Bay under its permit discharge limit of 120 mgd (SVP 2002c, DR53). The use of 0.94 mgd of this water in the PPP will not have a significant adverse impact on the WPCP or the environment. The slight reduction in the amount of fresh water being discharged to the Bay will provide an incremental benefit to the Bay.

The SBWR system is highly reliable. Historic operational information suggest that the system may experience limited outages in the range of 12 to 72 hours once or twice a year (SVP 2002c, DR53).

SOIL & WATER TABLE 5
South Bay Water Recycling customers and reclaimed water use[1]

Reclaimed Water User	Type of Use	Annual Use (AF)
Metcalf Energy Center	Cooling tower makeup water	3,249 [2]
Pico Power Project	Cooling tower makeup water	1,057
Miscellaneous Landscape – 147 sites	Landscape Irrigation	853
Oak Hill Memorial Park	Landscape irrigation	401
Various schools, college – 10 sites	Landscape irrigation	296
Various parks, athletic fields –19 sites	Landscape irrigation	231
Santa Clara Golf and Tennis Club	Landscape irrigation	218
San Jose Municipal Golf Course	Landscape irrigation	195
The Villages Golf and County Club	Landscape irrigation	137
Various cooling towers – 2 sites	Cooling tower makeup water	117
Golf driving ranges – 2 site	Landscape irrigation	86
California Paperboard	Paper Manufacturing	85
Various roadway medians, greenbelts – 10 sites	Landscape irrigation	64
San Francisco 49ers Training Facility	Landscape irrigation	35
Silver Creek Valley Country Club	Landscape irrigation	28
Great America Theme Park	Landscape irrigation	17
Various Landfills – 2 sites	Dust control, compaction	16
Freeway: Route 237	Landscape irrigation	8
Cisco Systems	Toilet flushing	2
Total Reclaimed Water Use		7,095

1. Data obtained from the California State Water Resources Control Board, Office of Water Recycling, Municipal Wastewater Reclamation Survey, May 24, 2000; data includes all contracted uses, whether active or future.
2. Metcalf Energy Center SBWR reclaimed water use estimated from Metcalf Energy Center AFC, Volume 1 (June, 1999).

Source: PPP 2002b, Table 8.15-S5.

Groundwater

The PPP plans to use groundwater for its backup water supply. This Staff Assessment focuses on potential direct and indirect impacts to the Lower Aquifer Zone because these lower aquifers are the primary water supply source for the region. Impacts to the Upper Aquifer Zone, which is generally no longer used for water supply, are only considered with respect to associated impacts to the lower zone. This analysis assumes that the maximum annual groundwater use for the project will be limited to 57 million gallons per year, during a period of no more than 45 days each year.

Three potential direct and indirect significant adverse impacts could occur as a result of the PPP's use of groundwater:

1. Well interference,
2. Groundwater contamination, and
3. Seawater degradation.

Well Interference

Power plants are water-intensive operations when water is used for cooling. Direct significant adverse impacts from well interference occur when a project's pumping causes substantial and unacceptable declines in groundwater levels in existing nearby wells. Four factors are key to determining whether the project well would cause a significant increase in drawdown typically experienced in existing wells:

1 acing and depth of wells,

2 Comparative capacity of wells,

3 Transmissive properties of the effected aquifers, and

4 Rate and duration of project pumping.

To be affected by project pumping, existing wells must draw water from the same aquifer zone as the project well and must be relatively close to the proposed project well. Only four wells located near the PPP site are likely to be affected by project pumping. All four wells are within 0.5 miles of the project well, with the closest located approximately 1,600 feet from the PPP site. One of the wells, Well 06S01W34H048, is completed at the same depth as the planned depth of the project backup well. The other three wells are probably deep wells because they are active industrial (or municipal) supply wells and, therefore, may also be adversely affected. Active industrial and municipal supply wells in the Groundwater Basin usually draw from the Lower Aquifer Zone because the water quality of the deeper aquifers is more reliably higher quality than water from the Upper Aquifer Zone.

SOIL & WATER TABLE 6
Active Industrial (or Municipal) Supply Wells Located Within One-Half Mile of the Proposed Pico Power Project Site

Well Name (State Well Code)	Well Description	Well Use	Depth of Completed Well	Approximate Distance from PPP Site	Capacity (Test Yield)
06S01W34A004	Fiberglass Manufacturing	Water Producing	672 feet	2,600 feet	1,339 gpm (1.9 mgd)
06S01W35F001	Paper Processing	Water Producing	Unknown	2,600 feet	unknown
06S01W26P002	Other Uses	Water Producing	Unknown	2,100 feet	unknown
06S01W34A001	Fiberglass Manufacturing	Water Producing	Unknown	1,600 feet	unknown

Source: PPP 2003a

The capacities of existing wells will also determine the relative impact from the proposed project well. Low-capacity wells, which are typically private domestic or low-water use facility wells, are usually configured to operate with relative small fluctuations in the water table and, therefore, are vulnerable to adverse impacts when located near high-capacity wells. However, these kinds of wells are most likely to be constructed and used in rural or sparsely populated areas.

Densely developed industrial areas such as the City of Santa Clara usually contain high capacity municipal and industrial production wells, rather than low-capacity private wells. In fact, no active domestic wells were identified near the PPP site. The one known deep supply well (Well 06S01W34H048) near the PPP site does has a relatively high capacity of 1,339 gpm (1.9 mgd), which is equivalent to the estimated maximum rate of the project well (1.8 mgd). It is reasonable to assume that the other industrial (or municipal) supply wells located near the PPP would also be relatively high capacity wells that are configured to operate in the vicinity of other high capacity wells.

In order to verify that significant drawdown from the project well would not adversely affect wells beyond the radius of investigation (0.5 miles from the PPP site), drawdown for the project well should be calculated based on local or site-based aquifer properties and the maximum estimated pumping rates.

The Applicant has estimated aquifer property values for the project well, based on values used in a DWR groundwater model for the South San Francisco Bay (SVP 2003a). No field data for wells in the Lower Aquifer Zone were available.

The Applicant calculated project drawdown based on these estimated aquifer properties and the estimated worst-case groundwater use for the project. Using these properties (transmissivity = 41,858 ft2/day and storativity = 1×10^{-4} and a pumping rate for maximum annual groundwater use of 1.26 mgd for 45 days[1]), the Applicant calculated that drawdown would be about 2.8 feet at a distance of 0.5 miles. Drawdown at 1,000 feet would be about 3.4 feet. The Applicant has also proposed to perform an aquifer test with the project well to determine the on-site aquifer properties and to more accurately calculate the potential well interference on nearby existing wells.

Staff performed sensitivity testing, assuming a more conservative transmissivity value of 20,000 ft2/day for the aquifer, to calculate how much potential drawdown might vary. This value of transmissivity is within a reasonable range of possible values for the Lower Aquifer Zone, assuming a saturated aquifer thickness of 200 to 300 feet and an average to low hydraulic conductivity for a clean sand (Freeze, 1979). The Applicant's storativity value of 1 x 10-4 is the most conservative value of storativity likely. Staff's calculation produced a drawdown of 5.3 feet at a radius of 0.5 miles from the project site. Although this magnitude of drawdown would probably be significant to a small-capacity well, it would not produce disproportionate or unusual declines in groundwater levels in the existing wells that have been identified in the vicinity of the project site. Therefore, staff finds that there would be no direct significant adverse impact to existing wells caused by well interference from the proposed project well pumping.

Groundwater Contamination

Significant adverse impacts from groundwater contamination could occur as a result of project groundwater pumping if:

[1] Transmissivity and storativity determine the extent to which pumping will affect nearby wells.
Transmissivity is a measure of an aquifer's capacity to transmit water. Storativity is a measure of the aquifer's capacity to store water

a. groundwater contamination pre-exists or occurs at the project site in the Upper Aquifer Zone, and

b. the project well is not fully sealed through the Upper Aquifer Zone and the Major Aquitard or if the aquitard is unusually transmissive.

If both of these conditions occur, project pumping could create a downward vertical gradient and draw contaminated water into the Lower Aquifer Zone, which is the primary water-supply zone for the basin. If contaminated groundwater were transmitted to the Lower Aquifer it would pose a threat to the water quality of the regional primary drinking water supply.

The Applicant reported there is no groundwater contamination on the proposed project site (SVP 2003b). The Applicant also provided a copy of a Phase II Environmental Site Assessment that was conducted to investigate soil staining at the PPP site. This assesment indicated the possibility of soil or groundwater contamination (Foster Wheeler, 2002). One groundwater sample from a 12-foot deep boring was collected and analyzed for petroleum hydrocarbons and four VOC's. Sample analysis indicated no hydrocarbons and only trace concentrations of the VOC's below drinking water standards in the shallow water-table aquifer beneath the site.

SOIL & WATER TABLE 7
Pico Power Project Site Groundwater Quality
Sample Results for the Water-Table Aquifer

Compound	Results of Analysis	Title 22 Drinking Water Standards (Maximum Contaminant Level)
TRPH	Not detected	--
TPH-d	Not detected	--
TPH-g	Not detected	--
1,1,-DCA	0.002 mg/L	0.005 mg/L
CIS-1,2-DCE	0.0017 mg/L	0.006 mg/L
1,1,1-TCA	0.00076 mg/L	0.2 mg/L
TCE	0.0015 mg/L	0.005 mg/L

Source: Foster Wheeler, 2002
Compound Abbreviations:
TRPH – Total Recoverable Petroleum Hydrocarbons
TPH-g – gasoline
TPH-d – diesel
1,1,-DCA – 1,1-dichloroethane
CIS-1,2-DCE – cis-1,2-dichloroethene
1,1,1-TCA – 1,1,1 trichloroethane
TCE – trichloroethene

The Applicant reported that there is insufficient information on groundwater levels and aquifer properties to calculate the potential vertical gradient that would be caused by project pumping. However, the Applicant assesses that downward transport of groundwater contaminant through the Major Aquitard would not occur, in part because project pumping would be infrequent (SVP 2003b). In addition, the backup well will be constructed according to the State and local water well standards (SVP 2002c).

General information supports the conclusion that the project is unlikely to cause contamination of the region's primary drinking water supply because:
The PPP site is located within the boundaries of the Major Aquitard; and

- Regional pumping from the Lower Aquifer Zones in the vicinity of the project site has not caused any reported contamination from the Upper Aquifer Zone (SVP 2003b).

However, given the limited on-site sampling of groundwater quality and the lack of information necessary to calculate the gradient that will be induced by project pumping, staff cannot fully assess the potential for significant adverse impacts from groundwater contamination that would be caused by project groundwater pumping.

In order to augment the limited information currently available, the Applicant has proposed an aquifer test program, which is discussed in Applicant's Proposed Mitigation and required in Condition of Certification SOIL & WATER 8.

Seawater Degradation

Significant adverse impacts caused by seawater degradation in the Lower Aquifer Zone could occur as a result of project groundwater pumping if seawater intrusion has occurred in the Upper Aquifer Zone underlying the PPP site. However, the PPP site is located about 0.5 miles west of the leading edge of seawater intrusion in the Upper Aquifer Zone beneath the Guadalupe River (RWQCB, 2001). Seawater intrusion has not extended to the PPP site. Therefore, staff concludes that no significant adverse impacts from seawater intrusion would be caused by the proposed project groundwater use.

Surface Hydrology

The Guadalupe River is one of several water bodies in the Santa Clara Basin that has been designated under Section 303(d) of the Clean Water Act as impaired due to mercury contamination. The PPP will not increase the level of mercury in the storm water runoff. Following construction of the PPP the sediment load of the storm water runoff from the site will be reduced from the current level because much of the presently unpaved site would be paved or covered with buildings or other structures. Therefore, staff has concluded that storm water runoff from the PPP project to the Guadalupe River will not have a significant adverse effect on the water quality of the Guadalupe River or worsen this water body's impairment for mercury (SVP 2002a).

The project site is not located on any natural permanent surface water features, or within the 100-year floodplain of the Guadalupe River, and will not alter its delineation so as to place other structures in the 100-year floodplain. The plant site would be graded to promote drainage and minimize on- and off-site flooding. Storm water released from the PPP is not expected to contribute to significantly higher flows in the Guadalupe River, or increase potential for flooding in the Guadalupe River. If the proposed mitigation measures and conditions of certification are implemented, no significant flooding-related impacts are expected.

Wastewater

The expected wastewater streams from the PPP site includes the following:

- Cooling tower and process blowdown
- Sanitary wastewater
- Plant drainage

Each waste stream will be checked as part of the routine maintenance procedures to ensure that the discharge to the existing sewer meets appropriate City of Santa Clara discharge limits.

Circulating (or cooling) water system blowdown will consist of reclaimed water that has been concentrated between 3 and 7 cycles of concentration, and residues of the chemicals added to the circulating water. These chemicals control scaling and biological growth in cooling towers and corrosion of the circulating water piping and condenser tubes. Cooling water treatment will require the addition of a pH control agent (acid), a mineral scale dispersant (i.e. polyacrylate polymer), corrosion inhibitors (phosphate based), and biocide (i.e. bleach or equivalent). This waste stream would be discharged via a new, 900-foot-long pipeline to be installed in Lafayette Street and discharging to the existing 27-inch sanitary sewer main in Central Expressway. Sanitary wastewater from sinks, toilets and other sanitary facilities would be collected along with process water and discharged to the existing 27-inch sanitary sewer pipeline in Central Expressway through a new 900 foot long, 18-inch diameter wastewater discharge pipeline. The predicted average daily sanitary wastewater discharge flow is 2 gpm.

Miscellaneous general plant drainage would consist of area washdown, sample drainage, equipment leakage, and drainage from facility equipment areas. Water from these areas would be collected in systems of floor drains, sumps, and pipes within the PPP and discharged to an oil/water separator. The oil-free discharge water would be sent to the existing 27-inch sanitary sewer pipeline in Central Expressway. An average flow of 1 gpm and peak flow of 50 gpm is projected (SVP 2002a).

All wastewater will be discharged to an existing 27-inch sanitary sewer pipeline. The existing pipeline has an operational capacity of 4.7 mgd. The current peak volume in the existing pipeline was measured at 4.1 mgd in July 2002. The PPP will have a maximum discharge of 0.56 mgd and an average discharge of 0.26 mgd (SVP 2002b, PPP 2002c, DR 59).

The addition of the discharge from PPP will bring the sewer line to its operational limit, which is approximately 80 percent of the maximum flow the pipe is capable of handling. In the event this line receives additional flows or new discharges, the existing line will need to be supplemented. In accordance with City of Santa Clara policy, if the line is to be supplemented the cost will be borne by the users of the line on a prorata share, based on site acreage (not volume of wastewater discharged). The PPP's share of the cost based on acreage would equate to a discharge rate of 2,450 gallons per day (SVP 2002a, Appendix 7).

Based on known water quality data, and the expected cycles of concentration between three and seven cycles, staff concludes that the PPP will meet the discharge standards imposed by the WPCP.

SOIL & WATER TABLE 8
Waste Discharge requirements

Constituent	*Units*	Cooling Tower Blowdown[1] and Plant Drainage Water Quality	South Bay Recycled Water (2001 Water Quality Data)	Daily Maximum Allowable Concentration[2,3,4]
Arsenic	mg/L	0.00585	.001	1.0[2]
Boron	mg/L	2.625	0.525	
Cadmium	mg/L	0.0025	<0.0005	0.7[2]
Chloride	mg/L	1,040	208	
Chromium	mg/L	0.005	<0.001	1.0[2], 0.2[4]
Copper	mg/L	0.015	0.003	2.7[2], (0.05 – 1.0)[3]
Hardness-calcium	mg/L	241.5	245	
Lead	mg/L	0.005	0.001	0.4[2]
Mercury	mg/L	0.000013	0.0000026	0.01[2]
Nickel	mg/L	0.035	0.007	2.6[2], (0.005 – 1.1) [3]
Nitrate as NO_3	mg/L	45	40	
Phosphate	mg/L	23	4.68	
Potassium	mg/L	74.5	15	
Silver	mg/L	0.005	<0.001	0.7[2]
Sodium	mg/L	805	161	
Sulfate	mg/L	470	109	
Total dissolved solids	mg/L	3,745	749	
Total suspended solids	mg/L	10	2.0	
Temperature	Degree F	73	69.1	
Zinc	mg/L	0.260	0.0519	2.6[2], 1.0[4]

[1] Estimated 5-cycle cooling tower blowdown water quality data based upon incoming water quality data provided by the SBWR and preliminary plant water balance diagram.

[2] Daily Maximum Allowable Concentrations for industrial wastewater discharge to the San Jose/Santa Clara WPCP (Table 23.6, City of Santa Clara, 1996).

[3] Group 2 Discharger limits for Industrial Wastewater Discharge Permit shown in parentheses (City of Santa Clara, 1996).

[4] 40 CFR 423.17 cooling tower blowdown pretreatment standards for new sources. Concentration limits shown are maximum daily values. Chemicals used in cooling tower treatment will not contain priority pollutants listed in 40 CFR 423.17.

PPP 2002b, Table 8.15-S4

During construction equipment wash water would be collected and disposed of offsite. No significant impacts are expected from wastewater discharge.

Storm Water

Development of roads, buildings, and other paved or impermeable surfaces, as well as the transfer and storage of various oils and chemicals associated with the proposed PPP, will increase the potential for adverse environmental effects. The potential increase in quantity of storm water discharged and the potential degradation in its quality can increase the chances for sediment and contaminants to contaminate surface or groundwater off-site. A variety of BMPs are planned to avoid significant adverse impacts associated with storm water at the PPP.

During construction, approximately 4.0 acres of land associated with the plant site and other facilities would be disturbed. Surface water impacts are anticipated to be primarily related to short-term construction activity and consist of increased turbidity due to erosion of newly excavated or placed soils. Activities such as grading can potentially increase rates of erosion during construction. In addition, construction materials could contaminate runoff or groundwater if not properly stored and used. Compliance with engineering and construction specifications, following approved grading and drainage plans, and adhering to proper material handling procedures will assure effective mitigation of these short-term impacts. In this way, possible erosion and other water quality degradation impacts will be reduced to less than significant levels. Erosion and sediment controls, surface water pollution prevention measures, and other BMPs will be developed and implemented for both construction and operational phases. These plans will be prepared in accordance with the Storm water Phase II Final Rule, Small Construction Program permit requirements of the San Francisco Bay RWQCB (SVP 2002a, section 8.15.2.6).

The proposed project drainage system includes oil-water separators that would receive storm water runoff from areas subject to oil contamination, including parking lots and gravel areas. The separators would be one or more underground vaults with baffles to collect oils and solids. Storm water would be routed through the baffles, allowing oils to rise to the surface and solids to settle to the bottom. The vault(s) would be pumped out each fall prior to the winter season. Oils will be removed using oil-absorbent pillows or other acceptable methods and transported to an approved disposal facility (SVP 2002a, section 8.15.2.6).

Under post-development conditions, within the power plant site, non-contact storm water runoff would be directed to the storm drainage system. The runoff that previously drained toward adjacent properties would be redirected on-site and collected. Future site grading would approximately duplicate pre-development drainage patterns, with a central ridge splitting the center of the PPP site to the north and south, and a series of gentle ridges and valleys further directing storm water toward designed storm water collection inlets. The proposed drainage lines would connect with the existing 54-inch diameter storm drain located in Pico Way (SVP 2002a).

The proposed storm water collection system is designed to handle the flow from a 100-year storm event. The existing storm water drainage system will experience a very minor increase in volume due to the paving and new structures associated with the project. After completion of construction the entire site would be covered with new

structures, paved, gravelled or landscaped. This will reduce the potential for soil erosion to near zero.

The peak flow associated with the 10- and 100-year storm events at the site before construction (pre-development) was compared to the after construction (post-development) conditions. The result of this evaluation shows that pre-project run-off conditions for the 10-year and 100-year storm events would be 2.91 cfs and 4.34 cfs, respectively. Post development run-off conditions for the same storm events were calculated to be 3.15 cfs and 4.69 cfs. Therefore, the PPP site development would result in a net increase in surface water run-off of approximately 8 percent or 0.24 cfs (10-year storm) and 0.35 cfs (100-year storm).
In addition, the PPP will be required to comply with the general NPDES storm water permit requirements that regulate storm water effluent limitations and monitoring and reporting requirements for both construction activities, and industrial (operational) activities. PPP will supply a Notice of Intent (NOI) to the SWRCB to operate under both General NPDES Storm Water Permits for Construction and Industrial Activities. Conditions of Certification SOIL & WATER 2 and 3 require the applicant to submit a Notice of Intent for both General NPDES Permits prior to site mobilization and prior to operation, respectively.

CUMULATIVE IMPACTS

Soils

Construction and operational activities related to the PPP project may cause a temporary increase in cumulative wind and water erosion. However, implementation of the Erosion Control Plan and Storm Water Pollution Prevention Plans for Construction and Industrial Activities will avoid significant adverse impacts resulting from erosion of soils.

Surface Hydrology

Project related construction activities could increase soil erosion and peak flows, potentially resulting in modification or sedimentation of surface hydrologic features. However, with the implementation of BMPs, no significant cumulative impacts are expected.

During construction of the facility the disturbed area would be subject to wind and water erosion until surface cover comprised of pavement or gravel is in place. The applicant has provided a Draft SWPPP for Construction Activity as required in a NPDES permit for construction activity.

The PPP development would alter drainage patterns on-site through creation of swales and new storm drain inlets. Linear facilities would be installed in existing roadways and utility right-of-ways to the maximum extent possible.

Best Management Practices will be employed to minimize erosion during and after construction.

The implementation of a SWPPP, application of BMPs and LORS compliance will mitigate potential surface hydrology impacts to less than significant levels.

Water Supply

The identified primary source of process water for the PPP is reclaimed water from SBWR. The WPCP currently discharges more than 100 mgd of tertiary treated wastewater to the San Francisco Bay. The SBWR program was initiated in 1997 to reduce the discharge of treated water flowing from the WPCP into the San Francisco Bay. The discharge of the WPCP's tertiary treated water into the Bay was believed to be endangering the salt marsh habitat by converting the salt marsh to fresh water and brackish water marsh. Rather than discharging all its treated water into the Bay, the WPC now diverts water to the recycled water system, thereby keeping discharges to the Bay under its permit discharge limit (SVP 2002c). This project would reuse and evaporate a portion of the wastewater that would other wise be discharged to the Bay, thereby, potentially providing a benefit to the Bay and saltmarsh habitat. The diversion of a portion of this water would not adversely impact the Bay. The WPCP currently recycles approximately 2,800 afy of tertiary treated wastewater. This amount is expected to increase to approximately 7,100 afy (6.5 mgd) when supplying the PPP and the Metcalf Energy Center. The use of reclaimed water by the PPP is not expected to adversely affect the reclaimed water supply, the treatment plant or the other users of reclaimed water. Therefore, less than significant cumulative impacts are expected from the use of this supply.

The backup water supply for the project is groundwater from a proposed new industrial water supply well. Use of this backup supply has been conservatively estimated at 45 days per year. At this estimate the project would require a maximum of 57 million gallons of groundwater per year. See groundwater for more details.

Groundwater

Staff's assessment focuses on potential cumulative impacts to the Lower Aquifer Zone because these aquifers are the primary water supply source for the region. Impacts to the Upper Aquifer Zone, which is generally no longer used for water supply, are only considered with respect to associated impacts to the lower zone. This analysis assumes that the maximum annual groundwater use for the project will be limited to annual groundwater pumping rate of 57 million gallons for a period of no more than 45 days each year.

There are four potential cumulative significant adverse impacts that could be caused by proposed PPP groundwater use:

1. Overdraft,
2. Land subsidence,
3. Seawater intrusion, and
4. Groundwater contaminant.

Overdraft

As described in Regional and Site Vicinity Description, groundwater overdraft is a cumulative significant adverse impact that has historically affected the Santa Clara Valley Groundwater Basin. Overdraft is not caused by the pumping effect of a single groundwater well. Specifically, the estimated annual project groundwater use, which would not exceed 170 AF (57 million gallons), is clearly a small fraction of current groundwater consumption of 115,400 AFY in the Santa Clara Valley Groundwater Basin.

Although the region's water resources and groundwater basin must be actively managed, the basin is not currently overdrafted. In addition, long-term projections of water use and supply (to 2020) do not predict a return to overdraft conditions in the basin (SCVWD, 2001b). Given the current and projected outlook for regional groundwater conditions and the active management of the groundwater basin, staff concludes that proposed project groundwater use would not contribute to cumulative significant adverse impacts caused by groundwater overdraft.

Land Subsidence

Land subsidence is also a cumulative significant adverse impact, which Santa Clara Valley has historically experienced. However, as described in the Regional and Site Vicinity Description, subsidence has been arrested since 1980 through the use of imported surface water. In addition, groundwater levels have significantly recovered from early periods of decline that were responsible for inducing subsidence. Furthermore, conditions that could trigger resumed land subsidence will be carefully controlled because the SCVWD considers land subsidence a key infrastructure risk in the management of regional water resources (SCVWD, 2001a).

Given the current status of subsidence, surface water importation, groundwater use, groundwater levels, and SCVWD's active management to avoid the reoccurrence of subsidence, staff concludes that the proposed project use would not contribute to a cumulative significant adverse impact caused by land subsidence.

Seawater Intrusion

Seawater intrusion is another cumulative significant adverse impact caused by groundwater overdraft. As described previously, seawater intrusion is induced by significant declines in groundwater levels and land subsidence combined with transmission of saline water through defective wells in areas of seawater incursion.

There are 23 abandoned wells of unknown depth reported with a 0.5 mile radius of the PPP site that might serve as conduits for downward flow of poor-quality groundwater between the Upper and Lower Aquifer Zones. However, there is no reported seawater intrusion in the immediate vicinity of the PPP site. The nearest evidence of seawater intrusion to the PPP site is the leading edge of seawater intrusion in the Upper Aquifer Zone beneath the Guadalupe River, located about 0.5 miles east of the PPP site. However, a recent SCVWD report shows that groundwater levels beneath the

Guadalupe River in the Lower Aquifer Zone are not currently depressed to a point that would induce downward migration of saline water (SCVWD, 2002b).
Although seawater intrusion has been a serious regional water quality problem in the Santa Clara Basin, intrusion has been halted since 1980 through the use of imported surface water and through the construction of bayshore levees, which provided physical barriers to seawater encroachment in the land that borders the Bay. In addition, the SCVWD actively monitors seawater intrusion of the aquifers and considers seawater intrusion another key infrastructure risk in the management of regional water resources (SCVWD, 2001a)

Given the location of seawater intrusion in the project area, the recovery of local and regional groundwater levels and the active management of the groundwater basin, staff concludes that the proposed project would not contribute to cumulative significant adverse impacts caused by seawater intrusion.

Groundwater Contamination

Groundwater contamination is a potentially significant cumulative adverse impact that threatens the groundwater supply of the Santa Clara Valley Groundwater Basin. Cumulative impacts can occur under the following three conditions:

(a) groundwater contamination is present in the Upper Aquifer Zone,
(b) deep defective wells in the vicinity of the contamination provide conduits for transport, and
(c) pumping in the Lower Aquifer Zone from many wells create downward gradients.

If these conditions simultaneously occur for a sufficient time period, they would cause shallow contamination to migrate to the Lower Aquifer Zone. If the PPP well drawdown contributed to such a process, it would contribute to ongoing groundwater contamination and would constitute a significant cumulative adverse impact.

The Applicant has identified several groundwater contamination sites within 0.5 miles of the PPP site that potentially could cause significant cumulative adverse impacts to the primary regional supply aquifers of the Lower Aquifer Zone. The local contamination sites include three groundwater plumes, three Spills, Leaks, Investigation & Cleanup (SLIC) sites, and three active and three recently-closed Leaking Underground Storage Tank (LUST) sites. However, all reported contamination in the area is restricted to the Upper Aquifer Zone (SVP 2003b).

Abandoned wells identified in the area could provide conduits for transport of contamination to the Lower Aquifer Zone if downward gradient exist between the two aquifer zones (SVP 2003b). However, there is little information on comparative groundwater level data for the Upper and Lower Aquifer Zones in the vicinity of the PPP site. However, the Applicant will measure static water levels in the Upper and Lower Aquifer Zones as part of its proposed aquifer test program (SVP 2003c). While these measurement will provide new information on vertical gradients, a multi-year record of measurements would be needed to determine the prevailing conditions.

Although both contamination sources and potential conduits for downward contaminant transport apparently exist in the vicinity of the PPP site, there are no reports of significant contamination of the Lower Aquifer Zone. Given the absence of any evidence of significant cumulative groundwater contamination of the Lower Aquifer Zone in the vicinity of the project and the regional recovery of groundwater levels since the 1980's, particularly in the lower aquifers, staff concludes that the proposed project groundwater pumping would not contribute to cumulative groundwater contamination.

Storm Water

The construction of the PPP would temporarily increase the potential for soil erosion from the plant site. The BMPs proposed and the SWPPP will greatly reduce the amount of soil leaving the site. After construction is completed the entire plant site would be covered with structures, paved, gravelled or landscaped. This will greatly reduce the potential for soil erosion. The soil erosion during plant operations is expected to be well below that of the existing condition.

The drainage system within the plant site is designed to convey the flow from a 100-year storm event. The sizing of the drain pipes indicates that a 100-year event peak discharge rate will be less than 50 percent of the capacity of a 15-inch RC drainpipe. The site drainage system would discharge to an existing 54-inch storm drain (SVP 2002c, DR 64). The PPP would lead to a net increase of 0.24 cfs (10-year storm) and 0.35 cfs (100-year storm) to the storm drain system (SVP 2002c, DR 61). The applicant stated that the storm drain has not had capacity problems in the past.

The slight increase in runoff from the plant site is not expected to cause a significant cumulative impact to the storm water system. The reduction in sediment as a result of the project will provide a slight benefit to the storm water system and the Guadalupe River. The proposed mitigation measures and the conditions of certification will reduce the impacts to less than significant.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the population of minorities is greater than 50 percent within a six-mile radius of the proposed Pico power plant (please refer to **Socioeconomics Figure 1** in this Staff Assessment). The Census 2000 information 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 unmitigated significant direct or cumulative impacts resulting from the construction or operation of the project. Therefore, there are no soil and water environmental justice issues related to this project.

FACILITY CLOSURE

The PPP 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.

A facility closure plan will be submitted to the California Energy Commission for approval prior to decommissioning. The plan shall address compliance with all applicable LORS and ensure closure of the facility will not result in significant adverse soil and water impacts.

COMPLIANCE WITH LORS

To ensure compliance with LORS, the PPP will be required to comply with the requirements of several permits for the construction and operation of power plant and its related facilities. The proposed project will be required to comply with the requirements of the Recycled Water Use Permit and the Industrial Waste Discharge Permit. The back-up well that would be constructed to serve the PPP must comply with the requirements of the SCVWD. Any discharge limits established by the City will ensure that the project does not result in a violation of the WPCP's NPDES limitations.

Construction and operation of the PPP must comply with the requirements of the RWQCB's general NPDES surface water discharge permits. Included in these requirements are provisions for spill prevention and response measures, source control, monitoring and sampling specifications and employee training.

If the conditions of certification listed below are implemented, staff believes the PPP will comply with Soil and Water resources related LORS.

MITIGATION

APPLICANT'S PROPOSED MITIGATION

Soils

The following applicant-proposed mitigation measures can be implemented to reduce potentially significant soil impacts. The applicant stated that an acceptable level of soil erosion, as used herein, is defined as that amount of soil loss that would not affect (i.e., limit) the potential long-term beneficial uses of the soil as a growth medium or adversely affect water resources due to accelerated erosion and subsequent sedimentation. The Applicant will:

Prepare an Erosion Control Plan prior to construction and implement the plan during and following construction. Erosion and sediment control measures may include, but are not limited to, use of sand bags, mulches, protective coverings (e.g., jute netting and rip-rap), installation of culverts under roadways at drainage crossings, installation of sediment detention basins, construction of water diversions along roads, and water bars along pipeline rights-of-way.
Conduct grading operations in compliance with the Santa Clara City Grading Ordinance.
Perform construction activities in accordance with the Storm Water Pollution Prevention Plan (SWPPP) and associated Monitoring Program. These items will be required for the project in accordance with California's General Permit for Storm Water Discharges Associated with Construction Sites under the United States Environmental Protection

Agency (USEPA) National Pollutant Discharge Elimination System (NPDES) Program. The SWPPP will include erosion control measures, including Best Management Practices to reduce erosion and sedimentation.
Stabilize disturbed areas that will not be covered with surface structures (e.g., buildings) or pavement following grading and/or cut-and-fill operations. In areas to be disturbed or excavated along pipeline routes and where vegetation is present prior to construction, topsoil will be selectively salvaged and replaced. No seeding or irrigation is proposed.
Limit soil erosion/dust generation by wetting active construction areas with water (including roads).
Conduct visual monitoring during and after construction of areas that were disturbed during the construction phase, particularly noting steep slope areas or other erosion prone areas.
Implement corrective measures in areas that do not respond adequately to initial stabilization techniques or in areas where accelerated erosion is occurring.
The applicant will incorporate standard Best Management Practices (BMPs) into the project design for construction and operation to mitigate erosion and sedimentation impacts.

Groundwater

The Applicant's analysis of potential project impacts as a result of the proposed PPP groundwater backup well and associated groundwater use found that no direct, indirect or cumulative significant adverse impacts would occur. In response to staff and SCVWD concerns regarding limited site-specific information on aquifer conditions, the Applicant has proposed an aquifer test program for the project backup well (to be installed after certification) to further evaluate and quantify the PPP impacts analysis. The aquifer test program is designed to provide site-specific data for the calculation of the aquifer properties in the production aquifer in the Lower Aquifer Zone, and of the impact of project pumping on vertical gradients between the Upper and Lower Aquifer Zones, which is needed for additional impacts analysis. The Applicant proposes to quantitatively evaluate the impact of project pumping on nearby wells, contamination in the Upper Aquifer Zone, saltwater intrusion and land subsidence. (SVP 2003c)

Surface and Storm Water

This section presents mitigation measures proposed to reduce impacts to water resources in areas affected by the proposed project, including the plant site and ancillary facilities. The applicant proposes to:
Implement Best Management Practices designed to minimize soil erosion and sediment transport during construction of the plant site and project corridor features, and design appropriate erosion and sediment controls for slopes, catch basins, culverts, stream channels, and other areas prone to erosion.
Conduct operations at the plant site in accordance with USEPA Storm Water Phase II Final Rule (for small construction activities disturbing between one and 5 acres), and design and implement the Best Management Practices to prevent or control pollutants potentially associated with the operation of the plant from entering storm water sewers.
Perform refueling and maintenance of construction equipment only in designated lined and/or bermed areas located away from stream channels, and prepare and implement spill contingency plans in areas where they are appropriate.

Implement Best Management Practices during construction of pipelines to control soil erosion.
Prepare and submit a Title 22 Engineer's Report to the State DOHS and RWQCB to ensure safe use of recycled water for the cooling water, and adhere to Reclamation Requirements issued by the RWQCB.

STAFF'S PROPOSED MITIGATION

Soils

As required by the RWQCB a Storm Water Pollution Prevention Plan (SWPPP) will be implemented to minimize erosion from construction and operation activities. Erosion and Sedimentation Control and Storm Water Management Plans that address standard erosion runoff and sedimentation impacts will be developed and implemented for construction, post-construction, and operational phases. These requirements are addressed in **Conditions of Certification SOIL & WATER 1, 2 and 3.** The applicant must provide complete, final Erosion and Sediment Control and Storm Water Management Plans to accompany the narrative portion of the SWPPP that addresses all staff's and other agencies' comments.

Groundwater

Staff analysis of potential project impacts as a result of proposed PPP groundwater backup well and associated groundwater use found no significant adverse impacts would occur, except in the case of potential indirect impacts from groundwater contamination. Specifically, the staff analysis found no significant adverse impacts for the following groundwater problems:

Direct or Indirect Impacts:

1. l interference and
2. Seawater degradation

Cumulative Impacts:

1. Overdraft,
2. Land subsidence,
3. Seawater intrusion and
4. Groundwater contaminant.

These findings are based on the assumption that the maximum annual groundwater use for the project will be limited to annual groundwater pumping rate of 57 million gallons for a period of no more than 45 days each year. To support these findings, the PPP is limited to this amount and duration of pumping in **Conditions of Certification SOIL & WATER 6.**

To address the unresolved issue of potential impacts of groundwater contamination, staff recommends the implementation of the Applicant's proposed aquifer test program (SVP 2003c) with the addition of water quality testing of the Upper Aquifer Zone.

Because previous on-site groundwater sampling was limited to one very shallow boring (12 feet in depth), staff recommends that additional water quality samples should be collected from the shallow observation well to be constructed for the aquifer test program. These samples should be analyzed at a State-certified laboratory for Title 22 constituents, as well as petroleum hydrocarbons (TPH-d, TPH-g, and TRPH), which have been constituents of concern at the project site. This recommended requirement is addressed in **Conditions of Certification SOIL & WATER 7.**

The proposed aquifer test program should include the calculation of the vertical gradients between the Upper and Lower Aquifer Zone under worst-case pumping conditions. Worst-case groundwater pumping is defined as an annual groundwater pumping rate of 57 million gallons for a period of 45 days each year for 40 years.

Because the PPP backup well would not be constructed and the proposed aquifer test program would not be performed until after certification, the criteria for evaluating the aquifer test program results and conditional mitigation to address a potential finding of significant adverse impacts is required prior to certification. Staff recommends the following criteria for evaluating the aquifer test program results.

- Significant Contamination Criteria: Detection of contamination concentrations of Title 22 constituents above the Maximum Contaminant Levels (MCL) or detection of petroleum hydrocarbons in the Upper Aquifer Zone.
- Significant Gradient Criteria: A calculated vertical downward gradient between the Upper and Lower Aquifer Zones that would allow transmission of water over the life of the project under worst-case groundwater pumping conditions.

Staff recommends that a copy of all sample results and the aquifer test program technical report be provided to the SCVWD and San Francisco Bay RWQCB, as well as to the CEC.

If the proposed aquifer test and recommended groundwater quality sampling confirm the absence of significant contamination in the Upper Aquifer Zone and a low transmission rate between the Upper and Lower Aquifer Zones that would preclude the transmission of water from the Upper to the Lower Aquifer Zone over the life of the project under worst-case conditions, staff would conclude that no significant adverse impacts from groundwater contamination would be caused by the proposed project groundwater use and no additional remedial actions would be required.

If the results of the aquifer test show a potential pumping impact, the project owner would be required to amend the project license to identify actions that will be implemented to avoid or reduce the impact to a level less than significant. This recommended requirement is addressed in Conditions of Certification **SOIL & WATER 8**.

Finally, water well standards, as defined in the State Water Code and the local SCVWD Ordinance 90-1, are essential for the protection of the primary drinking water supply, produced from the Lower Aquifer Zone. Staff recommends that these standards be required for the construction of the project backup well, as addressed in **Condition of Certification SOIL & WATER 5.**

Surface and Storm Water

The PPP will supply all information required by the Regional Water Quality Control Board (RWQCB) to determine compliance with the NPDES requirements for storm water discharge. When the information provided is satisfactory to the RWQCB, the project owner shall receive both an NPDES General Permit for Storm Water Discharges Associated with Construction and an NPDES General Permit to Discharge Storm Water Associated with Industrial Activity for the project. The applicant will be responsible for all monitoring and reporting guidelines and other provisions normally associated with the general storm water permits. These requirements are contained in **Conditions of Certification SOIL & WATER 2 and 3.**

This process also requires the submittal of a Storm Water Pollution Prevention Plan (SWPPP). **Conditions of Certification SOIL & WATER 2 and 3** requires that this plan must be approved by the Energy Commission Compliance Project Manager (CPM). Implementation of the approved plan will mitigate any storm water impacts from the project.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined the proposed project will result in less than significant impacts to soil and water resources. Staff recommends approval of the PPP, provided the proposed Conditions of Certification below are required.

PROPOSED CONDITIONS OF CERTIFICATION

The following conditions have been developed for this project:

SOIL & WATER 1: Prior to beginning any site mobilization activities, the project owner shall obtain staff approval of a Sedimentation and Erosion Control Plan. The plan shall be submitted to Santa Clara County, SCVWD and the City of Santa Clara Public Works Department for review and comment and to the CPM for approval.

Verification: At least 60 days prior to the start of any site mobilization activities the Sedimentation and Erosion Control Plan shall be submitted to the CPM for approval and to Santa Clara County, SCVWD and the City of Santa Clara Public Works Department for review and comment. Comments from other agencies shall be submitted to the CPM. The CPM must approve the sedimentation and Erosion Control Plan prior to the initiation of any site mobilization activities.

SOIL & WATER 2: Prior to beginning site mobilization, the project owner shall receive a General NPDES Permit for Discharges of Storm Water Associated with

Construction Activity from the Regional Water Quality Control Board, and obtain CPM approval of the related Storm Water Pollution Prevention Plan (SWPPP) for Construction Activity. The SWPPP will include final construction drainage design consistent with the Santa Clara County Ordinances regarding grading, and discharge of storm water, as well as the City of Santa Clara requirements for grading, drainage and erosion control and specify BMPs for all on and off-site PPP project facilities. This includes providing calculations for determining the design capacity of the perimeter drainage, as well as final site drainage plans and locations of BMPs. The SWPPP shall be submitted to Santa Clara County, SCVWD and the City of Santa Clara Public Works Department for review and comment at least 60 days prior to start of any site mobilization activities.

Verification: At least 60 days prior to the start of any site mobilization activities, the SWPPP for Construction Activity and a copy of the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity shall be submitted to the CPM for approval and to Santa Clara County, SCVWD and the City of Santa Clara Public Works Department for review and comment. 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 receive a General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity from Regional Water Quality Control Board, and obtain CPM approval of the related Storm Water Pollution Prevention Plan (SWPPP) for Industrial Activity. The SWPPP will include final operating drainage design consistent with the Santa Clara County Ordinances regarding discharge of storm water as well as the City of Santa Clara requirements for drainage and erosion control and specify BMPs and monitoring requirements for the PPP project facilities. The SWPPP shall be submitted to Santa Clara County, SCVWD and the City of Santa Clara Public Works Department for review and comment at least sixty days prior to initiation of project operation.

Verification: At least 60 days prior to the start of project operation, the SWPPP for Industrial Activity and a copy of the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity shall be submitted to the CPM. The SWPPP shall be submitted to Santa Clara County, SCVWD and the City of Santa Clara Public Works Department for review and comment at least 60 days prior to initiation of project operation. Approval of the final SWPPP plan by the CPM must be received prior to initiation of project operation.

SOIL & WATER 4: The project owner shall use tertiary-treated water supplied from South Bay Water Recycling (SBWR) as its primary water supply source for cooling, process and landscape irrigation. The project owner shall meter in-plant uses of water, distinguishing fresh water used for domestic purposes from recycled water used for cooling, process and landscape irrigation. The project owner shall prepare an annual summary, which will include the monthly range and monthly average of daily water usage in gallons per day, and total water used by the project on a monthly and annual basis in acre-feet. The annual summary shall distinguish sources and uses of water according to recycled water for cooling and process supply, fresh water source for cooling, process and irrigation supply, and for fresh water for domestic supply. For subsequent years,

the annual summary shall also include the yearly range and yearly average water use by the project. The annual summary shall be submitted to the CPM as part of the annual report.

Verification: The project owner will submit as part of its periodic reports and annual compliance report a water use summary to the CPM for the life of the project.

SOIL & WATER 5: The project groundwater backup well shall be constructed according to water well construction standards, as defined in the State Water Code and the local Santa Clara Valley Water District (SCVWD) well permit Ordinance 90-1. The project well shall only be screened in the Lower Aquifer Zone. The project owner shall pay all fees associated with SCVWD Ordinance 90-1 to the agencies specified in Ordinance 90-1.

Verification: The project owner shall submit a copy of their well permit for the project groundwater backup well from the Santa Clara Valley Water District to the CPM for review and approval at least 90 days prior to the construction of the well. The project owner shall pay all fees associated with SCVWD Ordinance 90-1 to the agencies specified in Ordinance 90-1. The project backup well shall not be constructed until it is approved by the CPM.

SOIL & WATER 6: Groundwater shall be used as a backup water supply for the PPP. Groundwater shall only be used during time when the primary water supply is unavailable. The maximum annual groundwater use for the project shall not exceed 57 million gallons nor shall it exceed a period of more than 45 days each year.

Verification: The project owner shall meter, record and report project groundwater pumping annually to the CPM.

SOIL & WATER 7: The project owner shall collect groundwater quality samples from the shallow observation well to be constructed for the aquifer test program. These samples shall be analyzed for Title 22 constituents, as well as petroleum hydrocarbons (TPH-d, TPH-g, and TRPH), at a State-certified laboratory. The project owner shall submit a groundwater sampling report, which includes a description of the sampling procedures and laboratory results to the CPM, the RWQCB and the Santa Clara Valley Water District at least 90 days prior to the commercial operation of the project backup well.

Verification: The project owner shall submit a groundwater sampling report, which includes a description of the sampling procedures and laboratory results, to the CPM, the RWQCB and the Santa Clara Valley Water District at least 90 days prior to the commercial operation of the project backup well.

SOIL & WATER 8: The project owner shall conduct the aquifer test program as proposed by the applicant in the *Statement of Work, Proposed Aquifer Test Program, Backup Water Supply Well, Pico Power Project* (SVP 2003c). The project owner shall calculate the projected vertical gradient between the Upper and Lower Aquifer Zones over the life of the project based on an annual groundwater pumping rate of 57 million gallons for a period of 45 days each year for 40 years. The aquifer test procedures, the interpretation of the test results, the raw data (in machine readable format), the calculation of aquifer properties,

and the impacts analyses shall be presented and discussed in the aquifer test technical report. If the results indicate a potential pumping impact, the project owner shall amend the project license to identify actions that will be implemented to avoid or reduce the impact to a level less than significant. The aquifer test technical report shall be provided to the RWQCB and the Santa Clara Valley Water District for review, as well as the CPM for approval, at least 90 days prior to the commercial operation of the project backup well.

Verification: The project owner shall provide a copy of the aquifer test technical report to CPM for review and approval at least 90 days prior to commercial operation of the project backup well. The project owner shall also provide a copy of the aquifer test technical report to the RWQCB and the Santa Clara Valley Water District for review and comment 90 days prior to commercial operation of the project backup well.

SOIL & WATER 9: Prior to the start of operation the project owner shall submit a copy of an approved Industrial Wastewater Discharge Permit for the process wastewater produced at the PPP.

Verification: The project owner shall submit a copy of the approved Industrial Wastewater Discharge Permit to the CPM at least 60 days prior to the start of operations.

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TRAFFIC AND TRANSPORTATION

Testimony of James Adams

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 Pico Power Project's (PPP) compatibility with applicable laws, ordinances, regulations, and standards (LORS). This assessment also analyzes and identifies potential impacts related to the construction and operation of the project on the surrounding transportation systems and roadways, and potential mitigation measures to avoid or lessen those impacts. It includes the evaluation of the influx of large numbers of construction workers, and how, over the course of the construction phase, the movement of these workers can increase roadway congestion and also affect traffic flow.

Staff has analyzed the information provided in the Application for Certification (AFC) and other sources to determine the potential for the PPP to have significant traffic and transportation impacts, and has assessed the availability of mitigation measures that could reduce or eliminate the significance of those impacts. Conditions of certification are included to implement the appropriate mitigation measures and to ensure that the project complies with the applicable LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

- Title 49, Code of Federal Regulations. Chapter 11, Subchapter C. These authorities establish national standards for the transportation of hazardous materials.
- Title 49, Code of Federal Regulations, Sections 171-177, governs 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, addresses safety considerations for the transport of goods, materials, and substances over public highways.
- Part 77, Federal Aviation Administration (FAA) Regulations, establishes standards for determining obstructions in navigable airspace and sets forth requirements for notification to the FAA of proposed construction. Notification is also required if the structure or obstruction is more than a specified height and falls within any restricted airspace in the approach to airports.

STATE

The California Vehicle Code and the Streets and Highways Code contain requirements applicable to the licensing of drivers and vehicles, and the transportation of hazardous materials and rights-of-way. In addition, the California Health and Safety Code

addresses the transportation of hazardous materials. Provisions within the California Vehicle Code are as follows:

- Section 353 defines hazardous materials.
- Sections 31303-31309 regulate the highway transportation of hazardous materials, the routes used, and restrictions thereon.
- Section 31030 identifies commercial shipping routes for specified waste streams.
- Sections 31600-31620 regulate the transportation of explosive materials.
- Sections 32000-32053 regulate the licensing of carriers of hazardous materials and include noticing requirements.
- Sections 32100-32109 establish special requirements for the transportation of inhalation hazards and poisonous gases.
- Sections 34000-34121 establish special requirements for the transportation of flammable and combustible liquids over public roads and highways.
- Sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5, and 34510-11 regulate the safe operation of vehicles, including those used for the transportation of hazardous materials.
- Section 25160 et seq. address the safe transport of hazardous materials.
- Sections 2500-2505 authorize the issuance of licenses by the Commissioner of the California Highway Patrol for the transportation of hazardous materials including explosives.
- Sections 13369, 15275, and 15278 address the licensing of drivers and the classifications of licenses required for the operation of particular types of vehicles. These sections also require certificates permitting the operation of vehicles transporting hazardous materials.
- California Streets and Highways Code, sections 117 and 660-72, and California Vehicle Code, section 35780 et seq., require permits for the transportation of oversized loads on county roads.
- California Street and Highways Code, sections 660, 670, 1450, 1460, 1470, and 1480, regulates right-of-way encroachment and the granting of permits for encroachments on state and county roads.
- Per the California Department of Transportation (Caltrans), all construction within the public right-of-way will need to comply with the “Manual of Traffic Controls for Construction and Maintenance of Work Zones.”

LOCAL

City of Santa Clara Comprehensive General Plan, Transportation Element.

The General Plan’s Transportation Element establishes goals and policies, and identifies implementation measures for County traffic and transportation systems. The Santa Clara County Board of Supervisors is the administering agency.

Part of the General Plan includes a Transportation Demand Management Program which seeks to reduce traffic impacts within the City of Santa Clara by: 1) reducing the number of commute-generated vehicular trips and total miles traveled, and 2) lowering vehicular emissions, energy usage, and ambient noise levels by reducing the number of vehicle trips, total vehicle miles traveled, and traffic congestion (City of Santa Clara 1992).

SETTING

REGIONAL SETTING

The PPP project site is located in the City of Santa Clara in Santa Clara County in the South Bay Subregion of the San Francisco Bay Area in Northern California (SVP 2002a, pg. 8.12-1). The subregion has an extensive transportation system that includes freeways, highways, bus lines, rail facilities, and a major airport. The major freeways in the general area include U.S. Highway 101 (Bayshore Freeway), and State Highways 17, 82, 85, and 237, as well as Interstate Highways 280, 680, and 880. Regional access to the site is provided by Highway 101 from the west and east, and SR 880 from the north and south.

Descriptions of some of the critical roads and highways in the study area are provided below. **Traffic and Transportation Figure 1** illustrates the major roads, potential access roads, and highways in the project area.

The Santa Clara General Plan was written in 1992. It notes that Highway 101 was expected to be congested by 2005, whereas it is frequently congested now, ahead of the General Plan timeframe. The City of Santa Clara's economy is heavily dependent on the extensive network of highways and roads. In particular, the industrial complex along the South Bay, which is anchored by a major electronics industry, relies on the movement of people and goods along the transportation system (City of Santa Clara 1992). Congestion on area freeways and roads has increased considerably since the General Plan was written.

LOCAL SETTING

As shown in **Traffic and Transportation Figure 1**, Highway 101 and SR 880 are the two major highways in the area of the project site. Highway 101 provides access to the site via De La Cruz Boulevard and San Tomas Expressway. SR 880 intersects Highway 101 approximately 8 miles to the east of the PPP site. Central Expressway is the primary east-west road providing access to the project site and intersects Scott Boulevard and Lafayette Street. From that point, the site can be accessed via the following streets:

- Space Park Drive
- Kenneth Street
- Duane Street

The various route options are discussed in the Impacts section. San Tomas and Montague Expressways, Lafayette Street, and De La Cruz Boulevard provide arterial access to the local road network surrounding the site.

Traffic and Transportation Table 1 gives existing peak hourly traffic at several intersections. The busiest intersections are Scott Boulevard and San Tomas Expressway (morning and evening peak), and Central Expressway and De La Cruz Boulevard (morning and evening peak). The intersections of Scott Boulevard and San Tomas Expressway, De La Cruz Boulevard and Central Expressway, and Lafayette Street and Central Expressway are the busiest in the local area in terms of total peak in/out vehicle trips (CALTRANS 2001). The corresponding numbers for 2001 are 7,807 trips, 5,146 trips, and 4,606 trips respectively (SVP 2003).

Accident History

The California Highway Patrol's Statewide Integrated Traffic Records System provides a variety of information related to car accidents, including the type and number of accidents, vehicles involved, and conditions that contributed to the accident. In 1997 (the last published data set), the number of accidents in California at signalized suburban intersections per million vehicles was 0.54. The average for roads near the proposed PPP site ranges from 0.03 for the intersection of Scott Boulevard and San Tomas, to 0.56 for the intersection of Scott Boulevard and Central Expressway. There were two accidents in 2001 at the uncontrolled (i.e. no traffic signals or stop signs) intersection of Lafayette and Duane Streets, and no accidents at the intersection of Kenneth and Duane Streets, or Kenneth Street and Space Park Drive (CHP 2002, Report 8).

Railways

Four regional rail operators are in the Bay Area: BART, CalTrain Peninsula Commute Service, Muni Metro, and Santa Clara Light Rail Transit (City of Santa Clara 1992). There are no light rail stations in the immediate vicinity of the proposed PPP site. There is a Union Pacific rail line for freight transportation located on the Santa Clara and San Jose border. The line is within 500 feet of the project site and additional rail lines are within a mile directly south.

Public TRANSPORTATION

Public transportation in the area is provided by Santa Clara Valley Transportation Authority (VTA). Local buses provide service along De La Cruz, Lafayette Street, Montague and San Tomas Expressways. Several bus routes are in the vicinity of the project site. These include Route 304, 56 and 58. Route 304 leaves on the half-hour and utilizes De La Cruz and Central Expressway, and crosses Lafayette Street. Routes 56 and 58 leave every 40 minutes and utilize Central Expressway and Scott Boulevard. The stop closest to the site is at Central Expressway and Lafayette Street (VTA 2003a). This is approximately one block south of the site.

Pedestrians and Bicycles

A majority of the roads in the area are well traveled and have sidewalks. San Tomas and Central Expressway are major arterial roads with three and four lanes in each

direction and bicycles are permitted. Within the project area, there are no Class I or II bike lanes or paths as delineated by the Santa Clara Valley Bikeways Map. The Map has a street rating system that describes how much caution a bicyclist needs to exercise when using various roads in the project area. Extreme to moderate caution is necessary when riding along most of the roads near the proposed PPP site (VTA 2003b).

Trucks

The Transportation Element of the Santa Clara County General Plan does not specifically detail size and weight/load limits for any roadways in the county. Therefore, all applicable regulations are found in California Vehicle Code. Some notable limits are 20,000 pounds per axle and 10,500 per wheel or wheels on one end of the axle. The General Plan notes that trucks are encouraged to stay on major streets and off local streets, except for deliveries (SVP 1992, Transportation Element, Section 4.9).

Airports

The PPP site is located approximately 1 mile northwest of the San Jose International Airport. FAA Form 7460-1 is normally required when new or altered structures are within an airport control zone, which is generally within a five-mile radius (FAA 2002). For airports with runways longer than 3,200 feet, the restricted space extends 20,000 feet (3.3. nautical miles[1] from the runway).

CURRENT ROADWAY AND INTERSECTION OPERATING CONDITIONS

When evaluating a local transportation system, staff uses levels of service (LOS) measurements as the foundation on which to base its analysis. LOS measurements represent the flow of traffic. In general, LOS ranges from "A" with free flowing traffic, to "F," which is heavily congested with flow stopping frequently. The City General Plan set the performance stand for intersections at LOS D. Existing LOS levels for the intersections in the PPP vicinity based on peak hour volume are listed:

- Central @ Lafayette (AM): LOS E
- Central @ Lafayette (PM): LOS F
- Central @ Scott (AM): LOS D
- Central @ Scott (PM): LOS F
- Scott @ San Tomas (AM): LOS D
- Scott @ San Tomas (PM): LOS F
- Central @ De La Cruz (AM): LOS F
- Central @ DE La Cruz (PM): LOS F
- Lafayette @ Duane (AM): LOS F
- Lafayette @ Duane (PM): LOS F
- Kenneth @ Space Park (AM): LOS A *

[1] A nautical mile contains 6,076 feet, whereas a linear mile contains 5,280 feet.

- Kenneth @ Space Park (PM): LOS A *
- Kenneth @ Duane (AM): LOS A *
- Kenneth @ Duane (PM): LOS A *

(Source: SVP, 2002a, pg. 8.12-18, * SVP 2003, pg. 3)

PROJECT FEATURES

The PPP project includes the following features: generating facility and switchyard at the site; 2 mile long natural gas pipeline; gas metering station; gas compressor station; and a wastewater pipeline.

ANALYSIS AND IMPACTS

THRESHOLDS OF SIGNIFICANCE

Significance criteria are based on California Environmental Quality Act (CEQA) Guidelines, the CEQA Environmental Checklist Form (amended December 1, 1999), and on performance standards or thresholds established by responsible agencies.

An impact may be considered significant if the project results in:

- an increase in traffic that 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);
- a level of service standard established by the county congestion management agency for designated roads or highways, is exceeded either individually or cumulatively;
- a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- a substantial increase in hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- inadequate emergency access;
- inadequate parking capacity; or
- a significant hazard to the public or the environment through the transportation of hazardous material.

CONSISTENCY WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Public Resources Code section 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 meets and consults with applicable agencies to determine conformity and, when necessary, "to attempt to correct or eliminate any noncompliance" (Pub. Resources Code § 25523(d)(1)). The traffic and transportation laws, ordinances, regulations, standards (LORS), and policies applicable to the project have been analyzed in the Impacts section below to determine the extent to which the PPP is consistent or at variance with each requirement or standard.

IMPACTS

The following discussion identifies potential traffic impacts associated with the construction of the PPP, and provides an explanation of the impact conclusion.

Construction Phase

Traffic impacts from the PPP construction were evaluated based on daily and peak hour volumes. The peak month of construction activity was evaluated to provide a conservative (i.e. worst case) analysis. The peak period of construction is expected to occur 12 to 15 months after the start of construction.

Construction Workforce and Truck Traffic

For traffic impact analysis purposes, the applicant has assumed that construction workers in their vehicles will reach the PPP site by using Central Expressway and Lafayette Street followed by a left turn onto Duane Street. Staff drove this route and observed that the left turn onto Duane was a difficult, potentially hazardous maneuver, because it involves waiting to make the left turn onto Duane while oncoming traffic is hidden by a retaining wall on a curved portion of Lafayette Street, about a thousand feet north of the intersection with Duane Street. Staff estimated that the oncoming traffic was moving at 45-50 miles per hour. There is no signal at this intersection and completing the turn involves a calculated risk. The situation is aggravated when it comes to larger, slow moving vehicles such as trucks making the turn.

Staff has identified, with input from City of Santa Clara Traffic staff (City of Santa Clara 2003a), two alternate routes for reaching the site that avoid the left turn off at Lafayette Street as shown in **Traffic and Transportation Figure 2**. The first involves using Central Expressway or San Tomas to Scott Boulevard followed by a turn onto Space Park Drive, a left turn onto Kenneth Street, and a right turn onto Duane Street and proceed east to the site. The second route involves going south on De La Cruz to Central Expressway and turning right and proceeding west to Scott Boulevard, followed by a right turn on Space Park Drive and proceeding in the same manner identified in the first route.

Workers leaving the site can take the any of the three routes noted above or can proceed east on Duane Street to Lafayette Street and make a right turn heading south

to Central Expressway. Staff believes that a left turn to go north onto Lafayette should be avoided.

The average construction workforce would be approximately 114, with a peak force of 206. The 18 to 20 month construction period is expected to last from the summer of 2003 to the winter of 2004. It is anticipated that more than one-half of the workers would come from south of the Bayshore Freeway. Approximately 5 percent of the construction vehicles accessing the project site would be heavy vehicles, which are defined as any vehicle that has more than four wheels (SVP 2002a, pg. 8.12-15).

The table below presents a summary of the trip generation for the project construction phase. Truck trips were converted to Passenger Car Equivalent (PCE) trips by applying a factor of 2.0 to reflect the additional impact that large trucks have on street system operations beyond that of a normal passenger car, as per the 1985 Highway Capacity Manual. Assuming a worst case of no carpooling, the proposed project will generate a total of 126 average hour vehicle round trips and 252 peak hour vehicle round trips. For the peak months of construction activity, the PPP will generate 156 average hour round trips, and 312 peak hour round trips. This includes both construction worker commute traffic and truck traffic. Staff believes that car-pooling should be encouraged when ever possible.

Traffic and Transportation Figure 1
Trip Generation Summary Table – Construction Phase

Average Qtr Daily Vehicle Round Trips			**Peak (1) Qtr Daily PCE (2, 3) Round Trips**	
	Average Hour	Peak Hour	Average Hour	Peak Hour
Workers (3)	114	206	132	260
Delivery Trucks	12	38	24	50
Total	**126**	**252**	**156**	**312**

Adapted from SVP 2002a, pg. 8.12-19

(1) "Peak" refers to scheduled peak quarter of construction activity (15 months from start of construction).
(2) A passenger car equivalent (PCE) factor of 2.0 was applied to delivery trucks and heavy trucks.
(3) Assumes 80 percent of workers and 10 percent of deliveries arrive or depart during peak traffic hour.

Construction traffic impacts to local and regional roads will be determined by the routes used by construction workers and delivery trucks arriving and departing from the project site (see **Traffic and Transportation Table 2)**. Most workers and deliveries of building supplies and equipment will come from the greater South Bay Area. More specifically, for purposes of analysis, the specified routes to the site as discussed earlier avoid a left turn off Lafayette onto Duane Street or a left turn from Duane onto Lafayette Street. For the purposes of this analysis, the following assumptions were made:

- When entering or leaving the site at Duane Street, approximately 75 percent of the traffic will travel east of the site on Duane Street to Lafayette Street, and the remaining 25 percent will go west on Duane Street to Kenneth Street, then south on Kenneth and west on Space Park Drive.

- Approximately 80 percent of the construction workers will arrive or depart during peak traffic hours; 10 percent of delivery trucks will arrive or depart during peak traffic hours.

Railways

The applicant does not plan on using any rail line during construction of the PPP.

Linear Facilities

Three related facilities will be constructed in conjunction with the PPP: a natural gas pipeline and metering station, a natural gas compressor facility, and a wastewater discharge pipeline. Each of the linear facilities is discussed below.

Lafayette Street Natural Gas Pipeline, Metering Station and Compressor station

The preferred route for the 2 mile-long natural gas pipeline begins near the intersection of Gianera and Wilcox Streets and proceeds easterly underneath the Union Pacific Railroad tracks, and then south along Lafayette Street. The pipeline would be bored underneath Highway 101 and would not disrupt freeway traffic (SVP 2002a, pg. 5-1.). The entire route is adjacent to paved roads with moderate to high traffic volumes.

The preferred location for the gas metering station, which would require a space of approximately 30 by 60 feet, is within the Hetch Hetchy Aqueduct right-of-way near Stars and Stripes Drive. An exiting bike path would need to be realigned to the east (SVP 2002a, pp. 5-1and 2).

The natural gas compressor station would be constructed approximately 500 feet from the PPP site at the corner of Lafayette and Comstock Streets. A new pipeline would deliver the gas from the compressor station to the PPP.

Construction of these facilities is anticipated to take nine months. Based on similar projects, it is estimated that a peak monthly workforce of approximately 12-14 employees will be required for pipeline and related facilities construction. Pipeline construction requires the use of heavy equipment including excavators (backhoe, loader, motor grader, and trencher), cranes, water trucks, and fuel trucks. Deliveries of heavy equipment, construction materials and supplies, piping, concrete, rebar, miscellaneous consumables, and other construction equipment would be made to the pipeline route by truck.

Wastewater Discharge Pipeline

An existing water pipeline within the boundaries of the PPP would provide tertiary treated recycled water, which is supplied by the San Jose/Santa Clara Water Pollution Control Plant, located in the City of Alviso. A new 900-foot waste water pipeline would deliver PPP waste water discharge south along Lafayette to an existing 27-inch water main in Central Expressway (SVP 2002a, pg. 8.12-21). Staff expects the construction of the waste water discharge pipe would be completed within one to two months.

The construction of the gas and water pipelines would require deliveries of heavy equipment, construction materials and supplies, piping, concrete, rebar, miscellaneous

consumables, and other construction equipment. There may be some minor impacts on adjacent roads (i.e. Lafayette Street and Central Expressway) such as temporary lane closures, detours, and traffic control procedures. Staff notes that additional parking will be made available on City-owned property during construction of the PPP (SVP 2002a, pg. 8.12-14).

Changes to Level of Service

The combination of commute, truck, and visitor traffic associated with the construction phase of the PPP would increase the volume of traffic in the local area. However, if staff's preferred route (Space Park Drive) for construction traffic outlined earlier is utilized, the level of service will not change between existing and "existing plus project" conditions on affected road segments during the construction phase of the PPP. With the measures described below, all of the roadway segments listed previously under existing conditions will remain at the same levels of service.

Prior to plant construction, a traffic control plan (see Condition of Certification **TRANS-6**) will be developed and implemented so that traffic flow and access on local roads and intersections will not seriously degrade existing traffic patterns. The traffic control plan will outline what measures will need to be taken on a month-to-month basis, given the expected construction traffic volumes. The construction contractor will be required to prepare this plan to address timing of heavy equipment and building materials deliveries; an employee ridesharing/trip reduction plan; and signing, lighting, and traffic control device placement.

The applicant has stated that best management practices will be incorporated in the construction traffic control plan, including:

- Truck loads will not exceed legal limits.
- Loads of material (i.e. excavated soil) will be centered in the cargo bed and either enclosed by vehicle covers or wetted to prevent wind from blowing materials out of the truck.
- Trucks and trailers will be swept cleaned or hosed after unloading and before entering highway.
- Mufflers, brakes, and all loose items on trucks will be maintained to minimize noise and ensure safe operation.
- Truck operations will be kept to quietest operating speeds. Drivers will be advised to avoid downshifting during vehicle operations through residential communities.

Levels of Service for most of the roads in the project area are D or worse. Vehicle and truck traffic during construction of the PPP could aggravate the situation further. PPP construction traffic could be easily accommodated on the Space Park Drive route. The streets on this route (i.e. Space park, Kenneth and Duane) have a LOS of A. Therefore they will not be affected significantly.

Roadway Size and Weight Limits

Occasional transportation of large project components such as the generator turbines may exceed the load size and weight limits of regional and local roadways. Oversize and/or overweight loads will require Overload Limit Permits from Caltrans. Mitigation measures and a condition of certification (see Condition of Certification **TRANS-1**) that ensure compliance are discussed later in the Conditions section of this analysis.

OPERATIONAL PHASE

Workforce and Visitor Traffic

The operation of the PPP would require a labor force of approximately 15 full-time employees with a maximum of 15 round trips per day (SVP 2002a, pg. 8.12-22). The existing expressways and streets can easily accommodate this increase. Staff recommends that workers and visitors avoid turning left from Lafayette Street onto Duane Street or turning left from Duane onto Lafayette (see Condition of Certification **TRANS-7**). No significant long-term traffic impacts are expected as a result of the PPP's operational workforce and visitor traffic.

Truck Traffic

During operation of the PPP, trucks would periodically deliver/pickup replacement parts, lubricants, liquid fuels, aqueous ammonia, sulfuric acid, trash, and other consumables. On average there would be one or fewer truck deliveries (round trips) to the project site per day (SVP 2002a, pg. 8.12-22). The anticipated travel route for materials delivery is the Scott Boulevard-Space Park Drive-Kenneth-Duane Streets approach.

The existing highway and roadway system would not be significantly affected by the increase in truck traffic associated with the operation of the PPP. Potential impacts of the transportation of hazardous substances can be mitigated to insignificance by compliance with Federal and State standards established to regulate the transportation of hazardous substances. Mitigation measures and conditions of certification that ensure this compliance are discussed later in this analysis.

Change in Air Traffic Patterns

The PPP site is located approximately one mile northwest of the Norman Y. Mineta/San Jose International Airport. As noted above in the LORS and setting descriptions, the Federal Aviation Administration (FAA) Regulations, Part 77 establishes standards for determining if a structure could endanger airport operations. Pursuant to the City of Santa Clara filing FAA Form7460-1, the FAA issued a Determination of No Hazard to Air Navigation from the two exhaust stacks for the PPP (FAA 2002b).

The heights of the exhaust stacks (i.e. 95 feet above ground) do not require a navigation easement from the Santa Clara County Airport Land Use Commission (SCCALUC). In addition, SCCALUC staff are not concerned about plumes that may be generated by the PPP (SCCALUC 2003). Given the SCCALUC experience with existing plumes in the airport vicinity, staff felt that PPP plumes would not create an aviation safety hazard. Staff believes that the PPP will not result in a change in air traffic patterns, or constitute any hazard to air traffic safety.

Hazards Posed by Design Feature or Incompatible Use

Staff has identified one roadway feature involving the difficult, potentially dangerous intersection of Lafayette and Duane Streets that could cause a substantial increase in roadway hazards. This involves traffic heading north on Lafayette Street and attempting a left-hand turn onto Duane Street just south of a blind curve on Lafayette Street. An alternate route has been proposed that would avoid this hazardous turn.

Staff has raised the issue of cooling tower plumes from the PPP turning into ground fog and reducing visibility on Highway 101, thereby creating a hazardous traffic impact. A plume analysis was performed by an air quality consultant to determine the likelihood of this occurring. In general, plumes do not occur frequently when the prevailing winds blow from west to east towards Highway 101. Additionally, when plumes do occur it is during times when wind velocities are low, or the low-to-ground air mass is stable. Therefore, no significant plume fogging is expected to occur (Aspen 2003).

Emergency Access

Any emergency vehicles would enter through the plant's main entrance on Duane Street or a secondary entrance off Comstock Street. Most of the surrounding roadways currently and are expected to continue to operate at LOS D or worse. Emergency vehicles such as fire trucks and ambulances should approach the site from the west via Space Park Drive or from the north using Lafayette Street. There are two fire stations within 1.5 miles of the PPP with a emergency response time of less than five minutes. Emergency vehicles are currently able to reach the project area any time regardless of traffic conditions (City of Santa Clara 2003b). The nearest medical facility is located on Kiely Boulevard about four miles south of the project site (SVP 2002a, pg. 8.10-6). Staff has concluded that the PPP would not impede or affect emergency access; therefore, no impact is expected.

Parking

The applicant has stated that all parking needs for the construction workforce and construction related trucks will require 1.7 acres of land. Available space is located at the adjacent Kifer Receiving Station and at the City of Santa Clara maintenance facility across Lafayette Street (SVP 2002a, pg. 8.12-14). Given 206 peak construction vehicles, staff concurs that these parking plans will be sufficient. The applicant stated at a workshop that workers could take a shuttle to the PPP site.

Transportation of Hazardous Material

Operation of the PPP will involve hazardous materials and waste including lubricants, liquid fuels, aqueous ammonia, and sulfuric acid. Licensed hazardous waste transporters will access the PPP via Space Park Drive to the west or Lafayette Street from the north.

The transportation and handling of hazardous substances associated with the PPP can increase roadway hazard potential. The handling and disposal of hazardous substances are addressed in the **WASTE MANAGEMENT** and the **HAZARDOUS MATERIALS MANAGEMENT** sections of the Final Staff Assessment. Potential impacts of the transportation of hazardous substances can be mitigated to insignificance by compliance with federal and state standards established to regulate

the transportation of hazardous substances. Condition of Certification **TRANS-3** addresses compliance with these regulations.

The State Department of Motor Vehicles specifically licenses all drivers who carry hazardous materials. Drivers are required to check for weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are also required to take instruction in first aid and procedures on handling hazardous spills.

The California Vehicle Code and the Streets and Highways Code are equally important to ensure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol. For an in-depth description of the amount and type of hazardous materials that would be used during the construction of the facility, see the **WASTE MANAGEMENT** and **HAZARDOUS MATERIALS MANAGEMENT** sections of the Staff Assessment.

CUMULATIVE IMPACTS

The PPP is an in-fill project in an area that is highly developed. Staff has consulted with CalTrans and the Santa Clara County Transportation Department, and is unaware of any other large development in the local area that could have a cumulative impact. The addition of PPP construction traffic in an already congested area is a potentially significant impact. However, Conditions of Certification **Trans 6** and **7** will mitigate this potential impact to a less than significant level. Operation phase traffic will contribute a negligible addition to existing levels, and will not result in a significant impact.

The region will likely continue to experience urban development and growth in traffic volume. Consequently, traffic volumes on the regional roadway system will likely increase. Planned highway, expressway and street improvements may alleviate some of the current congestion (SVP 2002a, pg. Pg. 8.12-6). The addition of PPP construction traffic to the roadways and highways is not expected to have any significant cumulative impacts. The PPP project's level of traffic generation will diminish significantly between the construction and operational phases and will not contribute significantly to background traffic.

FACILITY CLOSURE

The planned life of the generation facility is 30 years. Facility closure requirements are discussed in detail in the general conditions section of the Staff Assessment. At least 12 months prior to the proposed decommissioning, the applicant shall prepare a Closure Plan for submission to the Energy Commission for review and action. At the time of closure all then-applicable LORS will be identified and the closure plan will address how these LORS will be complied with. The effects of the PPP closure on traffic and transportation would be similar to those discussed for the project itself. Closure would create traffic levels that are similar in intensity and duration to those expected during facility construction. The removal of waste and other materials would produce impacts from truck traffic.

MITIGATION

The applicant should implement the following traffic and transportation mitigation measures:

- Obtain and comply with all necessary encroachment and transportation permits from Caltrans, and the City and County Santa Clara County, and other jurisdictions regarding the transportation of heavy equipment and hazardous materials and any construction activity within the public right-of-way (Condition of Certification **TRANS-1**).
- Repair any damage to Duane, Lafayette, and Kenneth Streets, Space Park Drive or other impacted roadway incurred during PPP construction to the roads' pre-project construction condition (Condition of Certification **TRANS-3**).
- Enforce a policy that all project-related parking occurs in designated parking areas (Condition of Certification **TRANS-5**).
- Prepare a construction traffic control plan with input from the City and County Santa Clara County and Caltrans (Condition of Certification **TRANS-6**). The plan should include alternate routes that do not allow left hand turns off of Lafayette Street and onto Duane Street.

COMPLIANCE WITH LORS

The applicant has stated its intention to comply with all federal, state and local LORS. Staff has recommended conditions of certification that will ensure compliance with identified federal, state, and local LORS, including the existing Santa Clara County General Plan and the Transportation Demand Management Program.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than 50 percent (64 percent) within a 6-mile radius of the proposed PPP power plant (please refer to **Socioeconomics Figure 1** in this Staff Assessment). Staff also reviewed Census 2000 information that shows the percentage of people below the poverty level is considerably less than 50 percent (9 percent) within the same radius. Staff has conducted a focused environmental justice analysis for traffic and transportation. Based on the traffic and transportation analysis, staff has identified potentially significant direct and cumulative impacts resulting from the construction or operation of the project. However, mitigation will reduce this potential impact to a less than significant level. Therefore, there are no traffic and transportation environmental justice issues.

CONCLUSIONS AND RECOMMENDATIONS

1. During the construction phase, increased roadway demand resulting from the daily movement of workers and materials will slightly increase traffic on some roads that are already congested (LOS D or worse). Other roads that are currently rated LOS A will not be significantly affected.

2. During the operational phase, increased roadway demand resulting from the daily movement of workers and materials will be negligible.

3. All potential impacts from the transportation and handling of hazardous substances can be mitigated to insignificance by compliance with federal, state, and local standards and permits established to regulate the transportation of hazardous substances.

4. The owner will obtain and comply with all necessary encroachment permits from Caltrans, and the City and County of Santa Clara County, and all other jurisdictions related to any construction within the public right-of-way.

5. Construction activities have the potential to damage local roadways. The applicant will be required to repair damaged roadways to their original condition.

6. The applicant indicates that parking for the construction workforce will be provided in area adjacent to the project site. The applicant will be required to enforce a policy that all project-related parking occurs in designated parking areas; therefore, construction parking is not considered a significant project impact.

The conditions of certification proposed below are those that staff has identified as necessary to mitigate project impacts and assure compliance with LORS.

If the Energy Commission certifies the PPP, staff recommends that it adopt the following conditions of certification.

CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall comply with California Department of Transportation (Caltrans) and Santa Clara County limitations on vehicle sizes and weights. Overload Limit Permits will be obtained from Caltrans, as necessary. In addition, the project owner or its contractor shall obtain other necessary transportation permits from Caltrans and all relevant jurisdictions for both rail and roadway use.

Verification: In the Monthly Compliance Reports, the project owner shall submit copies of any oversize and overweight transportation permits or other necessary 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 California Department of Transportation (Caltrans), City and County of Santa Clara, and other applicable jurisdictions' limitations for encroachment into public rights-of-way and shall obtain necessary encroachment permits from Caltrans, City and County of Santa Clara, and all other relevant jurisdictions.

Verification: In the Monthly Compliance Reports, the project owner shall submit copies of any encroachment 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-3` The project owner shall ensure that all federal and state regulations for the transport of hazardous materials are observed.

Verification: The project owner shall include in its Monthly Compliance Reports copies of all permits and licenses acquired by the project owner and/or subcontractors concerning the transport of hazardous materials.

TRANS-4 Following completion of project construction of the PPP and all linear facilities, the project owner shall restore Space Park Drive, Kenneth, Duane, and Lafayette Streets, and any other adversely affected road to their pre-construction condition.

Prior to start of site preparation or earth moving activities, the project owner shall photograph, videotape, or digitally record images of Duane Street from Lafayette Street to Kenneth Street, Lafayette Street from Montague Expressway to Central Expressway, Kenneth Street from Duane Street to Space Park Drive, and Space Park Drive from Kenneth Street to Scott Boulevard. The project owner shall provide the CEC Compliance Project Manager (CPM), Santa Clara County, City of Santa Clara and Caltrans (as necessary) a copy of these images. At least 60 days prior to start of site preparation or earth moving activities, the project owner shall also notify Caltrans about the schedule for project construction. The purpose of this notification is to postpone any planned roadway resurfacing and/or improvement projects until after the project construction has taken place and to coordinate construction related activities associated with other projects.

Verification: Within 30 days after completion of project construction, the project owner shall meet with the CPM, Santa Clara County, City of Santa Clara and Caltrans (as needed) to determine and receive approval for the actions necessary and schedule to complete the repair of identified sections of public roadways to original or as near original condition as possible. The project owner shall provide to the CPM a letter from Santa Clara County, City of Santa Clara and CalTrans (as necessary) stating their satisfaction with the road improvements.

TRANS-5 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 60 days prior to start of site preparation or earth moving activities, the project owner shall submit a parking and staging plan for all phases of project construction to Santa Clara County for review and comment, and to the CPM for review and approval.

TRANS-6 The project owner shall develop a construction traffic control plan that outlines what measures need to be taken on a month-to-month basis with input from the City of Santa Clara, Santa Clara County, Caltrans and the CPM. Specifically, the construction Contractor will be required to prepare a traffic control plan and implementation program that addresses timing of heavy equipment and building material deliveries; employee trip reduction; and signing, lighting, and traffic control device placement. The following specific best management practices will be incorporated into the construction traffic control plan:

- Truck loads will not exceed legal limits.
- Loads of material (i.e. excavated soil) will either be enclosed by vehicle covers, wetted, or centered in the truck to prevent wind blowing materials out of the truck.
- Trucks and trailers will be swept clean or hosed after unloading and before entering a public roadway.
- Mufflers, brakes, and all loose items on trucks will be maintained to minimize noise and ensure safe operation.
- Truck operations will be kept to quietest operating speeds. Drivers will be advised to avoid downshifting while driving through or near residential communities.

Verification: At least 30 days prior to start of site preparation or earth moving activities, the project owner shall provide the plan to the city of Santa Clara, Santa Clara County and Caltrans for review and comment, and to the CPM for review and approval.

TRANS-7 During construction and operation of the PPP, the project owner and contractors shall enforce a policy that all project-related traffic traveling north on Lafayette Street avoid turning left across traffic onto Duane Street, and from turning left onto Lafayette Street from Duane Street. Staff has identified two alternate routes for reaching the site that avoid the left turn off at Lafayette Street. The first involves using Central Expressway or San Tomas to Scott Boulevard followed by a turn onto Space Park Drive, a left turn onto Kenneth Street, and a right turn onto Duane Street and proceed east to the site. The second route involves going south on De La Cruz to Central Expressway and turning right and proceeding west to Scott Boulevard, followed by a right turn on Space Park Drive and proceeding in the same manner identified in the first route.

Verification: At least 60 days prior to start of site preparation or earth moving activities, the project owner shall provide a traffic routing plan for all phases of project construction and operation to Santa Clara County and Caltrans for review and comment, and to the CPM for review and approval.

REFERENCES

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City of Santa Clara 1992. General Plan, Transportation Element. Adopted on July 28, 1992.

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City of Santa Clara 2003b. Personal Communication with Mark Bindel, Fire Department, on February 21, 2003.

FAA (Federal Aviation Administration) 2002a. Personal communication with Karen McDonald, Obstruction Evaluation Specialist, Federal Aviation Administration, on June 26, 2002.

FAA (Federal Aviation Administration) 2002b. Letter to SVP dated 10-15-02 regarding Determination of No Hazard to Air Navigation. Submitted to the California Energy Commission on July 11, 2002.

Santa Clara County Valley Transportation Authority (VTA) 2003a. Bus and Rail Map. Downloaded from website (vta.org) on January 13, 2003.

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SVP, Silicon Valley Power, 2002. Pico Power Project, Application for Certification. Submitted to the California Energy Commission on October 7, 2002.

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TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

INTRODUCTION

The energy from the proposed Pico Power Project (PPP) would be delivered to the area's transmission grid by using the existing 115 kV Scott-Kifer line to electrically connect the project's on-site switchyard to the Kifer Substation, which is a major handling station for several of the area's 115 kV and 60 kV lines that cross the project site. This 115 kV Scott-Kifer line belongs to the applicant, Silicon Valley Power (SVP). Since PPP would be directly connected to the on-site Scott-Kifer line, no new transmission line would be required.

The purpose of the Transmission Line Safety and Nuisance analysis is to assess the proposed power transmission plan for compliance with the health- and safety-related laws, ordinances, regulations, and standards (LORS) associated with the operation of the transmission lines to be used by the PPP. If such compliance is established, staff would not recommend further mitigation measures with respect to the field and non-field issues of concern in this analysis; if not, staff would recommend revisions to the interconnection plan as appropriate. Staff's analysis focuses on the following issues:

- 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)

Discussed below by subject area are design-related LORS applicable to the physical impacts of the overhead transmission lines as proposed to be used to transmit the energy from PPP. The potential for these impacts would depend on the applicant's compliance with these LORS, which are specific federal or state regulations or established industry standards and practices. There presently are no local laws or regulations specifically aimed at those aspects of the structure or dimensions of electric power lines that influence the magnitude of the impacts noted above. The only such regulations are those requiring such lines to be located underground because of the potential for visual impacts on the landscape.

AVIATION SAFETY

Any hazard to area aircraft would relate to the potential for collision in the navigable air space. The applicable federal LORS discussed below are intended to ensure the distance and visibility necessary to prevent such collisions.

Federal

- Title 14, Code of Federal Regulations (CFR), Part 77, "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 a 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 all structures are located to avoid the aviation hazards of concern.
- 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.

INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION

Transmission line-related radio-frequency interference is one of the indirect effects of line operation produced by the physical interactions of line electric fields. Since electric fields are unable to penetrate most materials, including the ground, such interference and other electric field effects are not associated with underground lines. The level of any such interference usually depends on the magnitude of the electric fields involved. Because of this, the potential for such impacts can be assessed from field strength estimates obtained for the line. The interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge, but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio-frequency communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration, and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The following regulations are intended to ensure that such lines are located away from areas of potential interference and that any interference is mitigated whenever it occurs.

Federal

- Federal Communications Commission (FCC) regulations in Title 47 CFR, Section 15.25. Provisions of these regulations prohibit operation of any devices producing force fields, which interfere with radio communications, even if (as with transmission lines) such devices are not intentionally designed to produce radio-frequency energy. For such lines, such interference is minimized from the use of specific low-corona cables as conductors. The FCC requires each line operator to mitigate all complaints about interference on a case-specific basis.

State

- General Order 52 (GO-52), California Public Utilities Commission (CPUC). Provisions of this order govern the construction and operation of power and communications lines and specifically deal with measures to prevent or mitigate inductive interference. Such interference is produced in the case of power lines by the electric field directly induced by the energized conductor in the antenna of a radio signal receiver.

Several design and maintenance options are available for minimizing these induced fields. When incorporated into the line design and operation, such measures also serve to reduce the line-related audible noise discussed below.

AUDIBLE NOISE

Industry Standards

There are no design-specific federal regulations that limit the audible noise from transmission lines. As with radio noise, such noise is limited instead through design, construction, or maintenance practices established from industry research and experience. These practices are effective and do not significantly impact line safety, efficiency, maintainability, and reliability. All modern overhead high-voltage lines are designed to assure compliance. As with radio-frequency noise, such noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying or hissing sound, or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a 100-foot right-of-way. Underground lines do not generate such noise since they cannot produce surface-level electric fields as previously noted

NUISANCE SHOCKS

Industry Standards

There are no design-specific federal regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields. As with the proposed overhead line, the applicant is responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

FIRE HAZARDS

The fire hazards addressed through the following regulations are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

State

- General Order 95 (GO-95), CPUC. "Rules for Overhead Electric Line Construction" specify tree-trimming criteria to minimize the potential for power line-related fires.
- Title 14 California Code of Regulations Section 1250. "Fire Prevention Standards for Electric Utilities" specify utility-related measures for fire prevention.

HAZARDOUS SHOCKS

The hazardous shocks addressed through the following regulations and standards are those that could result from direct or indirect contact between an individual and the energized line whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

State

- GO-95, CPUC. "Rules for Overhead Line Construction" 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 line workers.
- GO-128, CPUC. "Rules for Construction of Underground Electric Supply and Communications Systems" specify the standards for the safe construction and operation of underground lines, AC power, and communication circuits.
- Title 8, California Code of Regulations (CCR), Sections 2700 through 2974. "High Voltage Electric Safety Orders" establish essential requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment

Industrial Standards

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements in the National Electrical Safety Code, Part 2: Safety Rules for Overhead Lines. These provisions specify the minimum national safe operating clearances applicable in areas where the line might be accessible to the public. They are intended to minimize the potential for direct or indirect contact with the energized line.

ELECTRIC AND MAGNETIC FIELD (EMF) EXPOSURE

The possibility of deleterious health effects from electric and magnetic field exposure has increased public concern in recent years about living near high-voltage lines. Both fields occur together whenever electricity flows, hence the general practice of describing exposure to them together as EMF exposure. The available evidence as evaluated by CPUC, other regulatory agencies, and staff, has not established that such fields pose a significant health hazard to exposed humans. However, staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate, in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability, and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant patterns (e.g., high-level, short-term versus low-level, long-term) of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State

In California, the CPUC (which regulates the installation and operation of high-voltage lines in California) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields below levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each electric utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure.

The other utilities that are not within the jurisdiction of the CPUC voluntarily comply with these CPUC requirements by designing their lines in keeping with the guidelines of the major area utility, which for this project is PG&E. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires each applicant to show how each proposed overhead line would be designed to comply with the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local issues bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied to an extent that does not significantly affect line operation and safety. The extent of such applications would be reflected by the ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess each line design for effectiveness at field strength reduction. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since each new line in California is currently required to be designed according to the EMF-reducing guidelines of the utility in the service area involved, its fields are required under existing CPUC policies to be similar to fields from similar lines in that service area. It is this similarity in field strengths that staff assesses for compliance with the present requirements on field management.

One of the most effective ways to reduce line fields is to closely place the lines together to allow for maximum cancellation from the interaction of all the fields involved. Such field strength cancellation occurs maximally with underground lines because they are placed within their burial casings. As a result of this close placement, underground lines produce fields of much lower strengths than their overhead counterparts of the same voltage and current-carrying capacity. The strength of the surface-level magnetic fields from such underground lines diminishes more rapidly away from the line than with their overhead counterparts of the same current-carrying capacity. Because of such rapid strength diminution, such lines are unlikely to contribute significantly to residential magnetic field levels as currently located along city streets and roadways.

Design and placement guidelines are established by the CPUC-regulated utilities in keeping with CPUC requirements for safety, efficiency and reliability. As with overhead lines, the other utilities voluntarily comply with such requirements when undergrounding is necessary. Since undergrounding produces the lowest-intensity fields possible for high-voltage lines, staff only requires a showing of the applicant's plan to design, place and operate the line according to the applicable utility guidelines.

Industrial Standards

There are no health-based federal regulations or industry codes specifying limits on the strengths of fields from power lines. However, the federal government continues to conduct and encourage research necessary for an appropriate policy on the EMF health issue.

In the face of the present uncertainty, several states have opted for design-driven regulations ensuring that fields from new lines are generally similar to those from existing lines. Some states (such as Florida, Minnesota, New Jersey, New York, and Montana) have set specific environmental limits on one or both fields in this regard. These limits are, however, not based on any specific health effects. Most regulatory agencies believe, as does staff, that health-based limits are inappropriate at this time and that the present knowledge of the issue does not justify any retrofit of existing lines.

Before the present health-based concern developed, measures to reduce field effects from power line operations were mostly aimed at the electric field component whose effects can manifest themselves as the previously noted radio noise, audible noise, and nuisance shocks. The present focus is on the magnetic field because only it can penetrate the soil, building, and other materials to potentially produce the types of health impacts at the root of the present concern. As one focuses on the strong magnetic fields from the more visible overhead transmission and other high-voltage power lines, staff considers it important for perspective, to note that an individual in a home could be exposed for short periods to much stronger fields while using some common household appliances such as hair dryers, electric shavers, and electric tooth brushes (National Institute of Environmental Health Services and the U.S Department of Energy, 1995). Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

SETTING

According to information from the applicant, (SVP 2002, pages 1-1, 6-1, 8.7-1,8.6-2, and Appendix 6-A), the proposed PPP and related switchyard would be located on a 2.8-acre site located west of the intersection of Lafayette Street and Duane Avenue in the City of Santa Clara, and immediately north of the existing SVP Kifer Substation through which the generated power would be transmitted. The site, which is located approximately 0.6 miles northwest of the San Jose International Airport, is surrounded by industrial and light industrial establishments and was chosen, in part, because of its proximity to the Kifer Substation. It is such proximity that would allow for PPP operation without building new transmission lines.

The nearest residential area to the project site is approximately 0.52 miles to the north, although there are a few residences in a converted motel approximately 0.39 miles away. These residences are far removed from the impact area for the fields from the Scott-Kifer line to be used, meaning that the residential field exposure of the present concern would be insignificant for this project.

The only project-related EMF exposures of potential significance are the short-term exposures to plant workers, regulatory inspectors, maintenance personnel, approved guests, or individuals in transit across the project's lines. These types of exposures are short term and well understood as not significantly related to the present health concern.

The applicant has provided a listing of the 115 kV lines and the one 60 kV line that presently cross or will cross the proposed site as they extend into the Kifer Substation (SVP 2002, page 6-1).

PROJECT DESCRIPTION

The proposed interconnection between PPP and the Kifer Substation would consist of the following major segments:

- A new 115 kV on-site switchyard;
- Modified segment of the existing SVP 115 kV line resulting from its direct connection to the new on-site project switchyard; and
- Project-related modifications within the Kifer Substation.

Placing the project at the proposed location would require PG&E to underground the portion of its Kifer-San Jose B and Newark-Kifer 115 kV transmission line (that currently crosses the project site) in the northwest corner of the project site where it would run between the project and the Kifer Substation. This would involve moving the existing on-site lattice-type transmission tower to the northwest corner of the site where it would be replaced with two steel poles. The undergrounded line would run either through the PPP site, or just outside the site on the western side, depending upon negotiations with PG&E. The existing 60 kV SVP transmission line would also be located away from its present location within the abandoned Pico Way. The applicant has provided the basic structure of the noted replacement supports relative to safety and field strength reduction efficiency.

Since undergrounding would produce the lowest-intensity fields possible for any given line, staff is not concerned about the precise route of the undergounded line, provided it is located in the general vicinity of its present route. Staff's only requirement is for the line to be designed, buried and operated according to the applicable PG&E requirements with respect to safety, efficiency, reliability, and field strength reduction.

Since the utilized 115 kV and the other area 115 kV grid lines would continue to be operated at 115 kV, the previously noted voltage-related electric field impacts would remain the same. The only project-related change within the area's 115 kV grid lines would be an increase in the magnetic field levels, given that the magnetic field is the only EMF component that depends directly on the current level. Since the underground lines would continue to be operated at the same voltage and current levels, their net contribution to the area's magnetic would be less than if they were to remain aboveground.

The noted project-related magnetic field increases would mainly occur within the 115 kV Scott-Kifer portion, which was recently reconductored to accommodate increased power flow for non-field reasons. According to the applicant, this re-conductoring would have occurred whether or not the PPP is built and was completed according to PG&E's guidelines on safety, reliability and field strength management (SVP 2002, page 6-6, and Appendix 6-A).

IMPACTS

GENERAL IMPACTS

GO-95, and Title 8, California Code of Regulations, section 2700 et seq., as noted in the LORS section, ensure the minimum regulatory requirements necessary to prevent the direct or indirect contact previously discussed in connection with hazardous shocks or aviation hazards. Of secondary concern are the noted field impacts manifesting themselves as nuisance shocks, radio noise, communications interference, and magnetic field exposure. The relative magnitude of such impacts would be reflected in the field strengths characteristic of a given line design. Since applied field-reducing measures can affect line operations and safety, the extent of their implementation and resulting field strengths would vary according to environmental and other local conditions bearing on line safety, efficiency, reliability, and maintainability. PG&E established its own design guidelines as best applicable to its utility service area. Given the present CPUC requirement to maintain the noted impacts within the levels associated with existing lines, compliance with applicable LORS would be achieved by showing the project-specific fields to be within the range associated with PG&E or other SVP lines of the same voltage and current-carrying capacity. The same similarity requirement would apply to underground lines.

PROJECT SPECIFIC IMPACTS

Aviation Safety

Although the proposed project site is only 0.6 miles from the San Jose International Airport, as previously noted, the maximum height (of 80 feet) and location of the existing on-site transmission towers (relative to the nearest runways) are not enough to pose an aviation hazard as defined using the previously noted FAA criteria. Since this tower would be relocated a few feet to the northwest as previously noted, it would be more distant from the airport than from its present location (SVP 2002, page 6-8). This absence of a significant hazard is reflected in FAA's aviation hazard analysis noted in the submittal from the applicant (SVP 2003). The same lack of a collision hazard has been true for the other SVP and PG&E 115 kV lines in the project area. The proposed underground plan would eliminate any such risks from the overhead lines involved.

Audible Noise and Interference with Radio-Frequency Communication

The previously noted corona-related communications interference is most commonly caused by irregularities (such as nicks and scrapes on the conductor surface), sharp edges on suspension hardware, and other discontinuities around the conductor surface. The existing SVP line to be utilized for PPP generation was built and is currently maintained according to standard SVP and PG&E practices that minimize such surface

irregularities and discontinuities. Moreover, the potential for such corona-related audible noise and interference is usually of concern for lines of 345 kV and above and not the 115 kV lines of this type. SVP recently reconductored the 115 kV line that the PPP would utilize. The low-corona design for the reconductoring was the same as used for other SVP and PG&E lines of the same voltage (SVP 2002, page 6-6) in compliance with the previously noted FCC (47 C.F.R. §15.25) and GO-52 prohibitions against interference with radio communication. Since (a) the edge of the right-of-way mark the beginning of the areas of possible human habitation around a high-voltage line, and (b) there are no residences in the immediate vicinity, staff does not expect the line to generate any complaints about operational noise, or interference with residential radio or television use. In the unlikely event of specific complaints, SVP would be responsible (as with other SVP lines) for the necessary mitigation as required by the FCC. For an assessment of noise from all aspects of the project construction and operation, please see staff's analysis in the **Noise and Vibration** section. The undergrounded lines would not pose an interference hazard because they would not produce the offending surface-level electric fields as previously noted.

Fire Hazards

Standard fire prevention and suppression measures for all SVP lines would continue to be implemented for the 115 kV line to be utilized. SVP's intended compliance with the clearance-related aspects of GO-95 would be an important part of this compliance approach (SVP 2002, pages 6-6 and 6-9). SVP's fire prevention practices for high-voltage lines would be implemented in compliance with Title 14, California Code of Regulations, section 1250. The newly underground lines would not pose a significant fire hazard because of their location away from surface-level combustible materials.

Hazardous Shocks

Since the 115 kV to be utilized was designed according to GO-95 requirements together with the requirements in specific sections of Title 8, California Code of Regulations, section 2700 et seq. against direct contact with the energized line, as is normal SVP and PG&E practice (SVP 2002, page 6-9), staff does not expect its use during PPP operation to pose a significant hazard shock hazard. The newly underground lines would not pose any such hazards as constructed according to relevant GO-128 requirements.

Nuisance Shocks

The potential for nuisance shocks around the 115 kV line to be utilized would continue to be minimized through continued implementation of the standard grounding practices implemented for similar SVP and PG&E lines (SVP 2002a, page 6-8).

Electric and magnetic field exposure

Since the 115 kV line to be utilized lines was designed and re-conductored according to existing SVP and PG&E guidelines on safety and field EMF minimization, staff concludes that the electric and magnetic fields generated during PPP operations would be similar in intensity to those from SVP and PG&E lines of the same voltage and current-carrying capacity.

The only area of significant change during PPP operation would mainly be the segment of this Scott-Kifer line between the proposed on-site project switchyard and the interconnected Kifer Substation. This change would derive directly from PPP's contributions to existing field levels and would reflect the effectiveness of the design applied to the line with respect to the following:

- Distance between the conductors and the ground;
- Spacing between conductors on the same line;
- Distance between conductors in nearby lines;
- Line current levels; and
- Current flow alignment for effective field cancellation.

These field-reducing measures were incorporated into the design for the existing area lines, including the reconductored 115 kV Scott-Kifer line, and will be incorporated into the design of the underground lines to the extent SVP and PG&E consider to be without impacts on line safety, efficiency, reliability, and maintainability. Thus, staff considers further mitigation unnecessary, but recommends Condition of Certification (**TLSN-2**) to allow for validation of the reduction efficiency attributable to the design in question. The need for further mitigation would be assessed by comparing the measured field strengths with fields from SVP and PG&E lines of the same voltage and current-carrying capacity.

CUMULATIVE IMPACTS

Since the 115 kV Scott-Kifer line to be utilized was designed and reconductored (for nonfield-related reasons) according to the applicable SVP and PG&E guidelines, staff expects any contribution to cumulative area exposures to be at the same level as from similar SVP or PG&E lines. This similarity in field strengths (and, therefore contributed fields) would reflect compliance with current CPUC requirements on field management. The proposed undergrounding plan would reduce the fields from the lines involved, meaning that their continuing contribution to the total magnetic exposure would be less than current levels. The actual field strengths and contribution levels would be assessed from field strength measurements specified in **TLSN-2**.

ENVIRONMENTAL JUSTICE

As noted in the information from the applicant (SVP 2002a, pages 8.10-13 through 8.10-23), and reflected in **Socioeconomics Figure 1**, the percentage of the minority groups in the census tracts within a six-mile radius of the proposed project site varies from 15 percent to 88.4 percent according to Census 2000 data, with an average of approximately 56.5 percent. Such a composition profile suggests the possibility of disproportionate project impacts among such groups and caused staff to conduct a screening-level minority grouping-related environmental justice analysis with respect to the field and non-field impacts of concern in this analysis. Given that the residential field exposure (at the root of the present health concern) would be insignificant for the project, the significant disproportionate impacts that constitutes environmental injustice would not apply to this project

Socioeconomics Figure 2 shows the percentage of the area's poor within the six-mile radius as averaging about 6.6 percent in the same six-mile radius suggesting that that there would be no environmental justice issue as related to income level. Furthermore, the design for the utilized line, its re-conductored version, and the undergrounded lines are standard SVP and PG&E designs usually applied throughout the area without regard to minority status or poverty level.

COMPLIANCE WITH LORS

Since (a) the 115 kV Scott-Kifer line to be utilized was designed according to the applicable SVP and PG&E guidelines, (b) the re-conductored version was built according to same guidelines, (c) the proposed undergrounding would be carried out according to PG&E guidelines, and (d) compliance with these design requirements constitute compliance with present CPUC and staff requirements, staff considers the proposed power delivery plan to be in compliance with the underlying health and safety LORS.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Since electric or magnetic field health effects have neither been established nor ruled out for overhead or underground lines, the public health significance of any PPP-related field exposures cannot be characterized with certainty. The long-term, mostly residential magnetic exposure at the root of the present health concern would be insignificant during operation of the proposed PPP given the general absence of residences in the lines immediate impact area. On-site worker or public exposures would be short-term and at levels associated with SVP and, therefore, PG&E lines of similar designs and current-carrying capacity. Such exposures are well understood and have not been established as posing a health hazard to humans.

The potential for nuisance shocks would continue to be minimized for the existing line through grounding and other field-reducing measures applied to all SVP and PG&E lines. The existing and proposed line support structures are neither tall enough nor close enough to any airport to pose a significant collision hazard to area aircraft, according to FAA criteria. The use of low-corona line design together with appropriate corona-minimizing construction practices would continue to minimize the potential for corona noise and its related interference with radio-frequency communication anywhere in the project area. The proposed undergrounding plan would reduce the magnetic field levels from the lines involved.

RECOMMENDATIONS

Since the 115 kV Scott-Kifer line to be utilized was designed and reconductored to minimize the safety and nuisance impacts of specific concern to staff, while remaining within its route that is located away from residential areas, staff does not recommend any changes to the proposed power transmission plan.

If the proposed power plant is approved, staff would recommend adoption of the Conditions of Certification specified below to ensure implementation of the measures necessary for the field reduction and safety assumed by the applicant for the overhead transmission line to be utilized and the overhead lines to be located underground.

CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall ensure that the proposed undergrounding of the Kifer-San Jose B and Newark-Kifer 115 kV transmission line shall be made according to the requirements of GO-128.

Verification: At least 30 days before starting construction of the PPP's transmission line or related structures and facilities, the project owner shall submit to the Energy Commission's Compliance Project Manager (CPM) notification of their intention to carry out the proposed undergrounding according to the requirement of GO-128.

TLSN-2 The project owner shall measure the strengths of the line electric and magnetic fields from the 115 kV Scott-Kifer line to be utilized to allow for evaluation of the project-related field additions together with total exposure levels. Measurements shall be made at representative points (on-site and along the line route) according to IEEE measurement protocols and as necessary to identify the maximum field exposures possible during operations. Staff would assess the need to recommend further mitigation through comparison with fields from SVP and PG&E lines of the same voltage and current-carrying capacity. Since undergrounding would yield the lowest magnetic field reduction possible, it would not be necessary for specific measurements to be made with respect to the existing lines that are proposed for undergrounding.

Verification: SVP shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements.

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VISUAL RESOURCES

Testimony of Eric Knight

INTRODUCTION

Visual resources are the natural and cultural features of the environment that can be viewed. This analysis focuses on whether construction and operation of the Pico Power Project (PPP) 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 is organized as follows:

- Description of analysis methodology;
- Description of applicable laws, ordinances, regulations, and standards;
- Description of the project aspects that may have the potential for significant visual impacts;
- Assessment of the visual 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 LORS;
- Identification of measures needed to mitigate any potential significant adverse impacts of the proposed project and/or to achieve compliance with applicable LORS;
- Conclusions and Recommendations; and
- Proposed Conditions of Certification

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

Energy 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 CEQA 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 LORS 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 (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?

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 several areas surrounding the project site. 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. Prior to the filing of the Application for Certification (AFC), staff visited the project area with consultants to Silicon Valley Power (applicant) for the purpose of selecting the KOPs. Staff believes that the KOPs presented in the AFC are appropriate for this analysis.

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. 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-4**.

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

[1] The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

related to visual quality, with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, that indicate a higher level of viewer concern. Industrial uses typically have the lowest viewer concern because workers are focused on their work, and generally are working in surroundings with relatively low visual value.

Viewer Exposure

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.

Visual Sensitivity

The overall level of sensitivity of a view area to impacts due to visual change is a function of visual quality, viewer concern, and viewer exposure and can range 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 and 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/Disruption

View blockage describes the extent to which any previously visible landscape features are blocked from view by the project. View disruption considers the interruption (i.e., breaking up rather than total blockage) of a view of large landforms such as mountain ranges, or where a project would physically replace previously visible landscape

features (for example, the project would require the removal of a grove of trees). View blockage or disruption 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.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

The proposed PPP site and linear facility routes are not located on federally administered public lands and therefore not subject to federal regulations pertaining to visual resources.

STATE

The project site lies approximately 400 feet south of Highway 101 (Bayshore Freeway). Highway 101 in this location is not an eligible or designated State Scenic Highway (California Scenic Highway System – Caltrans Web Site: http://www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm). Therefore, no state regulations pertaining to scenic resources are applicable to the project.

LOCAL

The PPP site is located within the City of Santa Clara and therefore the project would be subject to local LORS pertaining to the protection and maintenance of visual resources. Policies, regulations, and design guidelines applicable to the proposed project are found in the Santa Clara General Plan (Chapter 5 - Environmental Quality Element), the Santa Clara Zoning Ordinance, and the Community Design Guidelines. The project's consistency with these policies, regulations, and guidelines is discussed later in this analysis.

PROJECT DESCRIPTION

The following section describes the aspects of the proposed project that may have the potential to cause adverse impacts to visual resources.

POWER PLANT

The dimensions of the various project structures are listed in AFC Table 8.13-2. The most visually prominent structures of the PPP would be the two heat recovery steam generator (HRSG) units, the two HRSG stacks, and the cooling tower. The HRSG units and the stacks would be 53 feet tall and 95 feet tall, respectively. The HRSG units would be 40 feet long. The cooling tower would be 62 feet tall (to the top of the fan cones) and 126 feet long. The project would also include two 35-foot tall combustion turbine generators and an approximately 25-foot tall steam turbine generator enclosure [2]. Sound-attenuation walls (ranging in height from 8 feet to 25 feet) would be

[2] The steam turbine generator (STG) enclosure is listed in Table 8.13-2 as being 57 feet tall. Based on the architectural rendering (Figure 1.1-1) and the elevation view (Figure 2.2-3a) provided in the AFC, staff estimates that the STG enclosure is approximately 25 feet tall.

constructed around the western, northern and eastern boundaries of the site. These walls, which would partially screen the project facilities, would be given a textured, decorative façade.

The project has been designed so that the scale of the project structures would transition from the smaller structures located nearer to Lafayette Street to the larger structures in the center and western part of the site. The 33-foot tall Plant Operations Building, proposed at the corner of the project site at Lafayette Street and Duane Avenue, would incorporate design elements (e.g., reddish roof) to blend in with an adjacent mini-storage facility on Duane Avenue. To partially screen the power plant structures and to comply with City policies and regulations, landscaping would be installed within the setback and right-of-way area along Duane Avenue and Lafayette Street. The landscape areas would be approximately 25 feet wide along Duane Avenue and 20 feet wide along Lafayette Street.

LINEAR FACILITIES

Given its location adjacent to Silicon Valley Power's (SVP) Kifer Receiving Station, the PPP would not require any new offsite above ground transmission lines. The PPP onsite switchyard would connect directly to the Kifer and Scott Receiving Stations by intercepting the existing Scott-Kifer 115 kV transmission line that crosses the project site. The portions of the Kifer-San Jose B and Newark-Kifer 115 kV transmission lines that cross the PPP site would be placed underground (either onsite or just outside the west boundary of the site, within the paved access road/parking lot of the adjacent property) to make room for the project. The undergrounding of these lines would involve replacing the existing lattice tower in the center of the site with two steel monopole towers in the northwest corner of the site. In addition, the existing wooden-pole 60 kV line that runs along the east-central portion of the site would be relocated to the eastern property boundary, and run along Lafayette Street and Duane Ave.

A new 2.0-mile-long underground gas pipeline would be constructed to convey natural gas to the PPP site. The pipeline would begin at the corner of Gianera Street and Wilcox Avenue, proceed south along Lafayette Street to Basset Street, south on Basset to Laurelwood Road, under the Bayshore Freeway to Duane Avenue, and from Duane to Lafayette to a new gas compressor station at Comstock and Lafayette. The line would then travel from the compressor station back across Lafayette to the project site. The compressor station would be located within the City's current utility yard at Comstock and Lafayette, 500 feet southwest of the PPP site. The gas compressor equipment would be housed in a 15-foot tall, roofed building, with a footprint of approximately 85 by 80 feet. The gas pipeline would also require a metering station at the line's interconnection point with the PG&E gas distribution line, at the corner of Gianera and Wilcox. The metering station would require an area measuring approximately 30 feet by 60 feet. It would be located within an existing bicycle and pedestrian pathway that runs north from the east end of Gianera Street (at Wilcox Avenue) to the Hetch Hetchy Aqueduct right-of-way, and beyond the right-of-way to Stars and Stripes Drive. The metering station site is situated between the bike path to the east and the fence line of the Gianera Street residences to the west. The bike path would be partially realigned to the east to accommodate the facility. For access and

security reasons, either a 6-foot-high wall or a security fence with landscaping would surround the metering station.

The project cooling water supply would come from an existing tertiary treated recycled water pipeline located within the boundaries of the PPP site. Approximately 900 feet of underground pipeline would convey the project's wastewater discharge to an existing water main in Central Expressway.

CONSTRUCTION LAYDOWN AND WORKER PARKING AREAS

Construction of the project is anticipated to last 19 months. During construction, four areas would be used for equipment and materials laydown and construction worker parking. The location of these areas is shown on AFC Figure 2.2-5. One laydown area is a 0.4-acre area located within the fence line of the SVP Scott Receiving Station on Space Park Drive. A second area is a 1.5-acre area at the south end of the Kifer Receiving Station that is currently used as a storage area for electrical equipment. A third site is a 0.4-acre area at the City of Santa Clara maintenance yard at the corner of Comstock Street and Lafayette Street. The area is an existing parking lot east of the City-owned building on Comstock Street. The fourth site is a 1.9-acre vacant lot adjacent to the SVP Brokaw Substation located west of the intersection of Coleman Avenue and Brokaw Road.

SETTING

REGIONAL SETTING

The PPP site is located within the City of Santa Clara, which lies within the Santa Clara Valley. Santa Clara is bordered by the City of San Jose on the north, east, and south, and the cities of Sunnyvale and Cupertino on the west. To the south and west of the Santa Clara Valley is the Santa Cruz Mountain Range and to the east is the Diablo Mountain Range. The project area is essentially flat.

PROJECT AREA SETTING

The PPP site is located immediately south of the Bayshore Freeway (Highway 101) within an industrial area bounded on the south by the Union Pacific Railroad and to the north by Highway 101. Immediately north and west of the site are light industrial uses with attractively designed buildings and landscaped properties. Immediately northeast of the site across Duane Avenue is a public storage facility. East of the site on Lafayette Street is a landscaped office park. Immediately south of the site is the Kifer Receiving Station, which has a complex and chaotic industrial appearance. Approximately 1,000 feet south of the site at the corner of Central Expressway and Lafayette Street is the Owens Corning fiberglass insulation manufacturing plant. This is a large, heavy industrial facility with one large smokestack and a half dozen smaller stacks. The Owens Corning facility emits a water vapor plume, contributing to its heavy industrial character. The Owens Corning plant is shown in AFC Figure 8.13-3a (Visual Character Views - photograph #1). The Norman Y. Mineta San Jose International Airport lies approximately 0.5-mile southeast of the site.

PROJECT SITE

The 2.86-acre power plant site is a mostly undeveloped portion of the Kifer Receiving Station property. Several transmission lines currently traverse the project site. These lines would be relocated or placed underground to make room for the project. Approximately eight wood distribution poles, used by SVP for lineman training, currently occupy the north end of the site. Dirt, asphalt, and grasses cover the ground on this portion of the site. The portion of the site along Lafayette, where the office and warehouse buildings would be built, is covered with grass. A line of mature deciduous trees separate this portion of the site from the area where the power plant structures would be built. These trees, which partially screen views of the Kifer Receiving Station from Lafayette Street, would be removed to make room for the project.

VIEWING 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. Staff evaluated the visual setting and proposed project in detail from several viewing areas represented by six key viewpoints:

- KOP 1 – the intersection of Central Expressway and Lafayette Street;
- KOP 2 – the intersection of Lafayette Street and Duane Avenue;
- KOP 3 – 1425 Laurelwood Road;
- KOP 4 – Bayshore Freeway;
- KOP 5 – Raymond Street; and
- KOP 6 – the Lafayette Street Overpass to the Bayshore Freeway.

The location and view direction of each of these KOPs is shown on **Visual Resources Figure 2**. At each KOP a visual analysis was conducted, the results of which are summarized in **Appendix VR-1**. Existing conditions photographs are presented in **Appendix VR-4**. A discussion of the visual setting for each KOP is presented in the following paragraphs.

KOP 1 – Intersection of Central Expressway and Lafayette Street

KOP 1 is located at the intersection of Central Expressway and Lafayette Street about 1,000 feet south of the PPP site. This viewpoint was selected to represent the view of the site currently available to motorists travelling west on Central Expressway and stopped at the traffic signal at Lafayette Street, or to those motorists turning right from Central Expressway to travel north on Lafayette Street toward the site. **Visual Resources Figure 5A** shows the view from KOP 1 to the north toward the PPP site.

Visual Quality

The most prominent features in the view are the transmission towers (which cross Lafayette Street), and the electrical structures at the Kifer Receiving Station. Other visible features include the wooden electrical poles lining both sides of Lafayette Street, and a light industrial building located north of the site on Duane Avenue. Several clusters of small trees are visible within the street setback areas of the businesses along Lafayette Street and the Kifer Receiving Station. Not shown in Figure 3A, but visible to motorists at this viewpoint, are the commercial and light industrial buildings

that occupy the northwest and northeast corners of the Central Expressway/Lafayette Street intersection. Considering these factors, visual quality is rated low at KOP 1.

Viewer Concern

The predominant viewers at KOP 1 would be commuters travelling through or to an industrial section of the City of Santa Clara. Motorists on Central Expressway and Lafayette Street would likely anticipate seeing industrial uses and substantial energy infrastructure in this area of the City. Motorists travelling west on Central Expressway would see the large Owens Corning manufacturing facility located at the southwest corner of Central Expressway and Lafayette Street before reaching Lafayette Street. This facility dominates the intersection. There are no particularly pleasing visual elements existing within the view that would draw a viewer's attention. Viewer concern is considered low to moderate.

Viewer Exposure

Visibility of the project site itself is low because the Kifer Receiving Station obscures it from this viewpoint. However, the upper half of the project facilities would be visible from this location. Visibility is rated high. The number of viewers is quite high. Central Expressway has an annual daily traffic (ADT) volume of 34,000 vehicles per day in the westbound lane and Lafayette Street has an ADT of 23,000 vehicles per day in the northbound lane (SVP 2002a). Motorists could focus on the site while stopped at the intersection, and while approaching the site from the south. Duration of view is moderate for those drivers stopped at the intersection, and low to moderate for those travelling on Lafayette Street toward the site (the posted speed limit is 40 miles per hour (MPH)). Overall viewer exposure is moderate to high.

Overall Visual Sensitivity

For KOP 1, the low visual quality, low to moderate viewer concern and moderate to high viewer exposure result in low to moderate overall visual sensitivity.

KOP 2 – Intersection of Lafayette Street and Duane Avenue

KOP 2 is located at the intersection of Lafayette Street and Duane Avenue about 60 feet northeast of the PPP site. This viewpoint was selected to represent the view of the site available to southbound motorists on Lafayette Street. **Visual Resources Figure 6A** shows the view from KOP 2 to the southwest toward the project site.

Visual Quality

The most prominent features in the view toward the project site are the deciduous trees on the eastern portion of the site. The Kifer Receiving Station is partially visible (more so in the winter) to motorists at this location, as are the wood poles and steel transmission tower on the project site. The portion of the site at the corner of Duane and Lafayette is covered in grass (brown in the summer and green in the winter). Other features visible to viewers at KOP 2, but not shown in the photograph, are the public storage facility on the corner of Duane and Lafayette, the four travel lanes of Lafayette Street, transmission towers and lines exiting the substation, two water towers, and mountains in the distant background. Considering all of these factors, visual quality is rated low to moderate.

Viewer Concern

The predominant viewers would be commuters travelling through and to an industrial section of Santa Clara. Viewers at this KOP would anticipate seeing landscaped commercial and office buildings in this area, as well as the mature trees that partially screen the Kifer Receiving Station. Viewer concern is considered moderate at this viewing location.

Viewer Exposure

The view from KOP 2 toward the portion of the site at the corner of Lafayette Street and Duane Avenue is unobstructed. The ADT on Lafayette Street is 23,000 vehicles per day in the southbound lanes. Although the site is seen by a high number of viewers, the duration of view is brief. The site is briefly visible farther north of KOP 2 at the Lafayette overpass to Highway 101 (KOP 6), then obstructed by a large billboard attached to the roof of the public storage facility at Duane Avenue. The site becomes visible again at KOP 2 (Duane Avenue) within motorists normal cone of vision briefly before the road curves to the east away from the site. The posted speed limit on Lafayette Street is 40 MPH. Considering these factors, overall viewer exposure is moderate.

Overall Visual Sensitivity

For KOP 2, low to moderate visual quality and moderate viewer concern and viewer exposure result in moderate overall visual sensitivity.

KOP 3 – 1425 Laurelwood Road

KOP 3 is located at the driveway to 1425 Laurelwood Road, a motel converted into apartments, about 2,050 feet northwest of the site. This viewpoint was selected to represent the only residential viewers with a view of the project, as well as the view of the project for traffic travelling southeast on Laurelwood Road. The project would not be visible from the apartment units themselves because the windows either face to the west away from the site or are blocked by a building immediately east of the apartments. The project would only become visible as the residents drive out of the apartment parking lot and onto Laurelwood Road, a frontage road to the Bayshore Freeway. **Visual Resources Figure 7A** shows the view from KOP 3 to the southeast toward the project site. A photograph of the apartments is shown in AFC Figure 8.13-3b (photograph #6).

Visual Quality

The most prominent features in the view toward the site are the large commercial building on the south side of the Bayshore Freeway, the travel lanes of Laurelwood Road and the freeway, power poles along Laurelwood Road, and clusters of shrubs along the fence between Laurelwood Road and the freeway. Other visible features include a few trees and shrubs south of the freeway and in the distant background the Diablo Mountain Range. Visible to viewers at this location, but not shown in the photograph, are power poles and transmission towers on the north side of Laurelwood Road, and commercial light industrial buildings immediately to the east of the apartments. Considering all of these factors, visual quality is rated low.

Viewer Concern

Residential viewers are typically considered to have high viewer concern. However, given the location of the apartments within a commercial and industrial area and adjacent to Highway 101, and because the view in the direction of the site does not contain particularly unique or pleasing visual elements, viewer concern is considered low to moderate for the residents at KOP 3. Motorists on Laurelwood Road would anticipate commercial and industrial uses in this area. Viewer concern of motorists is low.

Viewer Exposure

The site itself is not visible from KOP 3, however, the project structures would be. There are 12 apartment units at 1425 Laurelwood, so the KOP represents a low to moderate number of residential viewers. Laurelwood Road has a traffic volume of 7,400 vehicles per day in the southeast lane, which is considered a moderate to high number of viewers. The project would be visible briefly to residents as they drive out of the parking lot. The clusters of shrubs along the highway would interrupt the view for motorists on Laurelwood Road. Overall viewer exposure is low to moderate for residents and moderate to high for travelers.

Overall Visual Sensitivity

For residents at KOP 3, low visual quality, and the low to moderate viewer concern and viewer exposure result in low to moderate overall visual sensitivity. For travelers at KOP 3, the low visual quality and viewer concern and the moderate to high viewer exposure also results in low to moderate overall visual sensitivity.

KOP 4 – Bayshore Freeway (Highway 101)

KOP 4 is located in the southern most lane of Highway 101, approximately 1,000 feet north of the site, near the intersection of Duane Avenue (frontage road) and Raymond Street. The viewpoint was selected to represent the view of the site available to motorists travelling southeast on Highway 101. **Visual Resources Figure 8A** shows the view from KOP 4 to the southeast toward the project site.

Visual Quality

The most prominent features in the view toward the project site are the commercial and light industrial buildings along Duane Avenue, the transmission lines crossing the Highway 101, and shrubs along the highway. Trees within the industrial area south of Duane Avenue are also visible. For these reasons visual quality is considered low to moderate.

Viewer Concern

Highway 101 in this area is not an eligible or officially designated State Scenic Highway. There are no particularly pleasing visual elements existing within the view that would draw a viewer's attention. Viewer concern is considered low to moderate.

Viewer Exposure

The project site is located about 1,000 feet southeast of KOP 4. Buildings along Duane Avenue obscure views of the site from Highway 101; however, the upper portions of the

power plant would be visible from this viewpoint. Although the number of viewers on Highway 101 is quite high (181,000 ADT), the duration of the view is brief (approximately 6 seconds at 55 MPH). Overall viewer exposure is moderate to high.

Overall Visual Sensitivity

For KOP 4, low to moderate visual quality and viewer concern, and moderate to high viewer exposure result in moderate overall visual sensitivity.

KOP 5 – Raymond Street

KOP 5 is located on Raymond Street, approximately 350 feet northwest of the project site. KOP 5 was selected to represent the view of the site available to people driving east on Raymond Street toward Space Park Drive to visit one of the several commercial and light industrial buildings in the area. **Visual Resources Figure 9A** shows the view from KOP 5 to the southeast toward the project site.

Visual Quality

The most prominent feature in the view is the light industrial building (Williams Communications) located immediately west of the project site. Other prominent features shown in the photograph include the transmission towers on the site and the trees in the parking lot of the light industrial building. A portion of the Kifer Receiving Station is also visible. Not visible in the photograph, but visible to drivers at KOP 5 looking south, are several stacks associated with the Owens Corning facility. The visual quality of the view is considered low to moderate.

Viewer Concern

The predominant viewers at KOP 5 would be people employed in or visiting an industrial sector of Santa Clara. Motorists on Raymond Street and employees at buildings in the area would anticipate seeing landscaped commercial and light industrial uses, with prominent energy infrastructure, in this area. Before reaching KOP 5, motorists travelling south on Raymond Street have a view of the upper portions of the Scott Receiving Station on Space Park Drive (the lower portions are screened by a masonry wall). At KOP 5 a portion of the Kifer Receiving Station is visible. In addition, several transmission lines cross over the area. Several transmission towers are located in the parking lots of the buildings along Raymond Street. Considering all these factors, viewer concern is considered low to moderate for both motorists and workers.

Viewer Exposure

The site is located approximately 350 feet southeast of KOP 5. The project would be clearly visible at this foreground distance. Raymond Street has a traffic volume of 1,800 vehicles per day, a low to moderate number of travelers. The project would be visible briefly as motorists drive east on Raymond Street before turning south toward Space Park Drive and away from the project site. Overall viewer exposure for motorists on Raymond Street is moderate. The entrance and only one window of the building (Williams Communications) immediately west of the site face the project site. The building to the northwest of the site has several windows that face the site (across the parking lot from Williams Communications) and has a less obstructed view of the Kifer Receiving Station. The site is visible briefly to workers at these buildings as they walk

from their cars to the building. On two field visits to the area staff observed very few cars in the parking lot, so the number of potential viewers appears to be low. Viewer exposure for workers at these buildings ranges from low to moderate to moderate.

Overall Visual Sensitivity

For KOP 5, the low to moderate visual quality and viewer concern, and the moderate viewer exposure result in low to moderate overall visual sensitivity.

KOP 6 – Lafayette Street Overpass to Highway 101, Southbound

KOP 6 is located on the Lafayette Street overpass to Highway 101, approximately 500 feet northeast of the project site. This viewpoint represents the first opportunity for southbound motorists on Lafayette Street to view the project. **Visual Resources Figure 10A** shows the view from KOP 6 to the southwest toward the project site.

Visual Quality

The most prominent features in the view are the public storage facility on Duane Avenue and the trees (which nearly completely obscure the Kifer Receiving Station from this viewpoint) on the eastern portion of the project site. Other visible features include a large billboard, transmission towers, light industrial buildings on Duane Avenue, and the Santa Cruz Mountain Range in the distant background. The visual quality of this view is considered low.

Viewer Concern

The predominant viewers would be commuters travelling through or to an industrial section of Santa Clara. Motorists on Lafayette Street would anticipate seeing industrial uses and substantial energy infrastructure in this area. Viewer concern is considered low to moderate.

Viewer Exposure

The site is visible across the tops of the public storage buildings. Although the project would be visible to a high number of viewers (the ADT on Lafayette Street is 23,300 vehicles per day), the duration of the view would be brief. The posted speed limit on Lafayette Street is 40 MPH. Overall viewer exposure is moderate.

Overall Visual Sensitivity

For KOP 6, the low visual quality, low to moderate viewer concern, and moderate viewer exposure result in low to moderate overall visual sensitivity.

IMPACTS

CONSTRUCTION IMPACTS

Construction of the proposed power plant and linear facilities would cause adverse visual impacts due to the presence of equipment, materials, and workforce. Construction would involve the use of cranes, heavy construction equipment, temporary storage and office facilities, and temporary laydown/staging areas. A typical pipeline

construction spread would include a bulldozer, backhoe, boom trucks, excavation diggers, material delivery trucks, welding trucks and inspection vehicles. Construction would include site clearing and grading, digging for construction of underground linear facilities, construction of the actual facilities, and site and rights-of-way cleanup and restoration.

Project construction would span a period of approximately 19 months in total. Construction of the gas pipeline would last approximately 6 months. As discussed earlier, four areas would be used for equipment and materials laydown and construction worker parking. Except for the 1.9-acre vacant lot adjacent to the SVP Brokaw Substation, none of these areas are visible from sensitive viewing locations (e.g., residential areas). The site adjacent to the Brokaw Substation (and the substation itself) is visible from the rear side of an apartment complex, consisting of four, two-story buildings. It is estimated that up to 30 residents reside within the apartment complex (SVP 2002; Data Adequacy Supplement). The windows on the rear side of the apartment buildings are small. The view in the direction of the laydown area has low visual quality due to the presence of the Brokaw Substation, railroad tracks, and gravel-covered ground. Use of this site for temporary laydown purposes would not cause substantial visual impacts to residents in the apartment complex and thus measures that would screen equipment and materials from view are not considered necessary at this location. Construction activities at the site would be most visible to motorists on Lafayette Street and Duane Avenue, and from adjacent industrial and commercial properties to the north and west. Gas pipeline construction activities would be temporarily visible to residents at the apartment complexes along the east side of Lafayette Street, north of Aldo Avenue. The pipeline would be constructed on the opposite side of Lafayette Street (which has a total of four traffic lanes) from the apartments, within the outside, southbound lane of Lafayette Street. Due to the temporary nature of project construction, the adverse visual impacts that would occur during construction of the power plant and linear facilities would not be significant. However, this conclusion assumes that complete restoration of construction areas and rights-of-way is accomplished. In addition, given the very close proximity of residences to the gas metering station site (discussed later under Operation Impacts - Linear Facilities), staging and material and equipment storage areas for gas metering station construction should be visually screened with temporary opaque or semi-opaque fencing. Proper implementation of Condition of Certification **VIS-1** would ensure that the visual impacts associated with project construction remain less than significant.

OPERATION IMPACTS

An analysis of operation impacts was conducted for the view areas represented by the key viewpoints selected for in-depth visual analysis. The results of the operation impact analysis are discussed below by KOP and presented in the Visual Analysis Summary table included as **Visual Resources Appendix VR-1**. The visual impacts of night lighting and visible plumes are discussed in separate sections of this analysis. For each KOP, an evaluation of visual contrast, project dominance, and view blockage is presented with a concluding assessment of the overall degree of visual change caused by the proposed project.

Impacts of Power Plant Structures

As previously discussed, the most prominent power plant structures would be the heat recovery steam generator (HRSG) units, the HRSG stacks, and the cooling tower. The HRSG units and the stacks would be 53 feet tall and 95 feet tall, respectively. The HRSG units would be 40 feet long. The cooling tower would be 62 feet tall (to the top of the fan cones) and 126 feet long. Sound-attenuation walls (ranging in height from 8 feet to 25 feet) would be constructed around the western, northern and eastern boundaries of the site.

KOP 1 – Intersection of Central Expressway and Lafayette Street

Visual Resources Figure 5B presents a visual simulation of the proposed project as viewed from KOP 1 at the intersection of Central Expressway and Lafayette Street. The most obvious change to the landscape would be the addition of prominent geometric forms with horizontal and vertical lines and complex industrial character. The structural mass of the project structures would be greater than the Kifer Receiving Station structures.

Visual Contrast

The cylindrical form of the HRSG stacks would contrast moderately with the triangular shaped transmission towers in the center of the view. The boxy cooling tower structure would appear similar in form and line to the commercial and light industrial buildings in the area of KOP 1. The gray color of the project structures would contrast moderately with the gray, light blue, and green colors in the landscape. Overall, visual contrast would be moderate.

Project Dominance

The prominent complex industrial forms of the Kifer Receiving Station dominate the landscape visible from KOP 1. The proposed power plant facilities would be spatially prominent within motorists' primary view direction. The two tall transmission towers at the Kifer Receiving Station and the trees lining either side of Lafayette Street tend to draw and channel the viewer's eye toward the project site. The sky backdrop to the project would contribute to the structural prominence of the proposed facilities. The scale of the proposed facilities would appear co-dominant relative to the existing energy infrastructure and the total field of view. Overall project dominance would be co-dominant to dominant.

View Blockage/Disruption

Nearly all of the light-industrial building to the north of the site on Duane Avenue would be blocked from view by the project. The mountains in the background are barely discernible from this location or are blocked by existing structures. A minor portion of sky is the only landscape feature of higher quality that would by blocked by the project. The Kifer Receiving Station and transmission towers and lines already disrupt views of the sky. The severity of the project's view blockage is considered low.

Overall Visual Change

From KOP 1, the overall visual change caused by the proposed project would be moderate to high due to the moderate degree of contrast that would occur from the

project's co-dominant to dominant structures, combined with the project's low degree of view blockage of higher quality landscape features (sky).

Visual Impact Significance

When considered within the context of the overall low to moderate visual sensitivity of the existing landscape and viewing characteristics, the moderate to high visual change that would be perceived from KOP 1 would cause an adverse but less than significant visual impact.

KOP 2 – Intersection of Lafayette Street and Duane Avenue

Visual Resources Figure 6B presents a visual simulation of the proposed project as viewed from KOP 2 at the intersection of Lafayette Street and Duane Avenue. The most obvious change to the view would be the removal of the mature deciduous trees on the site and their replacement with the massive horizontal forms of the office/warehouse and cooling tower structures. Depending on the season, these trees filter or nearly obscure views of the Kifer Receiving Station from Lafayette Street at Duane Avenue. Only the very tops of the 95-foot tall HRSG stacks would be visible, protruding from behind the office/warehouse structure. The simple forms of the office/warehouse and cooling tower structures would obscure the majority of the complex appearing equipment at the top of the HRSG units. The wood transmission poles that are visible traversing the site would be relocated to the edge of the site to run along Duane Avenue.

Visual Contrast

The simple, and predominantly horizontal forms and straight lines of the visible project structures would be consistent with the forms and lines of the existing commercial and light industrial buildings in the area of KOP 2. The form and line of the new wood poles would be similar to the poles they would replace. The proposed gray and red (office/warehouse roof) colors of the project would blend with the existing landscape and building (e.g., public storage facility) colors, resulting in low to moderate contrast. Overall, visual contrast would be low to moderate.

Project Dominance

The view of the project site from KOP 2 is currently dominated by a row of mature trees, which would be removed to make room for the project. The control building and cooling tower structure, which would have lower visual quality than the trees, would become the dominant features at the site as seen from KOP 2. The project structures would be located prominently within motorists' primary view direction (albeit briefly). As shown in Figure 6B, the project would completely fill motorists' view at this location on Lafayette Street. The simulation is really more representative of the view of the project that motorists turning right onto Duane Avenue would have. At 1,850 vehicles per day, Duane Avenue has substantially less traffic on it than Lafayette Street. For those motorists proceeding south on Lafayette Street, the view is more panoramic (see **Visual Resources Figure 4 – photograph #2**), and the project would appear less spatially dominant than it does in the simulation. The sky backdrop to the project would contribute to the structural prominence of the proposed facilities. Overall project dominance would be co-dominant to dominant.

View Blockage/Disruption

The project would block somewhat more of the sky than is already blocked by the trees. No other landscape features of higher quality would be blocked by the project. The existing view would be disrupted by the replacement of the trees (higher quality features) with the project structures. The applicant proposes to replace these trees with new street trees along Lafayette Street and Duane Avenue. It would take time for these trees to grow and mature, like the trees they would replace. The severity of the view blockage/disruption is considered moderate.

Overall Visual Change

From KOP 2, the overall visual change caused by the proposed project would be moderate to high due to the moderate degree of view blockage/disruption caused by the co-dominant to dominant structures.

Visual Impact Significance

When considered within the context of the overall moderate visual sensitivity of the existing landscape and viewing characteristics, the moderate to high visual change that would be perceived from KOP 2 would cause an adverse and significant visual impact. The trees depicted in **Visual Resources Figure 6B** (which are shown at 10 years after planting) would not screen the project structures sufficiently enough and within a reasonable amount of time (5 years) to reduce the visual impact to less than significance. For further discussion please see the section titled Additional Mitigation Proposed by Staff.

KOP 3 – 1425 Laurelwood Road

Visual Resources Figure 7B presents a visual simulation of the proposed project as viewed from KOP 3, which is located at the driveway to 1425 Laurelwood Road, a former motel converted to a 12-unit apartment building. The most obvious change to the landscape would be the addition of prominent geometric forms with horizontal and vertical lines and complex industrial character.

Visual Contrast

The cylindrical form of the HRSG stacks would appear similar to the form of the wood poles that line both sides of Laurelwood Road. The simple, horizontal form and straight lines of the cooling tower would appear similar to the large building to the right of the photograph. However, the busy, complex form of the HRSG units would contrast highly with the simple form of the aforementioned building. The proposed gray project colors would cause low to moderate contrast with the light blue color of the sky and predominantly gray colors of the landscape features. Overall, visual contrast would be moderate.

Project Dominance

The large building to the right of the photograph, the wood electrical distribution poles along Laurelwood Road, and Highway 101 dominate the view from KOP 3. The scale of the proposed facilities would appear subordinate to co-dominant relative to the existing visible structures and the total field of view. As residents wait to turn onto Laurelwood Road from the driveway of the apartment building, the proposed power plant facilities

would be spatially prominent in their view. The sky backdrop to the project would contribute to the structural prominence of the proposed facilities. Overall project dominance would be co-dominant.

View Blockage

The proposed project structures would block a very small portion of the sky and mountains (which are usually barely discernible in the distant background because of the haze), as well as the visible portion of the Kifer Receiving Station. The severity of the view blockage is considered low.

Overall Visual Change

From KOP 3, the overall visual change caused by the proposed project would be moderate due to the moderate degree of contrast that would occur from the project's co-dominant structures, combined with the project's low degree of view blockage.

Visual Impact Significance

When considered within the context of the overall low to moderate visual sensitivity of the existing landscape and viewing characteristics, the moderate visual change that would be perceived from KOP 3 would cause an adverse but less than significant visual impact.

KOP 4 – Bayshore Freeway (Highway 101)

Visual Resources Figure 8B presents a visual simulation of the proposed project as viewed from KOP 4, which is located within the southern most lane of Highway 101. The most obvious change to the landscape would be the addition of prominent geometric forms with horizontal and vertical lines and complex industrial character. The degree of visual change experienced at KOP 4 essentially would be similar to that at KOP 3. When considered within the context of the overall moderate visual sensitivity of the existing landscape and viewing characteristics, the moderate visual change that would be perceived from KOP 4 would cause an adverse but less than significant visual impact.

KOP 5 – Raymond Street

Visual Resources Figure 9B presents a visual simulation of the proposed project as viewed from KOP 5 on Raymond Street. The most obvious change to the landscape would be the addition of highly prominent geometric forms with horizontal and vertical lines and complex industrial character.

Visual Contrast

The simple horizontal form and straight lines of the cooling tower structure would appear somewhat similar to the form and line of the large, light industrial building on the right hand side of the photograph. The busy, complex form of the HRSG units would contrast highly with the aforementioned building. However, the intricate form of the pipe rack attached to the HRSG would be somewhat similar to the form of the lattice transmission tower and Scott Receiving Station structures that motorists travelling east on Raymond would have seen already. The proposed project colors would cause low to

moderate contrast with the light blue color of the sky and the predominantly gray colors of the landscape features. Overall, visual contrast would be moderate to high.

Project Dominance

The view is currently dominated by the large, light industrial building located immediately west of the project site (a portion of this building is visible on the right hand side of the photograph). The transmission lines crossing Raymond Street and converging on the site tend to draw the viewer's eye toward the project site. The proposed power plant facilities would be spatially prominent in the view from KOP 5. The sky backdrop to the project would contribute to the structural prominence of the proposed facilities. The scale of the proposed facilities would appear co-dominant with the large building to the west of the site. Overall project dominance would be co-dominant to dominant.

View Blockage/Disruption

The project structures would block a moderate portion of the sky. The mountains in the distant background (which are usually barely discernible because of the haze) would also be blocked. The project would block the visible portion of the Kifer Receiving Station. Construction of the project would require removal of the row of mature trees currently on the site (visible in the photograph to the left of center). The replacement of these trees with the project structures (lower quality elements) would disrupt the view. The severity of the view blockage/disruption is considered moderate at this viewing location.

Overall Visual Change

From KOP 5, the overall visual change caused by the proposed project would be moderate to high due to the moderate to high degree of contrast that would occur from the project's co-dominant to dominant structures, combined with the project's moderate degree of view blockage/disruption.

Visual Impact Significance

When considered within the context of the overall low to moderate visual sensitivity of the existing landscape and viewing characteristics, the moderate to high visual change that would be perceived from KOP 5 would cause an adverse but less than significant visual impact.

KOP 6 – Lafayette Street Overpass to Highway 101, Southbound

Visual Resources Figure 10B presents a visual simulation of the proposed project as viewed from KOP 6 at the Lafayette Street Overpass to Highway 101. The public storage facility and the line of mature trees on the project site currently dominate the view toward the site. The most obvious change to the view would be the addition of the massive rectangular form of the cooling tower structure and the removal of the mature trees from the project site. The upper portion and roof of the office/warehouse building and the tops of the HRSG stacks would also be visible. The simple form of the cooling tower would obscure the majority of the complex appearing equipment at the top of the HRSG units.

Visual Contrast

The rectilinear form and straight lines of the cooling tower structure would be similar to the public storage buildings in the foreground and the industrial buildings on Duane Avenue in the middleground. The cylindrical form and straight line of the HRSG stacks would be similar to the form and line of the wood poles. The form and line of the relocated 60kV wood poles would be similar to the form and line of the existing poles in the view. The proposed gray and red (warehouse roof) colors would blend well with the gray and red colors of the existing structures in the view and contrast moderately with the light blue sky. Overall, visual contrast would be low to moderate.

Project Dominance

The public storage facility and the mature trees on the project site dominate the view toward the site from KOP 6. The proposed power plant facilities would be spatially prominent in motorists' primary view direction (albeit briefly). The sky backdrop to the project would contribute to the structural prominence of the proposed facilities. The scale of the proposed facilities would appear co-dominant with the public storage buildings and the buildings to the west and north of the site. Overall project dominance would be co-dominant.

View Blockage/Disruption

The project structures would block from view a small part of the sky. The trees currently on the project site block the view of a portion of the mountains in the distant background. The project would increase the view blockage of the mountains slightly. The removal of the trees would increase the visibility of the electrical structures at the Kifer Receiving Station. The substation structures, combined with the existing and new power poles, would increase the visual clutter of the view. It would take time for the proposed trees to grow and mature, like the trees they would replace. View blockage/disruption is considered moderate.

Overall Visual Change

From KOP 6, the overall visual change caused by the proposed project would be moderate due to the low to moderate degree of contrast that would occur from the project's co-dominant structures, combined with the project's moderate degree of view blockage/disruption.

Visual Impact Significance

When considered within the context of the overall low to moderate visual sensitivity of the existing landscape and viewing characteristics, the moderate visual change that would be perceived from KOP 6 would cause an adverse but less than significant visual impact.

Linear Facilities

The project's electric transmission interconnection and associated switchyard and the relocated 60 kV aboveground transmission line are discussed above under the power plant facilities.

The proposed underground natural gas supply line would not be visible following installation except for an occasional warning marker and would not result in adverse visual impacts. However, the gas pipeline would include an aboveground gas compressor station and metering station that would be located in areas with public visual access.

The compressor station would be located within the City's current utility yard at Comstock and Lafayette streets. Various existing structures are located in the area surrounding the site, including lattice transmission towers, wood electrical poles, a corrugated metal shed, and two one-story buildings. The compressor station site and surrounding area are industrial in character and have low visual quality. The gas compressor equipment would be housed in a 15-foot tall, roofed building, with a footprint of approximately 85 by 80 feet. The character of the gas compressor building would appear consistent with the existing structures and would not cause adverse visual impacts.

The gas metering station would be located at the new pipeline's interconnection point with PG&E's Line 132 gas distribution line, near the corner of Gianera Street and Wilcox Avenue. The metering station would require an area measuring approximately 30 feet by 60 feet. The AFC did not provide a description of the proposed gas metering facilities; however, plan and elevation views were provided in Figure 2 in Appendix 5. Based on the diagrams, it appears that the gas metering stations would consist of an above ground segment of piping with several meters and valves. Although not indicated in the Figure, gas metering stations may include a small structure for control and communication equipment. The proposed metering station would be 4 feet tall (SVP 2002; Data Adequacy AFC Supplement). For access and security reasons, either a 6-foot-high wall or a security fence with landscaping would surround the gas metering station.

The metering site is immediately adjacent to a high-density residential area. Approximately seven to eight two-story residences in this area have views of the proposed site. The site is currently traversed by an approximately 200-foot-long bicycle and pedestrian pathway that runs north from the east end of Gianera Street (at Wilcox Avenue) to Stars and Stripes Drive. The bike/pedestrian path would be partially realigned to the east to accommodate the facility. The Esperonica Residential Development to the south of the pathway has limited ingress and egress points from/to Lafayette Street on the east due to the Union Pacific Railroad right-of-way and the soundwall that runs along the tracks. The short pathway appears to primarily serve as a convenient linkage for residents of the Esperonica Residential area to reach the Santa Clara Amtrak/Antioch Commuter Express Station parking lot to the north or other destinations to the north or east. No records are kept of the number of people using the pathway (SVP 2002; Data Adequacy AFC Supplement). Staff observed one individual jogging along the pathway during a site visit on January 15, 2003. The applicant did not observe anyone using the pathway during a site visit on October 24, 2002.

The metering station facilities would appear industrial in character, but would not be inconsistent with other energy infrastructure in the area. Immediately to the north of the gas metering station site are three large transmission towers (the pathway actually passes between two of the towers). These towers are visible from some of the

residences immediately west of the pathway. The towers carry transmission lines out of a large electrical substation located north of the Esperonica Residential area. The upper portions of the substation structures are visible from the pathway and the northern most residences above the solid wall and mesh-covered fence that surround the substation. Also visible from the residences is the Union Pacific Railroad soundwall. The portion of the soundwall north of Gianera Street is not covered with landscaping. The overall visual sensitivity of the viewing area is moderate (due to the low to moderate visual quality of the view, high viewer concern, and moderate viewer exposure). The metering station facilities would appear similar in character (form and line) to other visible features in the landscape. The metering station would be co-dominant relative to the size of other visible features and the total field of view. The facilities would only block views of an existing soundwall and would not block views of any higher quality landscape features. The overall visual change would be moderate. Considering the moderate overall visual sensitivity, the resulting visual impact would be adverse but less than significant. Although the visual impacts would be less than significant, because residences would be adversely affected, staff believes the impacts should be minimized with landscape screening. As noted above, SVP proposes either a 6-foot-high wall or a security fence with landscaping around the gas metering facilities. The inclusion of landscaping with either option would also achieve conformance with the City's Community Design Guidelines, which not only require equipment located on the ground to be screened by landscaping and/or screening walls, but also generally require walls and fences to be softened by landscaping treatments. See also the Compliance with LORS discussion below. The landscaping should be effective at substantially screening the metering facility equipment from view from the upper story windows of the residences immediately west of the bike/pedestrian pathway, and at softening the proposed wall or fence.

The power plant's cooling water supply would come from an existing tertiary treated recycled water pipeline located within the boundaries of the project site. Approximately 900 feet of underground pipeline would convey the project's wastewater discharge to an existing water main in Central Expressway. Operation of these underground lines would not result in adverse visual impacts.

Lighting

The project would require nighttime lighting for operational safety and security. To reduce offsite impacts, lighting at the facility would be restricted to areas required for safety, security, and operation, and would be turned off in areas where personnel are not present. High illumination areas not occupied on a regular basis would be provided with switches or motion detectors to light these areas only when occupied. Exterior lights would be hooded and directed on-site to minimize the amount of light or glare that would be dispersed or reflected onto adjacent properties. Fixtures of a non-glare type would be specified. The proposed perimeter sound walls and landscaping along the east side of the site would further reduce the visibility of night lighting. Effective implementation of the applicant's proposed mitigation measures and staff's proposed condition of certification **VIS-4** would ensure that impacts of nighttime lighting would not be significant.

Cooling Tower and Combustion Turbine Exhaust Visible Plumes

SVP has proposed a plume-abated wet cooling tower. The plume abatement design point is specified as 35°F and 85 percent relative humidity (RH). The project includes two separate turbine/HRSG systems, each with separate exhaust stacks. Water injection would be used for NO_x control, and duct firing would be used for peak generation. The applicant has not proposed to use any methods to abate visible plumes from the HRSG exhausts. Staff completed a visible plume modeling analysis of the proposed abated cooling tower and unabated HRSG designs (Walters 2003; see **Visual Resources Appendix VR-2**). The following discussion is a summary of the results of staff's plume analysis.

Cooling Tower Visible Plume Modeling Analysis

Visual Resources Table 1 provides the visible plume frequency results using a five-year (1991-1995) meteorological data set from the San Jose Airport.

Visual Resources Table 1 – Staff Predicted Hours with Cooling Tower Steam Plumes San Jose Airport 1991-1995 Meteorological Data

	Available (hr)	Plume (hr)	Percent
Full load with Duct Firing			
All Hours	43,634**	8,057	18.5%
Daylight Hours	22,169	1,604	7.2%
Seasonal Daylight Hours*	9,933	1,434	14.4%
Full load no Duct Firing			
All Hours	43,634	2,396	5.5%
Daylight Hours	22,169	454	2.0%
Seasonal Daylight Hours*	9,933	446	4.5%

*Seasonal conditions occur anytime from November through April.
** The BAAQMD meteorological data set used in this analysis is 99.6% complete (43,634 hours out of 43,824 hours). Staff did not attempt to fil the 190 hours of missing data.

These results confirm that the visible plume formation would mainly occur during the cold weather months, with the majority of plume formation occurring at night or early morning.

For the proposed cooling tower during seasonal daylight hours, the minimum relative humidity where a visible plume is predicted is 86 percent at 34°F when operating without duct firing, and 65 percent at 32°F when operating with duct firing. For plumes predicted during seasonal daylight hours the relative humidity is predicted to be equal to or greater than 95 percent over 85 percent of the time when operating without duct firing and over 50 percent of the time when operating with duct firing. The majority of the hours with a relative humidity equal to or greater than 95 percent are likely to be during periods of fog or rain or otherwise be visually impaired.

A plume frequency of 10 percent of seasonal (November through April) daylight clear hours is used as a plume impact study threshold trigger. If plume frequency exceeds 10 percent, staff conducts an assessment of the visual change (in terms of contrast, dominance, and view blockage) that would be caused by the predicted plume sizes. Considering the visual sensitivity of the existing landscape and viewing characteristics, the degree of visual change caused by the plumes may result in significant visual impacts. The modeling indicates that cooling tower plumes would occur 14.4 percent

(full load, duct firing) and 4.5 percent (full load, no duct firing) of seasonal daylight hours. It is expected that duct firing would not occur during the early morning hours that are the most favorable to plume formation. Therefore, the actual plume frequencies are expected to be less then 10 percent of seasonal daylight hours and well less than 10 percent of seasonal daylight clear hours (see below).

Cloud Cover Data Analysis Method

A plume frequency of 10 percent of seasonal (November through April) daylight clear hours is used as an initial plume impact threshold trigger; if exceeded, the analysis is further refined by determining plume dimensions during the seasonal daylight clear hours. The clear hours determination methodology is provided below.

Energy Commission management has identified a “clear” sky category during which plumes have the greatest potential to cause adverse visual impacts. Typically, meteorological data sets used in plume analyses categorize total sky cover and opaque sky cover in 10 percent increments. Staff includes in the “Clear” category a) all hours with total sky cover equal to or less than 10 percent plus b) half of the hours with total sky cover 20-100 percent that have sky opacity equal to or less than 50 percent. The rationale for including these two components in this category is as follows: a) plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or less than 10 percent, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and b) for a substantial portion of the time when total sky cover is 20-100 percent and the opacity of sky cover is relatively low (equal to or less than 50 percent), clouds do not substantially reduce contrast with plumes; staff has estimated that approximately half of the hours meeting the latter sky cover and sky opacity criteria can be considered high visual contrast hours and are included in the “clear” sky definition.

The meteorological data set used in this analysis (which was obtained from the Bay Area Air Quality Management District) does not include weather phenomena (i.e. rain and fog) or sky cover data. Thus, the actual plume hours during clear conditions would be significantly less than the total seasonal daylight values presented in this analysis. It is expected that the majority of daylight plume hours determined for the cooling tower and HRSGs would occur under visually impaired ambient conditions, either during rain or fog or under non-“clear” sky conditions.

HRSG Visible Plume Modeling Analysis

Staff evaluated the AFC (Appendix 8.1B) and performed an independent psychrometric analysis and dispersion modeling analysis. The Combustion Stack Visible Plume (CSVP) model was used to estimate the worst-case potential plume frequency for each HRSG stack.

Staff modeled the HRSG plumes using the CSVP model with a five-year meteorological data set from the San Jose Airport. **Table 2** provides the CSVP model visible plume frequency results.

Visual Resources Table 2 – Staff Predicted Hours with HRSG Steam Plumes San Jose Airport 1991-1995 Meteorological Data

	Available (hr)	Plume (hr)	Percent
Full load with Duct Firing			
All Hours	43,634	6,475	14.8%
Daylight Hours	22,169	1,238	5.6%
Seasonal Daylight Hours*	9,933	1,176	11.8%
Full load no Duct Firing			
All Hours	43,634	3,025	6.9%
Daylight Hours	22,169	540	2.4%
Seasonal Daylight Hours*	9,933	533	5.4%

*Seasonal conditions occur anytime from November through April.

The plume frequencies are higher than might be expected for the given exhaust temperatures due to the large amount of water injection (55 gpm per turbine) being used, primarily for NO_x emissions control. For the proposed HRSGs, the maximum temperature where a visible plume is predicted is 56°F when the relative humidity is 100 percent during duct firing and 50°F when the relative humidity is 100 percent when operating without duct firing.

The modeling indicates that HRSG exhaust stack plumes would occur 11.8 percent (full load, duct firing) and 5.4 percent (full load, no duct firing) of seasonal daylight hours. As stated before, a plume frequency of 10 percent of seasonal (November through April) daylight clear hours is used as a plume impact study threshold trigger. Considering that duct firing is not expected to be the normal operating condition during the early morning winter hours when daylight plumes are predicted, the plume frequencies are expected to be less then 10 percent of seasonal daylight hours and well less than 10 percent of seasonal daylight clear hours.

Conclusions

Visible plumes from the proposed plume abated cooling tower and HRSGs are not expected to occur greater than 10 percent of seasonal daylight clear hours. Therefore, the project is not expected to cause significant visual impacts under the expected operating conditions, and no further visual plume impact analysis (i.e., degree of visual change caused by anticipated plume dimensions) is necessary to address the impacts from the cooling tower or HRSG plumes.

CONSIDERATION OF IMPACTS IN RELATION TO CEQA SIGNIFICANCE CRITERIA

This analysis considered the potential impacts of the proposed project structures in relation to the four significance criteria for visual resource impacts listed in Appendix G of the CEQA Guidelines, under Aesthetics, specified below.

1. Would the project have a substantial adverse effect on a scenic vista?

There are no scenic vistas in the project viewshed so the proposed project would not result in significant visual impacts under this criterion.

2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

The proposed project is not located within the viewshed of a state scenic highway. Several mature trees currently occupy a portion of the site. These trees partially screen

views of the Kifer Receiving Station for motorists travelling southbound on Lafayette Street. The trees would be removed to make room for the project structures. Although not considered to be heritage trees or protected trees by the City of Santa Clara Zoning Ordinance, the ordinance does require them to be replaced (SVP 2002a). The removal of the trees is considered a significant impact under this criterion. The applicant proposes to meet the requirements of the ordinance by planting trees along Duane Avenue and Lafayette Street.

3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

As discussed in a previous section of this analysis, the proposed project would introduce prominent structures of industrial character into the foreground views from southbound Lafayette Street (KOP 2). The resulting visual change would be moderate to high. Combined with the moderate overall visual sensitivity at KOP 2, the moderate to high visual change would cause an adverse and significant visual impact under this criterion.

4. Would the project create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?

The project is located within an industrial area and immediately south of Highway 101. Nighttime lighting (which would be minimized) would not substantially affect nighttime views in the area or result in a significant visual impact under this criterion.

Mitigation of the visual impacts identified under Criteria 2 and 3 are addressed below in the Mitigation section.

CUMULATIVE IMPACTS

As defined in Section 15355 of the CEQA Guidelines (Cal. Code Regs., tit. 14), a cumulative impact consists of an impact created as a result of the combination of the project together with other projects causing related impacts. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Cumulative impacts to visual resources could occur where project facilities or activities (such as construction) occupy the same field of view as other built facilities or impacted landscapes. It is also possible that a cumulative impact could occur if a viewer's perception is that the general visual quality of an area is diminished by the proliferation of visible structures (or construction effects such as disturbed vegetation), even if the new structures are not within the same field of view as the existing structures. The significance of the cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) visual access to scenic resources is impaired; or (3) visual quality is diminished.

According to the AFC (Land Use Section), the City of Santa Clara has conducted discretionary reviews and approved the following projects in the vicinity of the proposed power plant project:

- 12-story, 171-room hotel located at 2875 Lakeside Drive (2.1 miles).
- 300,564 square foot automobile sales and service building located at 3041 Stevens Creek Boulevard (3.6 miles)
- 548-unit apartment complex located at 3751 Lick Mill Boulevard (1.4 miles to Lick Mill Blvd.).
- 30-acre research and development campus at 3333 Scott Boulevard (1.8 miles)
- 250,000-square-foot, seven-story hotel with over 150 rooms located at 805 Montague Expressway (0.9 miles to Montague Expressway)
- Nine-story, 225-room hotel located at 2451 Tasman Drive (2.3 miles)

Given the built-out nature of the area surrounding the project site, the visibility of the power plant project (see **Visual Resources Figure 1 - Project Viewshed**) from publicly accessible viewing areas is primarily limited to the streets and properties immediately surrounding the project. Due to intervening structures and distance, the power plant project would not be visible in the same field of view as the above listed projects and therefore the project would not combine together with these projects to produce cumulative visual impacts. Staff is not aware of any other project proposals in the vicinity of the PPP.

The proposed project would contribute to the significant cumulative visual impact that has occurred in this area of the City over time from past and present projects. The project's contribution to that cumulative visual impact would be cumulatively considerable, and thus significant, at KOPs 1, 2 and 6. At these KOPs the project would be the tallest or the most massive structures visible to the very high number of motorists driving by the project site on Lafayette Street. As viewed from KOPs 3 and 4, because the area is nearly completely built-out, the project is not considered as noticeable as it would be from nearby viewpoints on Lafayette Street, and therefore the visual impact of the project, combined with existing projects, would not be cumulatively considerable. The view represented by KOP 5 (Raymond Street) is the only viewing location within the industrial area to the west of the site from where the project would be visible. Given the limited visibility and the relatively low number of viewers, the cumulative visual impact would not be considered significant.

ENVIRONMENTAL JUSTICE

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

FACILITY 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 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 closure plan that the project owner is required to prepare will address removal of the power plant structures.

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 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. The contingency plan that the project owner is required to prepare would address removal of the power plant structures. No special conditions regarding visual resources are expected to be required to address any of the three types of closure.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

LOCAL

Visual Resources Table 3 provides a listing of the applicable LORS for the City of Santa Clara.

Visual Resources Table 3
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

LORS		Consistency Determination Before Mitigation/ Conditions	Basis for Consistency
Source	**Description of Principles, Objectives, and Policies**		
City of Santa Clara Zoning Ordinance Article 26 (Regulations for Public, Quasi-Public Zoning Districts; Sec. 26-11	Open Landscape Area. The following yards and areas shall be developed into and permanently maintained as open landscape areas: a) required front yards; b) street side yards of corner lots; and c) a landscaped area equal to 10 percent of the required parking area, to be evenly distributed throughout the parking area and adjacent to buildings.	Partially Consistent	The conceptual landscape plan dated December 11, 2002 depicts landscaping in the front and street side yards. No landscaping has been proposed in the parking area as required by the ordinance. Staff's proposed Condition of Certification **VIS-3** would bring the proposed project into compliance with this requirement.
City of Santa Clara Zoning Ordinance Article 26 (Regulations for Public, Quasi-Public Zoning Districts; Sec. 26-13	Additional Development Standards. c) Lighting: Lighting, if provided, shall be directed away from residential areas and public streets. d) Trash Disposal: Each property shall be provided with adequate and accessible trash disposal areas. Said disposal area shall be screened from public view by a masonry or solid wood fence at least six feet in height.	Consistent/To be Determined	The applicant proposes to install light fixtures so that lighting is directed onsite and away from adjacent properties. Condition of certification **VIS-4** includes these and other measures to minimize offsite impacts of night lighting. Effective implementation of this condition would ensure conformance with this ordinance. The site plan did not identify the location of a trash disposal area. Any trash disposal area would likely not be visible because perimeter walls a minimum of 8 feet in height would be constructed around all sides of the project site expect on the south side adjacent to the Kifer Receiving Station. Staff's proposed condition of certification **VIS-7** would ensure conformance with this provision.

Visual Resources Table 3
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

LORS		Consistency Determination Before Mitigation/ Conditions	Basis for Consistency
Source	**Description of Principles, Objectives, and Policies**		
Community Design Guidelines (This document contains the detailed policies and criteria, as required by Section 38 of the Zoning Ordinance, by which development proposals will be reviewed, in order to assist all applicants in meeting the City's standards of quality and to guide the City in its review of these proposals.)	Equipment Location: Mechanical and other equipment generally associated with industrial and commercial development shall be screened from view from the public right-of-way and from nearby properties to the greatest extent possible. Roof top equipment should be considered at the time of building design, or in the case of existing buildings, a parapet wall or roof screen designed as an integral part of the building should be provided. Equipment located on the ground should be located away from street yards or screened by landscaping and/or screening walls compatible with the building design.	Partially Consistent/To be Determined	The various equipment (e.g., steam drums, relief valves, vent silencers) at the top of the heat recovery steam generator (HRSG) units are essentially roof top equipment. The "top works" of the HRSG units would be visible from heavily traveled public rights-of-way (e.g., Lafayette Street and Highway 101) and nearby properties. The applicant has not proposed any measures to screen this equipment from view, to the greatest extent possible. Staff believes that it is feasible to attach architectural screens to the HRSG units to hide the equipment from view. However the applicant has indicated that screens may interfere with maintenance of the facility (Davy 2002). The City of Santa Clara Planning staff believes that it is in the public interest to make the large mass of the facility as pleasing to see on a day-to-day basis as practicable (Riley 2003). If the PPP was being reviewed by the City instead of the Energy Commission, the Architectural Committee, or possibly the City Council, would be responsible for determining how the project would comply with the guideline to screen roof top equipment, given the scale and nature of the project (Riley 2003). Staff's proposed Condition of Certification **VIS-5** would require SVP to submit their project to the appropriate City entity (Architectural Committee or City Council) to assist the Energy Commission in determining the extent of equipment screening that would be needed to satisfy the City's design guidelines. No equipment would be located within the street yards. Equipment located on the ground would be substantially screened by the 8 to 25 foot tall perimeter sound walls and landscaping at the PPP site. Either a 6-foot-high wall or security fence with landscaping is proposed around the gas metering station.

Visual Resources Table 3
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

LORS		Consistency Determination Before Mitigation/ Conditions	Basis for Consistency
Source	**Description of Principles, Objectives, and Policies**		
Community Design Guidelines (continued)	Fencing: Fencing should be compatible with the type of use and zoning on the property. A variety of prefabricated and textured masonry fences are available and may be appropriate in some cases. Where fencing is required by the Zoning Ordinance or as a condition of approval, both sides of the fence should be suitably textured and finished. Dilapidated fencing shall be replaced, repaired, or refinished as necessary.	Consistent	The applicant proposes to install prefabricated and textured masonry walls around the project site. These walls would be compatible with the proposed industrial use of the property. Staff's proposed condition of certification **VIS-2** would ensure that the walls are maintained, repaired or replaced, as necessary, for the life of the project.
Community Design Guidelines (continued)	Architecture. Bulk, Scale and Height: Development proposals shall be reviewed for their relative overall size and intensity to neighboring properties and development. Large blank walls, lack of architectural relief or building articulation, excessive heights, inadequate setbacks and other design features may result in proposals that appear out of scale with their surroundings. Architectural features should be provided to avoid large expanses of blank walls.	Consistent	The project has been designed so that the height of the structures would transition from the smaller structures on the east, closer to Lafayette Street, to the tallest structures near the center and western portion of the site (farthest from Lafayette Street). The tallest structures (HRSGs [casings 53 feet; top of highest drums, 75 feet] and cooling tower [top of parapet structure, 52 feet; top of fan cones, 62 feet]) would not be considerably out of scale with the buildings immediately surrounding the project property. The Williams Communications building immediately to the west is about 40 feet tall (SVP 2002a). The building immediately to the north is about 44 feet tall. The HRSG housing would have an accordion style ribbed appearance, and the cooling tower would have horizontal bands of alternating colors to provide architectural relief to these large structures. The sound walls would be given a decorative design treatment to relieve the solid mass that they would otherwise have. Condition of certification **VIS-2** would ensure conformance with these guidelines.

Visual Resources Table 3
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

LORS		Consistency Determination Before Mitigation/ Conditions	Basis for Consistency
Source	**Description of Principles, Objectives, and Policies**		
Community Design Guidelines (continued)	Screening Walls: Walls and fences for screening or enclosing areas of a site shall be compatible in scale, texture and color with the buildings on the site. Such walls generally should be softened by landscaping treatments.	Partially Consistent	The masonry sound walls would be compatible in scale and texture with the other buildings on the site. The applicant proposes to color treat the walls to blend with the power plant structures and surrounding buildings. The sound walls on the northeast and east fronting on public ROWs are the only walls proposed to be softened by landscaping. No landscaping would be planted along the 25-foot and 15-foot tall walls on the north and west sides of the site. These walls would be visible to employees and visitors using the parking lots and entrances to the adjacent buildings. The existing chain link fences along the north and west sides of the site are softened by small trees, shrubs, and clinging vines (see **Visual Resources Figure 4** – photos #6-8). The City required the adjoining property owners to plant the landscaping Typically, the City would require landscaping on the outside of a wall where the public or other property owners will see it. Given the space constraints of the PPP site, the City may be flexible on the application of this guideline to interior lot line walls, particularly because the adjoining properties are industrial. However, again, the Architectural Committee or City Council typically makes these types of decisions (Riley 2003). Energy Commission staff believes the proposed walls on the north and west sides of the site should be landscaped because they would be visible from adjoining properties and rights-of-way, and would be much more prominent than the existing, landscaped chain link fences. Staff believes that SVP should negotiate with the adjoining property owners to supplement the existing landscaping (and replace it if damaged by wall construction) with clinging vines and/or other landscaping to soften the visual impacts of the walls. Staff proposes condition **VIS-3** to ensure consistency with this guideline.

Visual Resources Table 3
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

LORS		Consistency Determination Before Mitigation/ Conditions	Basis for Consistency
Source	**Description of Principles, Objectives, and Policies**		
Community Design Guidelines (continued)	Landscaping. Building Foundation Plantings: Plantings at the foundation of a structure (including a wall or fence) are intended to soften the transition from the surrounding ground or paved areas to the vertical plane of the structure. Generally shrubs and trees are utilized to create the desired effect. Front Yard Landscaping: The front yard (and any street yard) landscaping scheme for the majority of areas of the City calls for lawn and tree plantings on rolling berms up to three feet in height, but not exceeding a 3:1 slope. Shrubbery is used at the rear of the lawn area as building foundation planting or to screen parking areas. Additional accent plantings to compliment this scheme or other innovative landscape treatments are encouraged. City street tree species are determined by the City's Street Department. Groundcovers: Groundcovers other than lawn may be used in the interest of water conservation to compliment lawn areas or as a substitute for lawn other than in the front yard. The use of ivy is generally discouraged. Irrigation: Automatic irrigation systems are required by the City in the interest of water conservation and continued landscape maintenance. The design of the irrigation system shall be compatible with and adequate for the size and nature of the planter area. Minimum Planting Size: Trees: Minimum 15 gallon (gal.) on private property; minimum 15 gal. street tree; minimum 24 or 36 inch box to replace a mature tree to be removed Shrubs: Minimum 5 gal. Groundcovers: Minimum 12 inches on center (flats); minimum 18 inches on center (1 gal.)	Partially Consistent	The applicant has not proposed landscaping at the foundation of all walls (see discussion above on Screening Walls). For those walls proposed to be screened, the applicant has proposed a variety of shrubs and trees to soften their appearance. Inconsistent with the guidelines, the landscaping plan does not depict rolling berms within the required street yards along Lafayette Street and Duane Avenue. Consistent with the guidelines, the applicant is proposing groundcovers (Carmel Creeper and Star Jasmine) other than lawn within the street yard areas. Consistent with the guidelines, the applicant proposes an automatic irrigation system with low precipitation sprinkler heads. Consistent with the guidelines, the planting sizes of all trees (Coast Redwoods) would be 24-inch box, and all shrubs would be 5 gallon. The planting notes for the groundcovers (1 gallon at 5 feet on center, and cuttings at 3 feet on center) are not consistent with the guidelines. Condition of certification **VIS-3** would ensure that the landscaping plan is installed and maintained consistent with the City's guidelines.

Visual Resources Table 3
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

LORS		Consistency Determination Before Mitigation/ Conditions	Basis for Consistency
Source	**Description of Principles, Objectives, and Policies**		
Community Design Guidelines (continued)	Lighting: Lighting should be directed away from nearby properties and streets. Lighting fixtures should generally not exceed the height of the building or a maximum height of 35 feet. Uplighting should be minimized or carefully designed to avoid distracting pedestrians and autos and to avoid contributing to the overall illumination of the nighttime sky.	Potentially Inconsistent	The applicant proposes to install lighting with shields and to direct lighting downward to avoid dispersal of lighting onto adjacent properties. Staff has expanded upon these measures in proposed condition of certification **VIS-4** to ensure that the backscatter to the nighttime sky and light trespass outside the project boundaries are minimized, and so that project lighting is designed consistent with these guidelines. The project would likely include light fixtures mounted at heights greater than 35 feet, which may be inconsistent with this guideline.
Community Design Guidelines (continued)	Signs. Content: Sign content is limited to the name of the project and/or business name and type of business. Telephone numbers and additional information are discouraged as they tend to clutter signs and should be displayed in small scale at business entrances. Design and Materials: Design shall be compatible with the project in style, scale, colors and materials. Materials shall be durable and of the highest quality. All sign copy shall have a professional appearance. Location: Project signs shall be located at focal points, preferably near driveways or at street corners and oriented to be visible on approach to the site; freestanding signs should be located within landscaped areas.	Consistent/To be determined	The applicant proposes to install minimal signage at the site. Signs would be constructed using non-glare materials and unobtrusive colors. Staff has proposed condition of certification **VIS-7** to ensure that project signs conform to the City's sign guidelines.

MITIGATION

APPLICANT'S PROPOSED MITIGATION MEASURES

The applicant proposes to incorporate the following design features into the project plan to reduce the visual impacts of the project and to enhance the visual appearance of the power plant facilities.

Power Plant and Associated Facilities

Site planning and landscape design, including the following:

- Siting of the major structures on the western portion of the site so they would be partially concealed by surrounding industrial buildings and the Kifer Receiving Station. Placement of the two-story Operations Building, small water tank, and other smaller structures on the eastern edge of the site to create a transition in scale, from low profile on the east to taller structures on the west.
- Placement of the cooling tower south of an existing three-story building so views of the structure would be partially blocked as viewed from Duane Avenue and Highway 101. The cooling tower and Kifer Receiving Station would partially screen views of the turbine buildings and visually conceal the cable tray structure in between the turbines, as viewed from Lafayette Street. Siting of the switchyard at the southwest corner of the site to reduce its visibility from public rights-of-way.
- Construction of a 25-foot-high sound wall along the north side of the site and a 15-foot-high wall along the west side of the site would partially screen views of the switchyard and turbine structures from the surrounding industrial properties and reduce or shield nighttime lighting. Construction of a 20-foot-high wall along the northeast side of the site would screen views of the cooling tower chemical tanks, ammonia storage tank, water pumps, condenser, and steam turbine.
- Installation of an 8-foot-high perimeter wall around the eastern portion of the power plant site to screen the reverse osmosis system equipment and vehicles in the parking lot from view.
- Installation of street trees and landscaping along Duane Avenue and Lafayette Street to soften the visual appearance of the sound walls and reduce the visual impacts of the project structures.

Architectural design features include:

- All power plant and switchyard structures would be painted neutral colors to visually blend with each other and with the surrounding industrial buildings.
- All large power plant structures would have architectural treatment to ensure conformance with the City's Community Design Guidelines. For example, the walls of the cooling tower would be relieved by horizontal, alternating bands of color.
- The HRSG housing would have an accordion-style "ribbed" appearance and would be painted a soft neutral color to visually blend with the turbine generator housing.
- The operations building would be designed (for example, with a textured façade) and painted to complement and match the adjacent mini-storage area between the site and Highway 101.

Additional features would include the following:

- Color treatment of walls to blend with the power plant structures and surrounding buildings.

- Textured and decorative wall treatments to reduce the solid mass that these walls would otherwise have.
- Minimal signage and construction of project signs using non-glare materials and unobtrusive colors. The design of any signs required by safety regulations would need to conform to the criteria established by those regulations.
- Night lighting would be limited to areas required for safety, security, or operations, and lighting would be installed with shields and directed downward to avoid dispersal of lighting onto adjacent properties. 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.
- Directional light fixtures with shields would be used to reduce light scatter and glare.

Switchyard and Transmission Line

- The switchyard area would be located where it cannot be seen from Highway 101 or any major arterial streets. Installation of a 15-foot-high wall along the west boundary of the site to reduce the visibility of the switchyard structures.
- The bus duct structure, transformers, and circuit breakers would be a light color with a neutral finish to visually blend with light colored buildings surrounding the site.
- The existing 115 kV lattice tower would be replaced with simpler, trim profile tubular steel structures (two poles with crossarms).
- Six overhead 115 kV transmission lines that now connect with the Kifer Receiving Station would be installed underground, allowing removal of numerous wooden transmission towers and lines.
- All towers and switchyard structures would be painted a neutral finish to reduce glare and reflection from equipment and enable them to blend with the surrounding background.
- Non-specular conductors would be used and insulators would be non-reflective and non refractive.

Pipelines

- Where the pipeline would be installed through vegetation-covered areas, new topsoil would be imported to fill the top of trenches, ground surfaces would be restored to their original condition, and any vegetation removed during the construction process would be replaced.
- All piles of soil, broken-up concrete and asphalt paving, as well as all other debris resulting from trenching along the streets would be removed from the area, and the area would be restored to original conditions.
- After the pipelines are installed and trenches are backfilled, streets would be re-paved and re-striped to conform to existing conditions.

ADDITIONAL MITIGATION PROPOSED BY STAFF

Energy Commission staff generally agrees with the applicant's mitigation proposals. However, staff's position is that some of these proposals need to be more precisely

developed. The following paragraphs discuss additional staff-proposed measures to mitigate project impacts.

Mitigation of Construction Impacts

Construction of the proposed gas pipeline would result in adverse visual impacts. Staff has proposed Condition of Certification **VIS-1** (temporary visual screening, restoration of storage and staging areas) to ensure that visual impacts resulting from pipeline construction do not become significant. Effective implementation of **VIS-1** would minimize the intrusiveness of gas pipeline construction and keep construction visual impacts to less than significant levels.

Mitigation of Impacts of Proposed Structures

As presently proposed, the project structures would result in adverse and significant direct visual impacts when viewed at a foreground distance from Lafayette Street (as illustrated in the view from KOP 2), and significant cumulative impacts at KOPs 1, 2, and 6.

In staff's opinion the landscaping scheme originally proposed in the AFC (as shown in **Visual Resources Figure 4B**) would not screen the project structures sufficiently enough and within a reasonable amount of time (5 years after planting) to reduce the impact to a less than significant level. In response to a staff data request, the applicant prepared a conceptual landscape plan (**Visual Resources Figure 11**), and new simulations from KOP 2 (**Visual Resources Figures 10A** and **10B**) and KOP 6 (**Visual Resources Figures 11A** and **11B**) that reflect this plan, in an effort to visually screen more of the facility from southbound Lafayette Street. The current proposal is to plant fast growing Coast Redwoods along Lafayette Street and Duane Avenue. Though these trees quickly grow very tall, they are conical shaped and planted far apart, leaving substantial gaps between the trees that allow views of the project structures. These trees would not grow wide enough to fill in the gaps until sometime near maturity (20 years). Ideally, a staggered row of Coast Redwoods planted fairly close together would provide more screening. However, the planting area along Lafayette and the area along Duane Avenue east of the power plant entrance do not appear to be wide enough to accommodate a staggered row of redwoods, particularly due to the clearances that must be maintained between the trees and the overhead 60kV transmission line. The planting area along Duane Avenue west of the entrance is wide enough for a staggered row of redwoods; the overhead power line would not present a problem here. A staggered row of closely planted redwoods in this area would substantially screen the cooling tower structure as viewed from the Lafayette Street overpass to Highway 101. Staff believes the landscaping along Lafayette Street, and the portion of Duane Avenue east of the entrance, needs to be denser. Staff believes the Coast Redwoods should be planted closer together, on the order of 10-12 feet apart, as opposed to nearly 20 feet apart as depicted on the conceptual plan[3]. Staff has proposed **VIS-3** to enhance the effectiveness of the applicant's landscaping measures so the project's structural dominance can be minimized.

[3] According to *Sunset Western Garden Book*, for grove planting, redwoods can be planted seven feet apart.

Effective implementation of Conditions of Certification **VIS-2** (structure painting, treatment and design) and **VIS-3** (landscaping) would substantially lessen structural contrast and project dominance, thereby reducing the project's visual impacts (direct and cumulative) to less than significant levels. Implementation of Condition **VIS-3** would also reduce the adverse visual impacts of the sound walls and gas metering station on adjacent properties.

Mitigation of Project Lighting Impacts

Effective implementation of standard measures to reduce offsite light and glare would keep lighting impacts to less than significant levels. Staff proposes **VIS-4** to mitigate project night lighting impacts.

Mitigation of Visible Plume Impacts

The applicant has proposed a plume-abated cooling tower to reduce adverse visual impacts of visible water vapor plumes. Staff proposes **VIS-6** to ensure that the frequency of occurrence of the cooling tower plumes is kept below levels of significance.

Mitigation of Impacts in Relation to CEQA Significance Criteria

As discussed previously, the proposed project would cause significant adverse visual impacts (both directly and cumulatively) with respect to Criterion 2 and 3 of the CEQA Guidelines. Effective implementation of the staff's proposed Conditions of Certification **VIS-2** and **VIS-3** would reduce these visual impacts to levels that would not be significant.

CONCLUSIONS AND RECOMMENDATION

Staff has concluded that project structures would cause significant adverse visual impacts (on a direct and cumulative basis) at key observation points 1, 2 and 6 (Lafayette Street). Effective implementation of staff's proposed Conditions of Certification **VIS-2** and **VIS-3** would reduce these impacts to less than significant levels. With the implementation of the applicant's proposed mitigation measures and staff's proposed conditions of certification, the project would be built consistent with local laws, ordinances, regulations, and standards related to visual resources.

Staff recommends that the Energy Commission adopt the following conditions of certification if it approves the project.

PROPOSED CONDITIONS OF CERTIFICATION

VIS-1 The project owner shall ensure that visual impacts of construction of the gas pipeline, metering station, and underground transmission line (if relocated offsite) are adequately mitigated. To accomplish this, the project owner shall require the following as a condition of contract with its contractors involved in constructing the gas pipeline, metering station, and underground transmission line:

The construction site and staging and material and equipment storage areas for gas metering station construction shall be visually screened from view from adjacent residences with temporary opaque or semi-opaque fencing. Fencing

will be of an appropriate design and color, as determined by the Compliance Project Manager (CPM). All evidence of pipeline and offsite underground transmission line construction activities, including ground disturbance in staging and storage areas, shall be removed, and all disturbed areas shall be remediated to an original or improved condition upon completion of construction, including the replacement of any vegetation or paving removed during construction. Any replacement plantings shall be monitored for a period of three years to ensure survival. During this period, all dead plant material shall be replaced.

The project owner shall submit to the CPM for review and approval and to the City of Santa Clara for review and comment a specific screening and restoration plan whose proper implementation will satisfy these requirements.

The project owner shall not implement the screening and restoration plan until receiving written approval from the CPM.

Verification: At least 60 days prior to construction of the gas pipeline and metering station, the project owner shall submit the screening and restoration plan to the CPM for review and approval and to the City of Santa Clara for review and comment.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification, the project owner shall submit to the CPM a revised plan.

The project owner shall notify the CPM within seven days after installing the temporary screening that it is ready for inspection.

The project owner shall notify the CPM within seven days after completing surface restoration that the restored areas are ready for inspection.

VIS-2 Prior to first turbine roll, the project owner shall treat the surfaces of all project structures, buildings, and walls visible to the public such that: their colors minimize visual intrusion and contrast by blending with the landscape; their surfaces do not create excessive glare; and they are designed consistent with the City of Santa Clara Community Design Guidelines. The project owner shall submit to the CPM for review and approval and to the City of Santa Clara for review and comment, a specific treatment and design plan, the proper implementation of which will satisfy these requirements. The submittal to the CPM shall include the City's comments. The treatment and design plan shall include:

a) Specification, and 11" x 17" color photo simulations at life size scale when viewed at 18 inches, of the treatment/design 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 wall and/or fence specifying the color(s) and finish proposed for each (colors must be identified by name and by vendor brand or a universal designation). The transmission line structures shall

have a neutral gray finish. The conductors shall be non-specular conductors and non-reflective, and the insulators shall be non-refractive;

c) Two sets of brochures and/or color chips for each proposed color;

d) A detailed schedule for completion of the treatment; and

e) 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 and design plan to the CPM and the City of Santa Clara at least 60 days prior to ordering the first structures that are color treated during manufacture.

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 after that notification.

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-3 The project owner shall prepare and implement a landscape plan to substantially screen views of the power plant and gas metering station and to soften views of the perimeter sound walls. Landscaping shall consist of a mix of trees, shrubs, vines, and groundcovers. Fast growing evergreen species shall be used to ensure that maximum screening of the project is achieved as quickly as possible and is effective year-around. Landscaping shall be provided along Lafayette Street and Duane Avenue of sufficient density and height, to substantially screen project structures from southbound views from Lafayette Street within five years after completion of construction. Landscaping shall be planted around the gas metering station to substantially screen it from view from residences at Gianera Street and Wilcox Avenue. Suitable irrigation shall be installed to ensure survival of all plantings. Landscaping shall be provided, including plantings to soften the appearance of the sound walls from public rights-of-way and adjacent properties, and installed consistent with the City of Santa Clara Zoning Ordinance and Community Design Guidelines.

The project owner shall submit a landscaping plan to the CPM for review and approval and to the City of Santa Clara for review and comment. The submittal to the CPM shall include the City's comments. The plan shall include:

a) 11”x17” color photo simulations of the proposed landscaping for the power plant, as viewed from KOPs 2 and 6, and for the gas metering station, as viewed from the residences to the west, at 5 years after planting and at maturity;

b) A detailed list of plants to be used, specifying their rates of growth and times to maturity and their proposed size and age at planting;

c) Maintenance procedures, including any needed irrigation and a plan for routine annual or semi-annual debris removal for the life of the project; and

d) A procedure for monitoring for and replacement of unsuccessful plantings for the life of the project.

The project owner shall not implement the plan until the project owner receives approval of the submittal from the CPM.

Verification: The project owner shall submit the landscaping plan prior to first turbine roll and at least 90 days prior to installing the landscaping.

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 landscaping that the plantings 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.

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. Lighting shall be installed consistent with the City of Santa Clara Zoning Ordinance and Community Design Guidelines. 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 reduce light trespass outside the project boundary while taking into consideration security concerns.

b) All lighting shall be of minimum necessary brightness consistent with worker safety and security concerns;

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; and

d) Plant operations staff shall 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 90 days prior to ordering any permanent exterior lighting, the project owner shall contact the CPM to arrange a meeting to discuss the documentation required in the lighting mitigation plan.

At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to the CPM for review and approval and to the City of Santa Clara for review and comment a plan that describes the measures to be used and demonstrates that the requirements of the condition will be satisfied. The submittal to the CPM shall include the City's comments. The project owner shall not order any exterior lighting until it receives CPM approval of the lighting mitigation plan.

Prior to first turbine roll, the project owner shall notify the CPM that the lighting has been completed and is ready for inspection.

The project owner shall report any complaints about permanent lighting and provide documentation of resolution in the Annual Compliance Report for that year.

VIS-5 To the extent required by the City of Santa Clara Community Design Guidelines, the project owner shall minimize the visibility of mechanical equipment located on top of the heat recovery steam generator (HRSG) units from public rights-of-way and nearby properties. The color or colors of any screening materials shall minimize visual intrusion and contrast by blending with the landscape and other project structure colors.

The project owner shall develop a plan for screening or otherwise minimizing the visibility of mechanical equipment located on the HRSG units for CPM approval to ensure that the treatment is effective and does not unduly contrast with the surrounding landscape. The project owner shall also submit the plan to the City of Santa Clara for review and comment. The submittal to the CPM shall include the City's comments. The plan shall include:

1) Specification, and 11" x 17" color photo simulations at life-size scale as seen from a northbound viewpoint on Lafayette Street (between KOPs 1 and 2), Highway 101 (KOP 4), and Raymond Street (KOP 5) of the proposed measure or measures to reduce the visibility of the equipment;

2) A detailed schedule for completion of the measures; and,

3) A procedure to ensure proper maintenance of the measures for the life of the project.

The project owner shall not implement the plan until approved by the CPM.

Verification: At least 60 days prior to start of construction, the project owner shall submit the plan for reducing the visibility of the HRSG equipment to the CPM for review and approval.

If the CPM notifies the project owner of any revisions that are needed before the CPM will approve the plan, within 30 days of receiving that notification the project owner shall submit to the CPM a revised plan.

Not less than 30 days prior to the start of commercial operation, the project owner shall notify the CPM that the screening measures are ready for inspection.

The project owner shall provide a status report regarding maintenance of the screening measures in the Annual Compliance Report.

VIS-6 The project owner shall reduce cooling tower visible vapor plumes through the use of a dry-cooling section that has a stipulated plume abatement design point of 35 degrees Fahrenheit and 85 percent relative humidity. An automated control system will be used to ensure that plumes are abated to the maximum extent possible for the stipulated design point.

Verification: At least 30 days prior to the first turbine roll, the project owner shall provide to the CPM for review and approval the specifications for the automated control systems and related systems and sensors that will be used to ensure maximum plume abatement from the dry-cooling section of the cooling tower.

VIS-7 The project owner shall design project signs using non-reflective materials and unobtrusive colors. The project owner shall ensure that trash disposal areas are fully screened from view from pubic rights-of-way. The project owner shall ensure that signs and trash disposal areas are installed consistent with the City of Santa Clara Zoning Ordinance Section Sec. 26-13 and the Community Design Guidelines. The design of any signs required by safety regulations shall conform to the criteria established by those regulations.

Verification: At least 60 days prior to installing signs, and construction of trash disposal areas, the project owner shall provide information to the City of Santa Clara for review and comment, and to the CPM for review and approval demonstrating that the requirements of the condition will be met. The submittal to the CPM shall include the City's comments.

The project owner shall not install signs or construct trash disposal areas until the project owner receives approval of the submittal from the CPM.

If the CPM notifies the project owner that revisions are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

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SVP (Silicon Valley Power) SVP 2002b. Applicant Responses to Data Requests. Submitted to the California Energy Commission, December 23, 2002 with supplemental responses submitted on January 15 and 23, 2003.

Walters, William. 2003. Pico Power Project Visible Water Vapor Plume Analysis. Testimony of William Walters. January 2003.

APPENDIX VR – 1: SUMMARY OF VISUAL RESOURCES ANALYSIS

APPENDIX VR – 2: VISIBLE WATER VAPOR PLUME ANALYSIS

Testimony of William Walters

INTRODUCTION

The following provides the assessment of Pico Power Project (PPP) cooling tower and heat recovery steam generator (HRSG) exhaust stack visible plumes. Staff completed a modeling analysis for the Applicant's proposed abated cooling tower and unabated HRSG designs.

PROJECT DESCRIPTION

The applicant has proposed a linear 3-cell plume abated wet cooling tower. The plume abatement design point is specified as 35°F and 85 percent relative humidity (RH).

The project includes two separate turbine/heat recovery steam generator (HRSG) systems, each with separate exhaust stacks. The CTGs are model LM6000 Sprint frame type engines supplied by GE Power Systems. Water injection would be used for NO_x control and duct firing would be used for peak generation. The applicant has not proposed to use any methods to abate visible plumes from the HRSG exhausts.

The PPP facility will be located on City of Santa Clara property at 850 Duane Avenue. An industrial setting, including the San Jose Airport to the south and Highway 101 to just to the east, generally surrounds the PPP project site area.

COOLING TOWER VISIBLE PLUME MODELING ANALYSIS

COOLING TOWER DESIGN PARAMETERS

The following cooling tower design characteristics, presented below in **Table 1**, were determined through a review of the applicant's AFC (SVP 2002a).

Visual Resources Appendix VR-2 Table 1 –
Cooling Tower Operating and Exhaust Parameters

Parameter	New Cooling Tower Design Parameters
Number of Cells	3 (1 x 3)
Stack Height	18.9 meters (62 feet)
Single Cell Exhaust Diameter	8.9 meters (29.3 feet)
Plume Abatement Design Point	35°F and 85% Relative Humidity

Source: AFC (SVP 2002a) and Electronic Air Quality Modeling Files

The applicant also provided fogging frequency curves from GEA Integrated Cooling Technologies Inc (SVP 2002b). These fogging frequency curves, one with duct firing and one without duct firing, were used to determine the predicted plume frequency for the plume abated cooling tower.

COOLING TOWER VISIBLE PLUME MODELING ANALYSIS

It was necessary for staff to extrapolate the fogging frequency curve as it approached 100 percent RH because GEA's fogging frequency curves did not continue much higher than 97 percent RH, or 93 percent RH for the no duct firing and duct firing curves, respectively. Staff estimated the asymptotic approach to 100 percent RH in order to complete each of the fogging frequency curves. **Table 2** provides the visible plume frequency results using a five-year (1991-1995) meteorological data set from the San Jose Airport.

Visual Resources Appendix VR-2 Table 2 – Staff Predicted Hours with Cooling Tower Steam Plumes San Jose Airport 1991-1995 Meteorological Data

	Available (hr)	Plume (hr)	Percent
Full load with Duct Firing			
All Hours	43,634	8,057	18.5%
Daylight Hours	22,169	1,604	7.2%
Seasonal Daylight Hours	9,933	1,434	14.4%
Full load no Duct Firing			
All Hours	43,634	2,396	5.5%
Daylight Hours	22,169	454	2.0%
Seasonal Daylight Hours	9,933	446	4.5%

*Seasonal conditions occur anytime from November through April.

These results confirm that the visible plume formation will mainly occur during the cold weather months, with the majority of plume formation occurring at night or early morning.

For the proposed cooling tower during seasonal daylight hours, the minimum relative humidity where a visible plume is predicted is 86 percent at 34°F when operating without duct firing, and 65 percent at 32°F when operating with duct firing. For plumes predicted during seasonal daylight hours the relative humidity is predicted to be equal to or greater than 95 percent over 85 percent of the time when operating without duct firing and over 50 percent of the time when operating with duct firing. The majority of the hours with a relative humidity equal to or greater than 95 percent are likely to be during periods of fog or rain or otherwise be visually impaired.

A plume frequency of 10 percent of seasonal (November through April) daylight clear hours is used as a plume impact study threshold trigger. It is expected that duct firing would not occur during the early morning hours that are the most favorable to plume formation. Therefore, the actual plume frequencies are expected to be less then 10 percent of seasonal daylight hours and well less than 10 percent of seasonal daylight clear hours (see below).

CLOUD COVER DATA ANALYSIS METHOD

A plume frequency of 10 percent of seasonal (November through April) daylight clear hours is used as an initial plume impact threshold trigger; if exceeded, the analysis is further refined by determining plume dimensions during the seasonal daylight clear hours. The clear hours determination methodology is provided below:

Energy Commission management has identified a “clear” sky category during which plumes have the greatest potential to cause adverse visual impacts. Typically, meteorological data sets used in plume analyses categorize total sky cover and opaque sky cover in 10 percent increments. Staff includes in the “Clear” category a) all hours with total sky cover equal to or less than 10 percent plus b) half of the hours with total sky cover 20-100 percent that have sky opacity equal to or less than 50 percent. The rationale for including these two components in this category is as follows: a) plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or less than 10 percent, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and b) for a substantial portion of the time when total sky cover is 20-100 percent and the opacity of sky cover is relatively low (equal to or less than 50 percent), clouds do not substantially reduce contrast with plumes; staff has estimated that approximately half of the hours meeting the latter sky cover and sky opacity criteria can be considered high visual contrast hours and are included in the “clear” sky definition.

The meteorological data set used in this analysis (which was obtained from the BAAQMD) does not include weather phenomena (i.e. rain and fog) or sky cover data. The actual plume hours during clear conditions would be significantly less than the total seasonal daylight values presented in this analysis. It is expected that the majority of daylight plumes hours determined for the cooling tower and HRSGs would occur under visually impaired ambient conditions, either during rain or fog or under non-“clear” sky conditions.

HRSG VISIBLE PLUME MODELING ANALYSIS

Staff evaluated the applicant’s AFC (SVP 2002a, AFC Appendix 8.1B) and performed an independent psychrometric analysis and dispersion modeling analysis. The Combustion Stack Visible Plume (CSVP) model was used to estimate the worst-case potential plume frequency for each HRSG stack.

HRSG PARAMETERS

Based on the stack exhaust parameters anticipated by the applicant for each HRSG stack, the frequency of visual plumes can be estimated. The operating data for these stacks are provided in **Table 3**.

Visual Resources Appendix VR-2 Table 3 – HRSG Exhaust Parameters

Parameter	HRSG Exhaust Parameters			
Stack Height	95 feet			
Stack Diameter	10.0 feet			
Ambient Conditions	Relative Humidity (%)	Moisture Content (% by Mole)	Exhaust Flow Rate (klb/hr)	Exhaust Temp (°F)
Full load with Duct Firing and Inlet Air Chilling [a]				
33 °F	80	11.9	1,106	224
61 °F	70	12.3	1,092	229
94 °F	25	12.3	1,092	234
Full load no Duct Firing and Inlet Air Chilling [a]				
33 °F	80	10.1	1,100	228
61 °F	70	10.6	1,086	230
94 °F	25	10.6	1,086	234

Source: AFC (PPP 2002a, Appendix 8.1B Table 8.1B-4) and Electronic Air Quality Modeling Files
For CSVP the analysis, values were extrapolated or interpolated between data points as necessary.
Note(s): a. No inlet air chilling at 33 °F.

HRSG VISIBLE PLUME MODELING ANALYSIS

Staff modeled the HRSG plumes using the CSVP model with a five-year meteorological data set from the San Jose Airport. **Table 4** provides the CSVP model visible plume frequency results.

Visual Resources Appendix VR-2 Table 4 –
Staff Predicted Hours with HRSG Steam Plumes
San Jose Airport 1991-1995 Meteorological Data

	Available (hr)	Plume (hr)	Percent
Full load with Duct Firing			
All Hours	43,634	6,475	14.8%
Daylight Hours	22,169	1,238	5.6%
Seasonal Daylight Hours*	9,933	1,176	11.8%
Full load no Duct Firing			
All Hours	43,634	3,025	6.9%
Daylight Hours	22,169	540	2.4%
Seasonal Daylight Hours*	9,933	533	5.4%

*Seasonal conditions occur anytime from November through April.

The plume frequencies are higher than might be expected for the given exhaust temperatures due to the large amount of water injection (55 gpm per turbine) being used, primarily for NO_x emissions control. For the proposed HRSGs, the maximum temperature where a visible plume is predicted is 56°F when the relative humidity is 100 percent when duct firing and 50°F when the relative humidity is 100 percent when operating without duct firing.

A plume frequency of 10 percent of seasonal (November through April) daylight clear hours is used as a plume impact study threshold trigger. Considering that duct firing is not expected to be the normal operating condition during the early morning winter hours when daylight plumes are predicted, the plume frequencies are expected to be less then

10 percent of seasonal daylight hours and well less than 10 percent of seasonal daylight clear hours.

CONCLUSIONS

Visible plumes from the proposed PPP plume abated cooling tower and HRSGs are not expected to occur greater than 10 percent of seasonal daylight clear hours.

REFERENCES

SVP (Silicon Valley Power) SVP 2002a. Application for Certification, Silicon Valley Power (02-AFC-3). Submitted to the California Energy Commission, October 7, 2002.

SVP (Silicon Valley Power) SVP 2002b. Applicant Responses to Data Requests. Submitted to the California Energy Commission, December 23, 2002 with supplemental responses submitted on January 15 and 23, 2003.

APPENDIX VR – 3

LIGHTING COMPLAINT RESOLUTION FORM

Pico Power Project City of Santa Clara, 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 VR – 4: VISUAL RESOURCES FIGURES

WASTE MANAGEMENT

Testimony of Ellen Townsend-Hough

INTRODUCTION

This Staff Assessment presents an analysis of issues associated with managing wastes generated from constructing and operating the proposed Pico Power Project (PPP). 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 the 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 U.S. Environmental Protection Agency 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 Santa Clara County Department of Environmental Health has the responsibility for administration and enforcement of the California Integrated Waste Management Act for non-hazardous solid waste at the proposed PPP. Local agencies are responsible for the administration and enforcement of the hazardous material laws. The City of Santa Clara Fire Department, Hazardous Materials Division, is the local agency that will regulate hazardous waste at PPP.

The City of Santa Clara Fire Department enforcement of the Uniform Fire Code, Article 80, the code requires that a Hazardous Materials Inventory Statement and a Hazardous Materials Management Plan be prepared.

SETTING

PROJECT AND SITE DESCRIPTION

The project site consists of two parcels of property, with the power plant site located on the southwest corner of Duane Avenue and Lafayette Street, and the gas compressor station site on the northeast corner of Comstock and Lafayette Streets. The project is surrounded by heavy industrial and light industrial land uses. The proposed PPP would be located on 2.86-acre project site located owned by the City of Santa Clara (SVP 2002, Section 8.14.1).

The proposed PPP would be a combined-cycle facility, comprised of two natural gas-fired combustion turbine generators; a single condensing steam turbine generator; a deaerating surface condenser; a mechanical draft plume-abated cooling tower; and other related equipment and infrastructure. A two-mile, 12-inch diameter pipeline would carry natural gas from PG&E Line 132 to a gas compressor station, and then a 500-foot pipeline would convey gas from the gas compressor station to PPP. A new 900-foot, 18-inch diameter pipeline would deliver the project's wastewater discharge from the PPP site south in Lafayette Avenue to a 27–inch water main in Central Expressway (SVP 2002, page 1-1).

The applicant completed and submitted a Phase I Environmental Site Assessment (ESA) conducted according to American Society for Testing and Materials (ASTM) standards. SCS Engineers completed the power plant ESA in June of 2002. The Phase I ESA performed for the power plant identified areas of concern and recommended that a Phase II ESA be performed. Historical aerial photography shows the project site as vacant. The proposed site is located immediately north of Silicon Valley Power's Kifer Receiving Station and was used by the City of Santa Clara for access roads, parking, and storage for the station. The power plant project site contained various vehicles, industrial storage bins, oil-stained telephone poles, chopped wood, stockpiles of asphalt and other items. The City of Santa Clara's street sweepers were washed on the site for over 20 years. Also, numerous nearby sites recorded release of contaminants to the groundwater around the project site.

Foster Wheeler performed a Phase II ESA in September 2002 (SVP 2002, Section 8.14.1). The Phase II investigation for the power plant site consisted of a geophysical survey and soil and groundwater sampling and analysis. Results from the Phase II investigation indicated that the site does not contain detectable concentrations of total petroleum hydrocarbons (TPH) quantified as gasoline, diesel, or polychlorinated biphenyls in near-surface soils. All but two samples results for the total recoverable petroleum hydrocarbons (TRPH) were below the San Francisco Bay Regional Water Quality Control Board's (RWQCB) Risk-Based Screening Level (RBSL). Deeper soil samples indicated that the TRPH samples were not above the RBSL, determining that there was no significant threat to groundwater (SVP 2003).

The Santa Clara maintenance facility and police pistol range are currently located on the natural gas compressor site. A substation was previously located on the compressor site and there is a possibility of polychlorinated biphenyl (PCB) contamination on the site. A large trichloroethylene (TCE) groundwater plume exists south of the site. Foster Wheeler Environmental performed the Phase I ESA for the gas compressor station site in August of 2002. A Phase II ESA was also performed for the compressor site.

The Phase II investigation for the natural gas compressor site was conducted on October 29, 2002. The investigation consisted of a geophysical survey to locate underground utilities and soil and groundwater sampling and analysis. Results indicate that the site does not contain detectable concentrations of TRPH or polychlorinated biphenyls (PCBs) in near-surface soils. Test results also indicate that lead and pH concentrations are well below the SFRWQCB RBSLs and are representative of the native soil conditions in the region. There are no volatile organic compounds in the groundwater beneath the site (SVP 2003).

PROJECT SPECIFIC IMPACTS

CONSTRUCTION

Site preparation and construction of the proposed generating plant, the compressor station, the gas pipeline and the wastewater pipeline would generate both nonhazardous and hazardous wastes in solid and liquid forms.

Nonhazardous Solid Wastes

Anticipated nonhazardous solid wastes generated during construction are detailed in Section 8.14.2.1 of the AFC (SVP 2002). Approximately 40 tons of wood, paper, glass and plastics, 15 tons of excess concrete, and 5 tons of scrap metal could be generated during project construction. Wherever possible and practical, these wastes would be recycled. Nonrecyclable wastes would be collected and disposed of in a Class III landfill. A possible exception might include the disposal of the waste concrete in a clean fill site if one is available.

Nonhazardous Liquid Wastes

Nonhazardous liquid wastes would be generated during construction, including sanitary wastes, equipment washwater, stormwater runoff, and wastewater from the gas pipeline hydrotesting process. If excavation dewatering occurs, additional nonhazardous wastewater would be generated.

Sanitary waste would be collected in portable toilet facilities. Equipment washwater would be contained at the designated wash sites and disposed of offsite. Stormwater runoff would be managed according to an approved plan developed by the construction contractor and is discussed in more detail in the **Soil and Water Resources** section of this document.

The wastewater produced from the natural gas pipeline and metering station would include wastewater from pressure testing the gas supply line after construction.

Filtering would be used to collect sediment and welding fragments from the gas supply pipeline hydrostatic test water (SVP 2002 page 8.14-4). Water that is not contaminated would be discharged to the City of Santa Clara sanitary sewer in conformity with applicable regulatory requirements. Contaminated water would be delivered to a permitted off-site treatment, storage and disposal (TSD) facility.

Hazardous Wastes

Hazardous wastes anticipated to be generated during construction are discussed in Section 8.14.2.1 of the AFC (SVP 2002). Solid hazardous wastes may include spent welding materials, oily rags and absorbent, spent batteries, and empty hazardous materials containers. Liquid hazardous wastes would include waste oil; flushing, cleaning and passivating (nitrate or phosphate solution) fluids; and waste solvents, paints and other material coatings. Wherever possible, the treatment method of choice for these wastes would be recycling at a permitted facility. The cleaning, flushing and passivating liquids would be sampled and characterized, and disposed of accordingly. Any non-recyclable hazardous wastes would be properly disposed of in one of three permitted Class I landfills discussed in Section 8.14.3.2 of the AFC.

The City of Santa Clara would be considered the generator of hazardous wastes at the PPP, and therefore responsible for compliance with all applicable LORS regarding these wastes. Construction contractors would be contractually bound by the city to comply with requirements for employee training, accumulation limits, record keeping, and reporting. The wastes thus accumulated would be removed from the site and transported by a certified collection company to a permitted transfer, storage and disposal (TSD) facility prior to the expiration of the 90-day limit (SVP 2002, p. 8.14-5).

OPERATION

The proposed PPP would generate both nonhazardous and hazardous wastes in solid and liquid forms under normal operating conditions. Non-hazardous wastewater will be the primary waste generated.

Nonhazardous Solid Wastes

Nonhazardous solid wastes generated during plant operation are expected to include rags, turbine air filters, machine parts, electrical materials, empty containers, and typical worker and small office wastes. Approximately 20 cubic yards of these wastes are projected to be generated annually (SVP 2002, p. 8.14-5).

Nonhazardous Liquid Wastes

The wastewater streams from the PPP site will be the cooling tower and process blowdown, sanitary wastewater, and plant drainage (SVP 2002, page 7-2). Liquid wastes are discussed in more detail in the **Soil and Water Resources** section of this document.

Hazardous Wastes

Hazardous wastes anticipated to be generated during routine project operation include waste lubricating 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 8.14-1 in the AFC lists the anticipated hazardous wastes along with their origin, composition, estimated quantity, hazard class, and disposal method. Most of the wastes would be generated in relatively small quantities and would be recycled by certified recyclers. Acidic and alkaline cleaning wastes would be disposed of offsite. The emission control catalysts would require regeneration every three to five years, resulting in the need to dispose of a total of 25,000 pounds of waste material every three to five years (SVP 2002, Table 8.14-1). Chemical materials collected in drains as a result of spillage, overflows, and maintenance operations will be neutralized onsite (if necessary) and directed into the cooling tower basin. Elementary neutralization is a type of hazardous waste treatment under California regulations (Cal. Code Regs., tit. 22, § 67450.1 et seq.) and requires a permit from the Department of Toxic Substances Control. In addition, Table 8.14-1 of the AFC notes that up to 60 pounds per year of cooling tower sludge will normally require disposal in a Class II facility, but could sometimes require disposal as a hazardous waste.

IMPACT ON EXISTING WASTE DISPOSAL FACILITIES

Nonhazardous waste disposal sites suitable for disposal of project-related construction and operation wastes are identified in Table 8.14-2 of the AFC (SVP 2002). During construction of the proposed project, 60 tons of nonhazardous waste are anticipated to be generated. This would consist of 40 tons of wood, glass, paper, and plastic, 15 tons of concrete, and 5 tons of metal. Recycling would reduce much of the wastes, including paper, wood, glass, plastic, and scrap metal. Project operation will generate minimal amounts of nonhazardous waste, on the order of 20 cubic yards per year. Thus, the total amount of nonhazardous waste generated from project construction and operation will contribute only a fraction of 1 percent of available landfill capacity. Staff concludes that this potential impact will be less than significant.

Section 8.14.3.2 of the AFC indicates that of the 250 RCRA TSD facilities in California listed by the U.S. EPA, the closest to the proposed PPP is a Safety-Kleen Corporation in San Jose. The Safety-Kleen facility can also store and transfer all hazardous wastes except radioactive and medical wastes. There is another Safety-Kleen facility in Oakland. The Oakland facility can store and transfer several hazardous wastes, including solvents, paint, and batteries. Oil is recycled at Safety-Kleen.

The AFC lists three Class I landfills in California that are permitted to accept hazardous waste: at Chemical Waste Management in King's County, Buttonwillow in Kern County, and Westmoreland in Imperial County (SVP 2002, page 8.14-9). In total, more than 21.9 million cubic yards of hazardous waste disposal capacity is available 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.

Much of the hazardous waste generated during facility construction and operation would be recycled, such as used oil and spent catalysts. The volume of hazardous waste from PPP requiring off-site disposal would be a very small fraction (less than 0.01 percent) of the existing combined capacity of the three Class I landfills, and would not significantly impact the capacity or remaining life of any of these facilities.

MITIGATION

In section 8.13.6 of the AFC the applicant states that the handling and management of wastes at the proposed PPP 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, and
4. Disposal of only those wastes that cannot be reduced, treated or recycled.

Sections 8.14.2.1 and .2 of the AFC discuss waste management measures PPP would employ during the construction and operation phases to manage and mitigate the impacts of the generation of liquid and solid non-hazardous and hazardous wastes.

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 would adequately assure that no significant adverse environmental impacts will result from the management and disposal of project-related waste.

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Energy Commission staff concludes that the proposed Santa Clara Pico Power Project would 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 PPP and its construction contractor would be required to obtain hazardous waste generator identification numbers from the DTSC. Accordingly, both PPP and its construction contractors 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 PPP if certain threshold quantities of hazardous wastes are generated on an annual basis (please see **Hazardous Materials** for further information).

CUMULATIVE IMPACTS

As proposed, the quantities of nonhazardous and hazardous waste generated during construction and operation of the PPP would add to the total quantities of waste generated in the City of Santa Clara and the State of California. However, because (a) the waste would be generated in small quantities, (b) recycling efforts would be prioritized wherever practical, and (c) capacity is available in a variety of disposal

facilities, these added quantities would not result in significant waste management impacts to any hazardous or nonhazardous landfill.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the population of people of color is greater than 50 percent within a six-mile radius of the proposed PPP (please refer to **Socioeconomics Figure 1** in this Staff Assessment), and Census 2000 information that shows the low-income population is less than 50 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

Section 8.14.4.3 of the AFC discusses PPP's responsibilities for waste management in the event of a temporary facility closure due to a disruption in the supply of natural-gas fuel or damage to the facility due to a natural disaster, or permanent closure due to a cessation of operations. The applicant indicates that a contingency plan for temporary closure will be prepared prior to facility startup. In addition, a Risk Management Plan (AFC Section 8.12.5.4) will be established containing additional procedures to be followed in the event of temporary closure due to plant damage or the possible release of a hazardous waste or material into the environment.

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 would 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 accumulation time to 90 days and requiring proper containment) would be adequate to avoid significant problems. In addition, staff's General Conditions for Facility Closure require 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, PPP would develop a facility General 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. The applicant indicates (see AFC

Section 8.13.6.3.2) that such a closure plan would emphasize the maximum recycling of facility components and 24-hour site security.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

AGENCY COMMENTS

Department of Toxic Substances Control, Cal-EPA
The Department of Toxic Substances Control issued data requests in a December 10, 2002 letter written to the Commission. In the letter, DTSC was concerned that a Phase II ESA would be completed for the power plant site and not the natural gas compressor station. In the letter, DTSC requested further evaluation that included additional testing and sampling of the soil and groundwater around both locations (DTSC 2003).

The applicant responded to DTSC's letter in their January 10, 2003 submittal (SVP 2003). The submittal from the applicant included a response to the letter and both Phase II ESAs. The applicant addressed DTSCs concerns and summarized the test results of the solid and water samples (SVP 2003). Staff has forwarded the January 10 submittal to DTSC for their review and comment.

CONCLUSIONS AND RECOMMENDATIONS

Management of the wastes generated during operation of the PPP would not result in any significant adverse impacts if the waste management measures proposed in the Application for Certification and the proposed Conditions of Certification are implemented. Staff is awaiting comments from DTSC on the Phase II ESAs submitted by the applicant prior to making final conclusions regarding potential impacts from management of construction wastes.

CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall provide the resume of a Registered Professional Engineer or Geologist, who shall be available for consultation during soil excavation and grading activities, to the Compliance Project Manager (CPM) for review and approval. The resume shall show experience in remedial investigation and feasibility studies.
The Registered Professional Engineer or Geologist shall be given full authority to oversee any earth moving activities that have the potential to disturb contaminated soil.

Verification: At least 30 days prior to the start of site mobilization the project owner shall submit the resume of the designated Registered Professional Engineer or Geologist to the CPM.

WASTE-2 If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Registered Professional Engineer or Geologist shall inspect the site, determine the

need for sampling to confirm the nature and extent of contamination, and file a written report to the project owner and CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the Registered Professional Engineer or Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the Registered Professional Engineer or Geologist, significant remediation may be required, the project owner shall contact (as appropriate) representatives of the San Francisco Regional Water Quality Control Board, the City of Santa Clara Fire Department, and the Berkeley Office of the California Department of Toxic Substances Control for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the Registered Professional Engineer or Geologist to the CPM within 5 days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-3 The project owner shall obtain a hazardous waste generator identification number from the Department of Toxic Substances Control prior to generating any hazardous waste.

Verification: The project owner shall keep its copy of the identification number on file at the project site and notify the CPM via the Monthly Compliance Report of its receipt.

WASTE-4 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the manner in which project-related wastes are managed.

WASTE-5 The project owner shall prepare a Construction Waste Management Plan and an Operation Waste Management Plan for all wastes generated during construction and operation of the facility, respectively, and shall submit both plans to the CPM for review and approval. The plans shall contain, at a minimum, the following:

- A description of all waste streams, including projections of rates and amounts generated and hazard classifications; and
- Methods of managing each type of waste, including treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation,

disposal requirements and sites, and recycling and waste minimization/reduction plans.

Verification: No less than 30 days prior to the start of site mobilization, the project owner shall submit the Construction Waste Management Plan to the CPM. The operation waste management plan shall be submitted no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions within 20 days of notification by the CPM.

In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year compared to the planned management methods.

REFERENCES

DTSC (Department of Toxic Substances Control) December 10, 2002. Submitted to the California Energy Commission on December 17, 2002.

SVP 2002. (Silicon Valley Power) Application for Certification, Volumes 1 and 2 (02-AFC-3). Submitted to the California Energy Commission on October 7, 2002. Docket date October 7 2002.

SVP 2003. (Silicon Valley Power) January 10, 2003. Responses to Data Requests from the Department of Toxic Substances Control. Submitted to the California Energy Commission on January 10, 2003.

WORKER SAFETY AND FIRE PROTECTION

Testimony of Geoff Lesh and Rick Tyler

INTRODUCTION

Worker safety and fire protection are 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 proposed facility would 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 whether the worker safety and fire protection measures proposed by the City of Santa Clara, DBA Silicon Valley Power (applicant) for the Pico Power Project (PPP) are 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 (OSH Act). This Act mandates safety requirements in the workplace and is found in Title 29 of the United States Code, § section 651 (29 U.S.C. §§ 651 through 678). Implementing regulations are codified at 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 OSH 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 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 U.S.C. § 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:

- Occupational Safety and Health Act of 1970 29 U.S.C. § 651 et seq.;
- Occupational Safety and Health Administration Safety and Health Regulations 29 C.F.R. §1910.1 - 1910.1500;
- 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 C.F.R. §§1910.1 – 1910.1500 and §§ 1952.170 – 1952.175.

STATE

California passed the Occupational Safety and Health Act of 1973 (Cal/OSHA) as codified in the California Labor Code § 6300 et seq. Regulations promulgated as a result of the Act are codified at Title 8 of the California Code of Regulations, beginning with sections 337-560 and continuing with sections1514 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)). Thus all Cal/OSHA health and safety standards meet or exceed the Federal requirements. California obtained federal approval of its State health and safety regulations, in lieu of the federal requirements codified at 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.

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 Cal. Code Regs., tit. 8, §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 C.F.R. §1910.1200), which established on the federal level an employee's "right to know" about chemical hazards in the workplace, and added the provision of applicability to public sector employers. A major component of this regulation is that project owners must make Material Safety Data Sheets (MSDSs) available to workers. MSDSs provide information on the identity, toxicity, and precautions to take when using or handling hazardous materials in the workplace.

Finally, California Code of Regulations, title 8 section 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:

- Cal. Code Regs., tit. 8, §339 - List of hazardous chemicals relating to the Hazardous Substance Information and Training Act;
- Cal. Code Regs., tit. 8, §337, et seq. Cal/OSHA regulations;
- Cal. Code Regs., tit. 24, § 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; and
- Health and Safety Code §§ 25500 - 25541 - Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at the facility.

LOCAL

The California Building Standards Code published at Title 24 of the California Code of Regulations section 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 & safety departments enforce the California Uniform Building Code.

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; 2) water supplies; 3) installation of fire protection and life safety systems; 4) fire-resistive construction practices; 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 Cal. Code Regs., 24 (Health and Safety 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 States' 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 (Title 24, California Code of Regulations, sections 901-907);
- California Building Code Title 24, California Code of Regulations, section 3 et seq.
- Uniform Fire Code, 1997

SETTING

Silicon Valley Power proposes to design, construct, and operate an electrical energy generating station within a portion of the City of Santa Clara, Santa Clara County, California. This facility is designated as the Pico Power Project (PPP). The PPP site is located on approximately 2.86 acres at 850 Duane Avenue in the City of Santa Clara, in Santa Clara County. A gas compressor station for the project would be located on the City of Santa Clara's maintenance yard, a 0.26-acre parcel at the corner of Lafayette and Comstock Streets in Santa Clara.

Fire support services to the site will be under the jurisdiction of the City of Santa Clara Fire Department. The closest City of Santa Clara Fire Station to the site is Station No. 2, located at 1900 Walsh Avenue, approximately 1 mile from PPP. Staff contacted the City of Santa Clara Fire department and determined that the response time to the project site is estimated to be less than 4 minutes (City average for all calls is 2 minutes 40 seconds). In the event of a fire emergency at the PPP, City of Santa Clara Central Dispatch would send Station 2. A second station, Station 6, located at 3575 De La Cruz, approximately 1.1 miles from PPP, might also be contacted, and would respond with an estimated response time of about 4 minutes. City of Santa Clara Fire Department Station 9, located at 3011 Corvin Dr., approximately 2.5 miles from the PPP, is the hazmat first responder. Response time for Station 9 is estimated to be 10 minutes. Firefighters from Station 2 and the Station 6 would secure the site until they arrived.

IMPACTS

PROJECT SPECIFIC IMPACTS

Industrial environments are potentially dangerous, during both 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 PPP to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. Staff concludes that with the Applicant's conformance to all applicable LORS, supplemented by staff's proposed condition, **WORKER SAFETY-1,** workers will be adequately protected from health and safety hazards.

During construction and operation of the proposed PPP there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas or flammable liquids, explosions, and over-heated equipment, 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. Staff concludes that with the Applicant's conformance to all applicable LORS, supplemented by staff's proposed condition, **WORKER SAFETY-2,** workers will be adequately protected from all fire hazards.

CUMULATIVE IMPACTS

Staff reviewed the potential for the construction and operation of the PPP, combined with existing industrial facilities, to result in impacts on the fire and emergency service capabilities of the City of Santa Clara Fire Department and found that cumulative impacts were insignificant. No request for additional equipment, staffing, or funding has been made by local authorities. Other power plant projects proposed for this same general area may change this opinion in the near future and should be resolved by the completion of the licensing process for the plant.

APPLICANT'S PROPOSED MITIGATION

A Safety and Health Program will be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

CONSTRUCTION SAFETY AND HEALTH PROGRAM

Workers at the PPP would be exposed to hazards typical of construction and operation of a gas-fired combined cycle facility. Construction Safety Orders are published at California Code of Regulations, title 8,section 1502 et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The Construction Safety and Health Program will include the following:

- Construction Injury and Illness Prevention Program (Cal Code Regs., tit. 8, § 1509);
- Construction Fire Protection and Prevention Plan (Cal Code Regs., tit. 8, § 1920); and
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 1514 - 1522).

Additional programs under General Industry Safety Orders (Cal Code Regs., tit. 8, §§ 3200 - 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§2299 - 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 450 - 544) will include:

- Electrical Safety Program;
- Unfired Pressure Vessel Safety Orders;
- 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;
- 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;
- Air Monitoring Program;
- Heat and Cold Stress Monitoring and Control Program; and
- Pressure Vessel and Pipeline Safety Program.

The Application for Certification (AFC) submitted by the Applicant includes adequate outlines of each of the above programs. Prior to construction of the PPP, detailed programs and plans will be provided pursuant to Condition of Certification **WORKER SAFETY-1**.

OPERATIONS AND MAINTENANCE SAFETY AND HEALTH PROGRAM

Upon completion of construction and prior to start of operation at the PPP, the Operations and Maintenance Safety and Health Program will be prepared. This operational safety program will include the following programs and plans:

- Injury and Illness Prevention Program (Cal Code Regs., tit. 8,§ 3203);
- Emergency Action Plan (Cal Code Regs., tit. 8,§ 3220);
- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (Cal Code Regs., tit. 8, § 3221); and
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 3401-3411).

In addition, the requirements under General Industry Safety Orders (Cal Code Regs., tit. 8, §§ 3200 - 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§2299 - 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 450 - 544) will be applicable to the project. Written safety programs for the PPP, which the applicant will develop, will ensure compliance with the above-mentioned requirements. The AFC includes adequate outlines of the Construction and Operation Health and Safety Programs, as well as the Emergency Action Program/Plan, the Construction and Operation Injury and Illness Prevention Programs, and the Fire Protection and Prevention Programs (SVP 2003, AFC Sections 8.16.2.1 and 8.16.2.2). Prior to operation of the PPP, all detailed programs and plans will be provided pursuant to Condition of Certification **WORKER SAFETY-2**.

SAFETY AND HEALTH PROGRAM ELEMENTS

The Applicant 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 will submit an expanded Construction and Operations Illness and Injury Prevention Program to Cal/OSHA for review and comment 30 days prior to both construction and operation of the project.

The IIPP will include the following components as presented in the AFC:

- Identity of person(s) with authority and responsibility for implementing the program;
- System ensuring employees comply with safe and healthy work practices;
- System facilitating employer-employee communications;
- Procedures identifying and evaluating workplace hazards, including inspections to identify hazards and unsafe conditions;
- Methods for correcting unhealthy/unsafe conditions in a timely manner;
- Methods of documenting inspections and training, and for maintaining records; and
- A training program for new, transferred, or promoted employees, supervisors and contractors introducing the program, new processes and equipment .

Emergency Action Plan

California regulations require an Emergency Action Plan (Cal Code Regs., tit. 8, § 3220). The AFC contains a satisfactory outline for an emergency action plan (SVP 2001a, AFC Section 8.16.2.2). The outline lists 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;
- 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 (Cal Code Regs., tit. 8, § 3221). The AFC describes a proposed fire prevention plan that is acceptable to staff. The plan will include the following topics:

- Responsibilities of employees and management;
- Procedures for fire control;
- Fixed and portable fire-fighting equipment;
- Housekeeping;
- Employee alarm/communication practices;
- Servicing and refueling areas;
- Training; and
- Flammable and combustible liquid storage.

Staff proposes that the Applicant submit a final Fire Protection and Prevention Plan to the California Energy Commission Compliance Project Manager (CPM) and the City of Santa Clara Fire Department 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 (Cal Code Regs., tit. 8, § 3380-3400). The Pico Power Project operational environment will require the availability of PPE.

Information provided in the AFC indicates that prior to commencing any work requiring use of PPE, all employees required to use PPE will be checked for proper fit and to see if they are medically capable of wearing the equipment. 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. All safety equipment will meet NIOSH or ANSI standards and will carry markings, numbers, or certificates of approval. Respirators will meet NIOSH and California Department of Health and Human Services Standards. Each employee will 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.

Operations and Maintenance Written Safety Program

In addition to the specific plans listed above, there are additional LORS applicable to the project, which are called "safe work practices." Both the Construction and the Operations Safety Programs will address safe work practices under a variety of programs. The components of these programs 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 will be trained in the safe work practices described in the above-referenced safety programs.

FIRE PROTECTION

Staff reviewed the information regarding available fire protection services and equipment (SVP 2002, AFC Sections 2.16.2.1 and 2.16.2.2) to determine whether workers would be adequately protected and if construction and operation of the project would affect the fire protection services in the area. Staff agrees with the Applicant that the project should 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 City of Santa Clara Fire Department. The Applicant intends to meet the minimum fire protection and suppression requirements as mandated by the City of Santa Clara Fire Code, NFPA Standards, and the UFC. Elements include both fixed and portable fire extinguishing systems. Raw water for use as fire water would be supplied by the City of Santa Clara, with backup supply coming from a to-be-drilled groundwater well on the project site capable of delivering 1,000 – 1,500 gpm. Staff has contacted both the Fire Marshal and the Deputy Fire Chief of the City of Santa Clara Fire Department to determine their assessment of the adequacy of available fire protective and hazmat response capabilities. Both expressed that they felt adequate resources were available.

A fire protection system would be provided for the combustion turbine, generator and accessory equipment. Fire detection sensors would also be installed.

A deluge spray system would provide fire suppression for the generator transformers and auxiliary power transformers. Fire hydrants and hose stations would be used to supplement the plant fire protection system.

In addition to the fixed fire protection system, fire extinguishers would be located throughout the plant Administrative/Maintenance Building, water treatment facility, and other structures as required by the local fire department.

The applicant will be required to provide the final Fire Protection and Prevention Program to the Energy Commission's Compliance Project Manager (CPM) and to the City of Santa Clara Fire Department, prior to construction and operation of the project, 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. A facility closure plan will be developed prior to closure to incorporate these requirements.

CONCLUSION AND RECOMMENDATIONS

If the Applicant for the proposed Pico Power Project 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 plant will not create significant impacts to 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 do not pose 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 CPM a copy of the Project Construction Injury and Illness Prevention 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 comment 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 City of Santa Clara Fire Department for review and comment prior to submittal to the CPM.

Verification: At least 30 days prior to site mobilization, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Injury and Illness

Prevention Program. The project owner shall provide a letter from the City of Santa Clara Fire Department 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 (Cal Code Regs., tit. 8,§ 3221); and;
- Personal Protective Equipment Program (Cal Code Regs., tit. 8,§§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted by the project owner 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 by the project owner to the City of Santa Clara Fire Department for review and acceptance.

Verification: At least 30 days prior to the start of operation, the project owner shall submit to the CPM a copy of the final version of the Project Operations and Maintenance Safety & Health Program. It shall incorporate Cal/OSHA Consultation Service's comments, stating that they have reviewed and accepted the specified elements of the proposed Operations and Maintenance Safety and Health Plan.

REFERENCES

City of Santa Clara Fire Department (SCFD). 2003. Personal communication with Fire Marshall Martin Von Raesfeld, January 16, 2003

City of Santa Clara Fire Department (SCFD). 2003. Personal communication with Deputy Fire Chief Gene Sawyer, March 24, 2003

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.

SVP (Silicon Valley Power) 2002. Application for Certification, Volume 1 & Appendices, Pico Power Project (02-AFC-3). Dated October 7, 2002 and docketed October 7, 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.

ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Shahab Khoshmashrab, Al McCuen and Steve Baker

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 that 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 intent of the engineering LORS and any special design requirements.

FINDINGS REQUIRED

The Warren Alquist Act requires the Energy 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 will comply with all applicable engineering LORS.

SETTING

Silicon Valley Power (SVP) proposes to construct and operate a 147 megawatt (nominal peak output) combined-cycle power plant known as the Pico Power Project (PPP). The project will be located in the City of Santa Clara, Santa Clara County. The site will occupy approximately 2.86 acres, located at the intersection of Lafayette Street and Duane Avenue and will lie in seismic zone 4. For more information on the site and related project description, please see the **Project Description** section of this document. References to "the City" and "the County" designate the City of Santa Clara and Santa Clara County, respectively. Additional engineering design details are contained in the Application for Certification (AFC), in Appendices 10-A through 10-G (SVP 2002a).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical and electrical) are described in the AFC (SVP 2002a, Appendices 10-A through 10-G). Some of these LORS include the California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM), and American Welding Society (AWS).

ANALYSIS

The basis of this analysis is the applicant's analysis and proposed construction methods, and 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 and electric transmission line. The applicant proposes to use accepted industry standards (see AFC Appendices 10-A through 10-G for a representative list of applicable industry standards), design practices and construction methods in preparing and developing the site. Staff concludes that the project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes Conditions of Certification (see below and the **Geology and Paleontology** section of this document) to ensure compliance.

MAJOR STRUCTURES, SYSTEMS AND EQUIPMENT

Major structures, systems and equipment are defined as those structures and associated components or equipment that are necessary for power production and are costly 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 will be identified through compliance with proposed Condition of Certification **GEN-2** (below).

The AFC contains lists of the civil, structural, mechanical and electrical design criteria that demonstrate the likelihood of compliance with applicable engineering LORS, and that staff believes are essential to ensuring that the project is designed in a manner that protects public health and safety.

The project shall be designed and constructed to the 1998 edition of the California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect at the time design and construction of the project actually commences. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 1998 CBSC is in effect, the 1998 CBSC provisions, identified herein, shall be replaced with the applicable successor provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed using the appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1** (below), which, in part, requires review and approval by the CBO of the project owner's proposed lateral force procedures prior to the start of construction.

PROJECT QUALITY PROCEDURES

The AFC (SVP 2002a, § 2.2.18.5) describes a project Quality Program that will be used on the project to maximize confidence that systems and components will be designed, fabricated, stored, transported, installed and tested in accordance with the technical codes and standards appropriate for a power plant. Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this quality assurance/quality control (QA/QC) program would ensure that the project is actually designed, procured, fabricated, and installed as contemplated in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the CBO 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 CBO and has the responsibility to enforce the code. In addition, the Energy Commission has the power to render interpretations of the CBC and to adopt and enforce rules and supplemental regulations to clarify the application of the CBC's provisions.

The Energy Commission's design review and construction inspection process is developed to conform to CBC requirements and to ensure that all facility design Conditions of Certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to carry out the design review and construction inspections and act as delegate CBO on behalf of the Energy Commission. These delegates typically include the local building official, and/or independent consultants

hired to cover technical expertise not provided by the local official. The applicant, through permit fees as provided by CBC Sections 107.2 and 107.3, pays the costs of the reviews and inspections. While building permits in addition to the Energy Commission certification are not required for this project, in lieu permit fees are paid by the applicant consistent with CBC Section 107, to cover the costs of reviews and inspections.

Energy Commission staff has completed and signed a Memorandum of Understanding (MOU) with BJY, Inc. (BJY), a third party engineering consultant, to act as CBO for the project. The MOU outlines BJY's roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed Conditions of Certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities and qualifications of the applicant's engineers responsible for the design and construction of the project (proposed Conditions of Certification **GEN-1** through **GEN-8**). Engineers responsible for the design of the civil, structural, mechanical and electrical portions of the project are required to be registered in California, and to sign and stamp each submittal of design plans, calculations and specifications submitted to the CBO. These conditions require that no element of construction subject to CBO review and approval shall proceed without prior approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written to require that no element of construction of permanent facilities subject to CBO review and approval, which would be difficult to reverse or correct, may proceed without prior approval of plans by the CBO. Those elements of construction that are not difficult to reverse are allowed to proceed without approval of the plans. The applicant shall bear the responsibility to fully modify those elements of construction to comply with all design changes that result from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service, or decommissioning, as a result of the project reaching the end of its useful life, may range from "mothballing" to removal of all equipment and appurtenant facilities and restoration of the site. Future conditions that may affect the decommissioning decision are largely unknown at this time.

In order to assure that decommissioning of the facility will be completed in a manner that is environmentally sound, safe and will protect public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of:

- proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;

- all applicable LORS, local/regional plans and the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;
- the activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and,
- decommissioning alternatives, other than complete site restoration.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure plan.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents are those applicable to the project.
2. Staff has evaluated the proposed engineering LORS, design criteria and design methods in the record, and concludes that the design, construction and eventual closure of the project are likely to comply with applicable engineering LORS.
3. The Conditions of Certification proposed will ensure that the proposed facilities are designed and constructed in accordance with applicable engineering LORS. This will occur through the use of design review, plan checking and field inspections, which are to be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.
4. Whereas future conditions that may affect decommissioning are largely unknown at this time, it can reasonably be concluded that if the project owner submits a decommissioning plan as required in the **General Conditions** portion of this document prior to the commencement of decommissioning, the decommissioning procedure is likely to occur in compliance with all applicable engineering LORS.

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 CBSC (or successor standard, if such is in effect when the initial project engineering designs are submitted for review); and
3. The CBO shall review the final designs, conduct plan checking and perform field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct and inspect the project in accordance with the 1998 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval. (The CBSC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously.) 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 CBSC is in effect, the 1998 CBSC provisions identified herein shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

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 project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the Master Drawing List and the Master Specifications List of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 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.

Facility Design Table 1: Major Structures and Equipment List

Equipment/System	Quantity (Plant)
Combustion Turbine (CT) Foundation and Connections	2
Combustion Turbine Generator Foundation and Connections	2
Steam Turbine (ST) Foundation and Connections	1
Steam Turbine Generator Foundation and Connections	1
Steam Condenser and Auxiliaries Foundation and Connections	1
Heat Recovery Steam Generator (HRSG) Structure, Foundation and Connections	2
HRSG Feed Pumps Foundation and Connections	4
HRSG Stack Structure, Foundation and Connections	2
CT Main Transformer Foundation and Connections	2
ST Main Transformer Foundation and Connections	1
Auxiliary or Station Service Transformer Foundation and Connections	1
CT Inlet Air Plenum Structure, Foundation and Connections	2
HRSG Transition Duct from CTG — Structure	2
Condensate Pumps Foundation and Connections	3
Circulating Water Pumps Foundation and Connections	3
Power Cycle Makeup and Storage Pumps Foundation and Connections	2
Cooling Tower Makeup Pumps Foundation and Connections	2
Demineralized Water Storage Tank and Pump Foundations and Connections	1
Condensate Storage and Transfer System Foundation and Connections	1
Condensate Water Tank Foundation and Connections	1
Closed Cycle Cooling Water Heat Exchanger Foundation and Connections	2
Auxiliary Cooling Water Pumps Foundation and Connections	2
Waste Water Collection System Foundation and Connections	1
Fuel Gas Heater Foundation and Connections	1
Fire Protection System	1
Cooling Tower Structure, Foundation and Connections	1
Generator Breakers Foundation and Connections	3
Transformer Breakers Foundation and Connections	3
Natural Gas Metering Station Structure, Foundation and Connections	1
Natural Gas Compressor Skid Foundation and Connections	3
Ammonia Storage Facility Foundation and Connections	1
Closed Cycle Cooling Pumps Foundation and Connections	2
Demineralizer – Reverse Osmosis (RO) System Foundation and Connections	2
Warehouse/Shop Structure, Foundation and Connections	1
Gas Compressor Building Structure, Foundation and Connections	1
Ammonia Vaporizer System Foundation and Connections	1

Equipment/System	Quantity (Plant)
Continuous Emissions Monitoring Systems Structure, Foundation and Connections	1
Sound Wall at Property Line	1
Potable Water Systems	1 Lot
Drainage Systems (including sanitary drain and waste)	1 Lot
High Pressure and Large Diameter Piping and Pipe Racks	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot
Switchyard, Buses and Towers	1 Lot
Electrical Duct Banks	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan check and construction inspection based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 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) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided each part is clearly defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part.

The RE shall:

1. Monitor construction progress of work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all the facilities subject to CBO design review and inspection conforms in every material respect to the applicable LORS, these Conditions of Certification, approved plans, and specifications;
3. Prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;
4. Be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) of stamped drawings, plans, specifications and any other required documents;
5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and,
6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests as not conforming to the approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work, if the work does not conform to applicable requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) are subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: A) a civil engineer; B) a soils engineer, or a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; and C) an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: D) a design engineer, who is either a structural engineer or a civil

engineer fully competent and proficient in the design of power plant structures and equipment supports; E) a mechanical engineer; and F) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 requires state registration to practice as a civil engineer or structural engineer in California.] All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all responsible engineers assigned to the project [1998 CBC, Section 104.2, Powers and Duties of Building Official].

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A: The civil engineer shall:

1. Review the Foundation Investigations Report, Geotechnical Report or Soils Report prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;
2. Design, or be responsible for design, stamp, and sign all plans, calculations and specifications for proposed site work, civil works and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and
3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes in the construction procedures.

B: The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports;
2. Prepare the Foundation Investigations Report, Geotechnical Report or Soils Report containing field exploration reports, laboratory tests and

engineering analysis detailing the nature and extent of the soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load [1998 CBC, Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations];

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 1998 CBC, Appendix Chapter 33; Section 3317, Grading Inspections (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both); and
4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations [1998 CBC, section 104.2.4, Stop orders].

C: The engineering geologist shall:

1. Review all the engineering geology reports and prepare final soils grading report; and
2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 1998 CBC, Appendix Chapter 33; Section 3317, Grading Inspections (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both).

D: The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;
2. Provide consultation to the RE during design and construction of the project;
3. Monitor construction progress to ensure compliance with engineering LORS;
4. Evaluate and recommend necessary changes in design; and
5. Prepare and sign all major building plans, specifications and calculations.

E: The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform with all of the mechanical engineering design requirements set forth in the Energy Commission's Decision.

F: The electrical engineer shall:

1. Be responsible for the electrical design of the project; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 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 shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;
2. Observe the work assigned for conformance with the approved design drawings and specifications;
3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action [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 project owner and CBO approved alternative timeframe) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next Monthly Compliance Report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend the corrective action required [1998 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The discrepancy documentation shall 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, Geotechnical Report or Foundation Investigations Report required by the 1998 CBC [Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations].

Verification: At least 15 days (or project owner and CBO approved alternative timeframe) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next Monthly Compliance Report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area [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, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a Non-Conformance Report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs for the reporting month shall also be included in the following Monthly Compliance Report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage 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 **Facility Design 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 project owner and CBO approved alternative timeframe) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 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 non-conforming 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) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and
5. Reports covering other structural activities requiring special inspections shall be in accordance with the 1998 CBC, Chapter 17, Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection); Section 1702, Structural Observation and Section 1703, Nondestructive Testing.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM [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 to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the Monthly Compliance Report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in Chapter 3, Table 3-E of the 1998 CBC shall, at a minimum, be designed to comply with the requirements of this Chapter.

Verification: At least 30 days (or project owner and CBO approved alternate timeframe) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the

CBO for design review and approval final design plans, specifications and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following Monthly Compliance Report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in **Facility Design Table 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:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Specific City/County code.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [1998 CBC, Section 104.2.2, Deputies].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 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 project owner and CBO approved alternative timeframe) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the

project owner shall request the CBO's inspection and approval of said construction. The final plans, specifications and calculations shall include approved criteria, assumptions and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS [1998 CBC, Section 108.7, Other Inspections; Section 106.3.4, Architect or Engineer of Record].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for electrical equipment and systems 480 volts and higher, listed below, with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations [CBC 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 handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

A. Final plant design plans to include:

1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and
2. system grounding drawings.

B. Final plant calculations to establish:

1. short-circuit ratings of plant equipment;
2. ampacity of feeder cables;
3. voltage drop in feeder cables;
4. system grounding requirements;
5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
6. system grounding requirements; and
7. lighting energy calculations.

C. The following activities shall be reported to the CPM in the Monthly Compliance Report:

1. Receipt or delay of major electrical equipment;
2. Testing or energization of major electrical equipment; and
3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission Decision.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

REFERENCES

SVP (Silicon Valley Power). 2002a. Application for Certification, Pico Power Project (02-AFC-3). Submitted to the California Energy Commission, October 7, 2002.

GEOLOGY, MINERAL RESOURCES, AND PALEONTOLOGY

Testimony of Patrick A. Pilling, Ph.D., P.E., G.E.

INTRODUCTION

In the geology, mineral resources, and paleontology section, staff discusses potential impacts of the proposed Pico Power Project (PPP) regarding geologic hazards, geologic (including mineralogic), 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. In addition, geologic hazards are assessed to determine the potential for such hazards to affect operation of the facility. A brief geologic and paleontologic overview of the project is provided. The section concludes with staff's proposed monitoring and mitigation measures with respect to geologic hazards and geologic, mineralogic, and paleontologic resources.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The applicable LORS are listed in the Application for Certification (AFC) in Section 8.4.5 (SVP, 2002). The following is a brief description of the LORS for geologic hazards and resources, and paleontologic resources.

FEDERAL

The proposed PPP is not located on federal land. As such, there are no federal LORS for geologic hazards or geologic, mineralogic, and paleontologic resources for the proposed project.

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 used in project 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 paleontological 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 Paleontology, 1995) is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. They were adopted in October 1995 by the Society of Vertebrate Paleontology, a national organization.

ENVIRONMENTAL SETTING

The proposed PPP is located within the Coast Ranges geomorphic province at the southern end of the San Francisco Bay. This area within the Coast Ranges is characterized by gently sloping alluvial fans formed by outwash from rivers and streams draining the Coast Ranges to the east and the Santa Cruz Mountains to the west and mud flats associated with San Francisco Bay to the northwest. Alluvial fans present in the area are composed of materials exposed within the adjacent mountain ranges, and grade into mud flats along the periphery of San Francisco Bay. Major geologic units present in the vicinity of the site include Holocene floodplain and flood basin deposits, levee deposits, and stream channel deposits and the Cretaceous to Jurassic Franciscan Complex. Many other geologic units are present in both the Coast Ranges and the Santa Cruz Mountains. In addition, various geologists have described the surrounding deposits using different names and classification systems, making comparisons between geologic maps difficult.

The Holocene floodplain deposits generally consist of fine-grained, organic-rich clay to very fine silty clay sediments (Wentworth et al., 1998; Wesling and Helley, 1989; Helley and Wesling, 1989). The Holocene flood basin deposits generally consist of organic-rich, dark colored clay and very fine silty clay. The Holocene levee deposits generally consist of sandy to clayey silt to sandy and silty clay. The Holocene stream channel deposits generally consist of unconsolidated sand, silt, and gravel. The Cretaceous to Jurassic Franciscan Complex generally consists of a heterogeneous assemblage of sandstone, shale, basalt, other sedimentary rocks, and oceanic crust materials from subduction processes (Page, 1992).

Exploration performed at the PPP plant site by the applicant’s subconsultant generally encountered fat clay to depths of 8 to 10.5 feet, overlying various layers of lean clay, sandy lean clay, and poorly graded sand with silt and gravel (Kleinfelder, 2002). The fat clay soils were generally classified as dark brown, stiff to hard, and as exhibiting high plasticity. The lean clay soils were generally classified as light brown to grey, medium stiff to very stiff, and as exhibiting low to medium plasticity. The coarse-grained soils were generally classified as brown and medium dense to dense.

Based on a review of available geologic maps as described above, similar material types are expected to be present in the vicinity of the project linears. In particular, the natural gas and wastewater pipeline linears cross through Holocene floodbasin deposits as described above.

Ground water was encountered at depths that varied between 8 and 18 feet below the existing ground surface (Kleinfelder, 2002).

ANALYSIS AND IMPACTS

There are two types of impacts considered in this section. The first are geologic hazards, which could impact proper functioning of the proposed facility and include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, and tsunamis and seiches. The second considers potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

STAFF'S CRITERIA FOR DETERMINING IMPACT SIGNIFICANCE

There are no federal LORS with respect to geologic hazards and geologic and mineralogic resources; however, the California Building Code (*CBC*) provides geotechnical and geological investigation and design guidelines, which engineers must adhere to when designing a proposed facility. As a result, the criteria used to assess geologic hazard impact significance includes evaluating each potential hazard in relation to being able to adequately design and construct the proposed facility.

With respect to impacts the proposed facility may have on existing geologic and mineralogic resources, geologic and mineral resource maps for the surrounding area are reviewed, in addition to any site-specific information provided by the applicant, to determine if geologic and mineralogic resources are present in the area. If present, operating procedures of the proposed facility, in particular ground water extraction and mass grading operations, are reviewed to determine if such operations could adversely impact such resources.

Staff also researches existing paleontologic information for the surrounding area, as well as any site-specific information provided by the applicant, in accordance with accepted assessment protocol (Society of Vertebrate Paleontology , 1995) to determine if there are any known paleontologic resources in the general area. If present or likely to exist, Conditions of Certification are applied to project approval, which outline procedures required during construction to mitigate impacts to potential resources.

GEOLOGIC HAZARDS

The AFC (SVP, 2002) provides adequate documentation of potential hazards at the PPP plant site and associated linears. Review of the AFC, coupled with staff's independent research, indicates that geologic hazards exhibit a low potential to adversely affect operation of the proposed facility. Staff's independent research included review of available geologic maps, reports, and related data of the PPP plant site and associated linear facility areas. Geologic information was available from the California Geological Survey (CGS), U. S. Geological Survey (USGS), and other governmental organizations.

Faulting and Seismicity

Energy Commission staff reviewed the CGS publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions*, dated 1994 (CGS, 1994); *Geologic Map of California – San Francisco-San Jose Sheet* (Wagner et al., 1990); *Preliminary Geologic Map of the San Jose 30x60 Minute Quadrangle* (Wentworth et al., 1998); *Geologic Map and Map Database of the Palo Alto 30'x60'*

Quadrangle (Brabb et al., 2000); *Alquist-Priolo Zone Maps* (CGS, 2000); the Database of Potential Sources for Earthquakes Larger than Magnitude 6 in Northern California (USGS, 1996); and *Maps of Known Active Fault Near-source Zones in California and Adjacent Parts of Nevada* (International Conference of Building Officials [ICBO], 1998). The project is located within Seismic Zone 4 as delineated on Figure 16-2 of the *CBC*.

The closest known active (Holocene) fault is the Hayward (SE Extension) Fault, located approximately 6.2 miles northeast of the plant site. Other active (Holocene) faults in the vicinity of the project include the Monte Vista – Shannon [7.8 miles southwest], Hayward [8.9 miles northeast], Calaveras [9.2 miles northeast] and San Andreas [11.5 miles southwest] Faults. CEC staff estimates a deterministic peak horizontal ground acceleration for the project would be on the order of 0.35g (Boore et al., 1997). This estimate is based on a moment magnitude 7.9 earthquake on the San Andreas Fault. The closest potentially active fault is the Silver Creek Fault, located approximately 1.7 miles east of the plant site. The CBC requires that a minimum peak horizontal ground acceleration of 0.4g be used in design within Seismic Zone 4.

Liquefaction

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. Liquefaction potential has been mapped by the USGS at the plant site and linear facilities as high (Knudsen et al., 2000); however, exploration at the plant site generally encountered lean to fat clay with thin interbedded, poorly graded, medium dense to dense sand and silty sand. The thickness of the interbedded silty sand layers is typically on the order of inches such that even if liquefaction were to occur is these layers, reflection of the associated settlement would be negligible at the ground surface. Based on the soil conditions encountered during exploration, the preceding discussion, and staff's independent assessment of site liquefaction potential, liquefaction potential at the plant site is considered low.

Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density). The decrease in volume can result in settlement of overlying structural improvements. Since the site is generally underlain by lean to fat clay with thin layers of interbedded, saturated poorly graded, medium dense sand to silty sands, the potential for dynamic compaction is low.

Hydrocompaction

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 wetting. 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, fine flash flood deposits, clayey loose sands, loose sands cemented by soluble salts, and windblown silts. Since the site is generally underlain by lean to fat clay with interbedded, poorly graded, medium dense sand to silty sands below the water table; the potential for hydrocompaction is negligible.

Subsidence

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. Subsidence may also be caused by regional tectonic processes or withdrawal of ground water. Typically, these forms of subsidence affect a large area. Subsidence due to ground water withdrawal was virtually halted in 1971, due to a ground water recharge program in southern Santa Clara Valley (Helley and LaJoie, 1979). Since the PPP will obtain water from the South Bay Water Recycling Program – San Jose/Santa Clara Water Pollution Control Plant via a new water pipeline to the site, significant draw down of the water table is not anticipated. As a result, the potential for ground subsidence due to construction and operation of the project is low.

Associated with ground subsidence is consolidation of normally or under consolidated fine grain soils when subjected to surcharge loading. Since these types of soil deposits are present at the plant site, excessive consolidation settlement of these layers could be experienced under the larger foundations associated with this project; however, the impact to the facility due to consolidation settlement can be mitigated through foundation design as discussed in the project geotechnical report (Kleinfelder, 2002). As a result, the potential for consolidation settlement to adversely impact the plant site facilities is considered low as long as foundation design incorporates appropriate mitigation measures (see **GEN-5** under **Facility Design**).

Expansive Soils

Soil expansion occurs when clay-rich soils, with an affinity for water, exist in-place at a moisture content below their plastic limit. The addition of moisture from irrigation, capillary tension, water line breaks, etc. causes the clay soils to collect water molecules in their structure, which, in turn, causes an increase in the overall volume of the soil. This increase in volume can correspond to movement of overlying structural improvements. As reported in the project geotechnical report, highly expansive clay soils are present between 2 feet and 4-1/2 feet below existing grade at the plant site, and are anticipated along the proposed linears; however, expansive soils can be mitigated through foundation design as discussed in the geotechnical report for this project (Kleinfelder, 2002). As a result, the potential for expansive soils to affect

overlying structural improvements is considered low as long as foundation design incorporates appropriate mitigation measures (see **GEN-5** under **Facility Design**).

Landslides

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. Since the site and linear facility areas are generally topographically flat, the potential for landslides is negligible.

Tsunamis and Seiches

Tsunamis and seiches are earthquake-induced waves, which inundate low-lying areas adjacent to large bodies of water. The proposed site is situated approximately 35 feet above mean sea level and approximately 7 miles southeast of the San Francisco Bay. No other large bodies of water are present near the plant site or associated linear facilities. As a result, the potential for tsunamis and seiches to affect the site is considered low.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff have reviewed applicable geologic maps and reports for this area (Kohler, 2002; Larose et al., 1999; Stinson et al., 1987; Burnett, 1965; DOGGR, 1982; CGS, 1980; and Tooker and Beeby, 1990). Based on this information and the information contained in the AFC (SVP, 2002), there is one gravel pit present immediately west of the natural gas pipeline linear within this highly urbanized area. However, since the natural gas pipeline linear will be constructed within the right-of-way of Lafayette Avenue, no impact to the existing gravel pit is anticipated. No other mineralogic resources are known to be located at or immediately adjacent to the proposed PPP plant site or linear facilities.

The applicant's consultant conducted a paleontologic resources field survey and a sensitivity analysis for the proposed PPP and the proposed linear facility improvements to support the PPP. No significant fossil localities were identified at the PPP site or directly under the associated linear facilities. However, fossils were found in similar geologic units (Temescal Formation – Pleistocene to Holocene alluvial deposits) within 2 miles of the plant site. Surficial geologic units were assigned a "high" sensitivity rating with respect to potentially containing paleontological resources. Staff contacted the University of California Museum of Paleontology (UCMP) in order to obtain a literature review and a check of the Regional Paleontologic Locality Inventory (RPLI). In an e-mail dated January 9, 2003, UCMP verified that there are no known paleontologic resources at the plant site or along the associated linear facilities (Holroyd, 2003). Based on review of available information, staff concludes that the proposed PPP project exhibits a moderate to high potential to contain significant paleontologic resources, but impacts to such resources can be successfully mitigated (see **PAL-1** through **PAL-7**).

PROJECT SPECIFIC IMPACTS

Consolidation settlement, expansive soils, and seismicity represent the main geologic hazards at this site. No geologic or mineralogic resources are known to exist in the area and the (confidential) Paleontologic Resources Report (SVP, 2002) assigns a sensitivity rating of high for all geologic units, which underlie the proposed facility and associated linears. Conditions of Certification **GEN-1**, **GEN-5**, **CIVIL-1** (**Facility Design**), and **PAL-1** through **PAL-7** should mitigate any potential hazards and resource impacts discussed above to a less than significant level.

CUMULATIVE IMPACTS

The PPP site lies in an area that exhibits moderate geologic hazards and no known geologic, mineralogic, or paleontologic 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 have an impact on 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 AND RECOMMENDATIONS

The applicant will likely be able to comply with all applicable LORS. The project should have no adverse impact with respect to design and construction of the project, and geologic or mineralogic resources. Staff proposes to ensure compliance with applicable LORS and protection of potential paleontologic resources through the adoption of the proposed Conditions of Certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

General Conditions of Certification with respect to Geology are covered under Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section. Conditions of Certification for Paleontology are as follows:

PAL-1 The project owner shall provide the CPM with the resume and qualifications of the Paleontological Resource Specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain CPM approval of the replacement PRS. The project owner shall submit

to the CPM to keep on file, resumes of the qualified Paleontological Resource Monitors PRMs. If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM, the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology guidelines of 1995. The experience of the PRS shall include the following:

1. institutional affiliations or appropriate credentials and college degree;
2. ability to recognize and collect fossils in the field;
3. local geological and biostratigraphic expertise;
4. proficiency in identifying vertebrate and invertebrate fossils and;
5. at least three years of paleontological resource mitigation and field experience in California, and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic resource monitors (PRMs) shall have the equivalent of the following qualifications:

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: 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.

At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project and stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor beginning on-site duties.

Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction laydown areas and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and 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 of such a scale that ranges between 1 inch = 40 feet and 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 project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner 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 Vertebrate Paleontology (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, field work, flagging or staking; construction monitoring; mapping and data recovery; fossil preparation and collection; identification and inventory; preparation of final reports; and transmittal of materials for curation will be performed according to the PRMMP procedures;
2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the Conditions of Certification;
3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;
4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained 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 halting construction, resuming construction, and how notifications will be performed;
7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;
8. Procedures for inventory, preparation, and delivery for curation of fossil materials into a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources; and
9. Identification of the institution that has agreed to receive any data and fossil materials collected, requirements or specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution; and,
10. A copy of the paleontological Conditions of Certification.

Verification: At least (30) days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for all project managers, construction supervisors and workers who are

involved with or operate ground disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of an initial in-person PRS training during the project kick-off for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern.

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.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontologic sensitivity.
3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery of 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: 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.

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.

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.

In the Monthly Compliance Report (MCR) the project owner shall provide copies of the WEAP Certification of Completion forms with the names of those trained and the trainer or type of training offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitors 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 project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered.

The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring different from the accepted schedule presented in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.
2. The project owner shall ensure that the PRM(s) keeps a daily log of monitoring of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.
3. The project owner shall ensure that the PRS immediately notifies the CPM 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 project owner shall ensure that the PRS prepares a summary of the monitoring and other paleontological activities that will be placed in the Monthly Compliance Report. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities and general locations of excavations, grading, etc. A section of the report will include the geologic units or subunits encountered; descriptions of sampling within each unit; and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring including any incidents of non-compliance and any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the project shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the

plan identified in the PRMMP. If there is an unforseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction .

Verification: The project owner shall maintain in 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 Paleontological Resources Report (See PAL-7). The project owner shall be responsible to pay any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information and submitted to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated.

Verification: Within 90 days after completion of ground disturbing activities, including landscaping, the project owner shall submit the Paleontological Resources Report under confidential cover to the CPM.

Certification of Completion of Worker Environmental Awareness Program
PICO POWER PROJECT (02-AFC-3)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on Cultural, Paleontology and Biological Resources for all personnel (i.e. construction supervisors, crews, and plant operators) working on-site or at related facilities. By signing below, the participant indicates that they understand and shall abide by the guidelines set forth in the Program materials. Include this completed form in the Monthly Compliance Report.

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Cul Trainer: _____ Signature:_____ Date: ___/___/____

PaleoTrainer: _____ Signature:_____ Date: ___/___/____

Bio Trainer: _____ Signature:_____ Date: ___/___/____

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POWER PLANT EFFICIENCY

Testimony of Kevin Robinson

INTRODUCTION

The Energy Commission makes findings as to whether energy use by the Pico Power Project (PPP) will result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the PPP's consumption of energy would create a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impacts. In this analysis, staff addresses the issue of inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- examine whether the facility will likely present any adverse impacts upon energy resources;
- examine whether these adverse impacts are significant; and if so,
- examine whether feasible mitigation measures exist that would eliminate the adverse impacts, or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

No federal LORS apply to the efficiency of this project.

STATE

No State LORS apply to the efficiency of this project.

LOCAL

No local or county ordinances apply to power plant efficiency.

SETTING

The applicant proposes to construct and operate the combined-cycle PPP to generate 122 MW of baseload power (nominal net output, baseload) and 147 MW (nominal net output, peaking) of load-following power, providing power to the SVP customers (SVP 2002a, AFC §§ 1.1, 1.1.1, 2.2.16, 2.2.18.1). (Note that this nominal rating is based upon preliminary design information and generating equipment manufacturers' guarantees. The project's actual maximum generating capacity may differ from this figure.) As proposed, the PPP will consist of two General Electric (GE) LM6000PC Sprint combustion gas turbines with inlet air chilling/filters, two multi-pressure heat recovery steam generators (HRSGs) with duct burners, and a single 2-pressure, reheat, condensing steam turbine generator arranged in a two-on-one combined cycle train

(SVP 2002a, AFC §§ 1.1.1, 2.1, 2.2.2, 2.2.4.1, 2.2.4.2, 2.2.4.3). The gas turbines and HRSGs will be equipped with dry low-NO_x combustors and selective catalytic reduction to control air emissions (SVP 2002a, AFC §§ 1.1.1, 2.2.2, 2.2.4.2, 2.2.11-2.2.11.4). Natural gas will be delivered by the existing PG&E gas distribution system from line 132 through a new 2-mile section of 12-inch pipeline (SVP 2002a, AFC §§ 1.1.1, 2.2.6, 2.2.18.3).

ANALYSIS

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).

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. Under normal conditions, the PPP would burn natural gas at a nominal rate of 859 million Btu per hour, lower heating value (LHV) without duct firing. With duct firing, the expected fuel consumption is estimated at 1,100 million Btu per hour, LHV (SVP 2002a, AFC Figure 2.2-4a, 2.2-4b). This is a substantial rate of energy consumption, and holds the potential to impact energy supplies. Under expected project conditions, electricity will be generated at a full load efficiency of approximately 48.4 percent LHV without duct burning and 45.7 percent LHV with duct burning (SVP 2002a, AFC Figures 2.2-4a, 2.2-4b); compare this to the average fuel efficiency of a typical 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 (SVP 2002a, AFC §§ 1.1.1, 2.2.6, 2.2.18.3, 5.0, 10.2.1, Appendix 5). Natural gas for the PPP will be supplied from the existing PG&E gas distribution system from line 132. The

PG&E natural gas system has access to gas from the Rocky Mountains, Canada and the Southwest. This represents a resource of considerable capacity. Furthermore, the PG&E gas supply represents an adequate source for a project of 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 will be supplied to the project by PG&E line 132 via a new 2-mile section of 12-inch pipeline (SVP 2002a, AFC §§ 1.1.1, 2.2.6, 2.2.18.3, 5.0, 10.2.1). This is a resource with adequate delivery capacity for a project of this size. There is no real likelihood that the PPP will require the development of additional energy supply capacity.

Compliance With Energy Standards

No standards apply to the efficiency of the PPP or other non-cogeneration projects.

Alternatives To Reduce Wasteful, Inefficient And Unnecessary Energy Consumption

The PPP 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

As proposed, the PPP will be configured as a combined cycle power plant, in which electricity is generated by two gas turbines, and additionally by a steam turbine that operates on heat energy recuperated from the gas turbines' exhaust (SVP 2002a, AFC §§ 1.1, 1.1.1, 2.1, 2.2.2, 2.2.4.1, 2.2.4.2, 2.2.4.3). By recovering this heat, which would otherwise be lost up the exhaust stacks, the efficiency of any combined cycle power plant is increased considerably from that of either gas turbines or 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.

The Applicant proposes to use inlet air chillers, HRSG duct burners (re-heaters), two-pressure HRSG and steam turbine units and a circulating water system (SVP 2002a, AFC §§ 1.1, 1.1.1, 2.1, 2.2.2, 2.2.4.1, 2.2.4.2, 2.2.4.3, 2.2.8). Staff believes these features contribute to meaningful efficiency enhancement to the PPP. The two-train combustion turbine (CT)/HRSG configuration also allows for high efficiency during unit turndown because a single fully loaded CT is more efficient than two CTs operating at 50 percent load.

The PPP includes HRSG duct burners, partially to replace heat to the steam turbine (ST) cycle during high ambient temperatures when CT capacity drops, and partially as

added power. Duct firing also provides a number of operational benefits, such as load following and balancing and optimizing the operation of the ST cycle.

Equipment Selection

Modern gas turbines embody the most fuel-efficient electric generating technology available today. The GE LM6000PC Sprint turbine to be employed in the PPP represents one of the most modern and efficient such machines now available. The applicant will employ 2 GE LM6000PC Sprint gas turbine generators in a two-on-one combined cycle power train (SVP 2002a, AFC §§ 1.1.1, 2.1, 2.2.2, 2.2.4.2, 2.2.4.3, 2.2.18.2). The GE LM6000PC Sprint gas turbine in a one-on-one configuration (the only configuration for which GTW combined cycle efficiency data is available) is nominally rated at 56 MW and 53 percent efficiency LHV at ISO conditions (GTW 2002).

Efficiency Of Alternatives To The Project

The project objectives include generation of baseload electricity and ancillary services, as market conditions dictate (SVP 2002a, AFC §§ 2.2.16, 2.2.18.1, 10.2.2).

Alternative Generating Technologies

Alternative generating technologies for the PPP are considered in the AFC (SVP 2002a, AFC §§ 9.5, 9.6). Fossil fuels, geothermal, biomass, solar, hydroelectric, and wind 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 thus strongly motivated to purchase fuel-efficient machinery.

Capital cost is also important in selecting generating machinery. Recent progress in the development of gas turbines, incorporating technological advances made in the development of aircraft (jet) engines, combined with the cost advantages of assembly-line manufacturing, has made available machines that not only offer the lowest available fuel costs, but at the same time sell for the lowest per-kilowatt capital cost.

SVP has selected the GE LM6000PC Sprint, one of the most modern simple cycle gas turbine generators available. The LM6000PC Sprint is further enhanced by the incorporation of spray intercooling (thus the name, SPRay INTercooling). This takes advantage of the aeroderivative machine's two-stage compressor. By spraying water into the airstream between the two compressor stages, the partially compressed air is cooled, reducing the amount of work that must be performed by the second stage compressor. This reduces the power consumed by the compressor, yielding greater net power output and higher fuel efficiency. The benefits in generating capacity and fuel efficiency increase with rising ambient air temperatures. At temperatures above 90°F, the Sprint machine enjoys a 4 percent increase in both power output and efficiency

(GTW 2000). Alternative machines that can meet the project's objectives are the GTX100 and FT8, which are aeroderivative machines, adapted from Alstom and Pratt & Whitney aircraft engines, respectively.

The Alstom GTX100 gas turbine generator in a two-on-one combined cycle power train is nominally rated at 124.5 MW and 54 percent LHV at ISO conditions (GTW 2002).

Another alternative is the Pratt & Whitney Twin FT8 Plus gas turbine generator in a two-on-one combined cycle power train that is nominally rated at 74 MW and 51 percent LHV at ISO conditions (GTW 2002).

Selecting among these machines is based chiefly on factors such as the flexibility of configuration, generating capacity, cost, and commercial terms.

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-chilling (SVP 2002a, AFC §§ 1.1.1, 2.2.2, 2.2.4.1, 9.6.4). 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 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. The older, less efficient power plants consume more natural gas to operate than the new, more efficient plants such as the PPP. The high efficiency of the proposed PPP should allow it to compete very favorably, running at a high capacity factor, replacing less efficient power generating plants, and therefore not having an

impact or even reducing the cumulative amount of natural gas consumed for power generation.

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. Yet 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

CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 122 MW of baseload electric power, and a nominal 147 MW of peaking power, at an overall project fuel efficiency between 46 and 48 percent LHV. While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

RECOMMENDATION

No Conditions of Certification are proposed.

REFERENCES

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POWER PLANT RELIABILITY

Testimony of Kevin Robinson

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 Silicon Valley Power (SVP) has predicted a 94 to 96 percent availability for the Pico Power Project (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 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 7-10 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 restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the California Independent System Operator (Cal-ISO), an entity that purchases, dispatches, and sells electric power throughout the state. How Cal-ISO 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.

The Cal-ISO also requires those power plants selling ancillary services, as well as those holding reliability must-run contracts, to fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the Cal-ISO.

The Cal-ISO's mechanisms to ensure adequate power plant reliability apparently have been devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there is cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants exhibit individual reliability sufficiently lower than this historical level, the assumptions used by Cal-ISO to ensure system reliability will prove invalid, with potentially disappointing results. 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 122 MW (nominal baseload output) Pico Power Project (PPP), providing power to the SVP customers (SVP 2002a, AFC §§ 1.1, 2.2.2, 2.2.16, 2.2.18.1, 10.2.2). The project is expected to operate at an overall availability in the range of 94 to 96 percent (SVP 2002a, AFC §§ 2.2.2, 2.2.16), and at a capacity factor, over the life of the plant, of 30 to 100 percent of baseload (SVP 2002a, AFC §§ 2.2.18.1, 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 (SVP 2002a, AFC §§ 2.2.18.1, 10.2.2), the PPP 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 PPP 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 SVP describes a QA/QC program (SVP 2002a, AFC §§ 2.2.18.1, 2.2.18.5) typical of the power industry. Equipment will be purchased from qualified suppliers, based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history will be evaluated. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate Conditions of Certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility called on to operate 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 combined-cycle portion of the project (SVP 2002a, AFC §§ 2.2.2, 2.2.5.3, 2.2.5.4, 2.2.18.2, Table 2.2-2). The fact that the project consists of two trains of gas turbine generators/HRSGs provides inherent reliability. Failure of a non-redundant component of one train should not cause the other train 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. Emergency DC and AC power systems will be supplied by redundant batteries, chargers, and inverters. Other balance of plant equipment will be provided with redundant examples, thus:

- two 100 percent HRSG feedwater pumps per HRSG;
- three 50 percent condensate pumps;
- three 50 percent circulating water pumps;
- two 100 percent closed cycle cooling water pumps; and

- two 100 percent closed cycle cooling water heat exchangers.

With this opportunity for continued operation in the face of equipment failure, staff believes that equipment redundancy will be sufficient for a project such as this.

Maintenance Program

The applicant proposes to establish a preventive plant maintenance program typical of the industry (SVP 2002a, AFC § 2.2.18.1). Equipment manufacturers provide maintenance recommendations with their products; the applicant will base its maintenance program on these recommendations. The program will encompass preventive and predictive maintenance techniques. Maintenance outages will be planned for periods of low electricity demand. In light of these plans, staff expects that the project will be adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

The PPP proposes to burn natural gas from the PG&E distribution system. Gas would be transmitted to the plant via a new 2-mile section of 12-inch diameter pipeline connected to the existing line 132 (SVP 2002a, AFC §§ 1.1.1, 2.2.6, 2.2.18.3, 10.2.1). The PG&E natural gas system has access to gas from the Rocky Mountains, Canada and the Southwest. This represents a resource of considerable capacity. Furthermore, the PG&E gas supply represents an adequate source for a project of this size (SVP 2002a, AFC §§ 2.2.6, 2.2.18.3, 10.2.1, Appendix 5). 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 PPP intends to obtain reclaimed tertiary treated water from the City of San Jose/Santa Clara Water Pollution Control Plant for use in cooling tower makeup, and in the HRSGs to meet the water requirements for the project (SVP 2002a, AFC §§ 1.1.1, 2.2.7, 2.2.18.4, 7.0, Appendix 7). The applicant predicts a peak demand of 1,260 gallons per minute of reclaimed water for the project (SVP 2002a, AFC § 7.1). An industrial well on the project site would provide water for emergency backup use. The City of Santa Clara would supply potable water. Staff believes these sources yield sufficient likelihood of a reliable supply of water. (For further discussion of water supply, see the **Soil and Water Resources** section of this document.)

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, flooding, tsunamis (tidal waves), and seiches (waves in inland bodies of water) will not

likely represent a hazard for this project, but seismic shaking (earthquake) presents a credible threat to reliable operation.

Seismic Shaking

The site lies within Seismic Zone 4 (SVP 2002a, AFC §§ 2.2.17.1, 8.4.2.2, 8.4.2.3, 8.4.3); see that portion of this document entitled **Geology, Mineral Resources, and Paleontology**. The project would be designed and constructed to the latest appropriate LORS (SVP 2002a, AFC §§ 2.2.17.1, 8.4.2.2, 8.4.2.3, 8.4.3, 8.4.5, 8.4.5.1, 8.4.5.2, Table 8.4-3). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking compared to older facilities, due to the fact that these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project will likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see that portion of this document entitled **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no special concern with power plant functional reliability affecting the electric system's reliability due to seismic events.

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 1996 through 2000 (NERC 2001):

For Combined Cycle units (All MW sizes)
Availability Factor = 90.96 percent

The gas turbines that would be employed in the project have been on the market for several years, and can be expected to exhibit typically high availability. The applicant's prediction of an annual availability factor in the 94 to 96 percent range (SVP 2002a, AFC §§ 2.2.2, 2.2.16) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). Further, since the plant would consist of two parallel gas turbine generating trains, maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures. The applicant's estimate of plant availability therefore appears realistic. The stated procedures for assuring design, procurement and construction of a reliable power plant appear to be in keeping with industry norms, and staff believes they are likely to yield an adequately reliable plant.

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 the **Transmission System Engineering** section of this document.

CONCLUSION

The applicant predicts an equivalent availability factor in the 94 to 96 percent range, which staff believes is achievable in light of the industry norm of 90.96 percent for this type of plant. Based on a review of the proposal, staff concludes that the plant would be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No Conditions of Certification are proposed.

REFERENCES

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TRANSMISSION SYSTEM ENGINEERING

Testimony of Mark Hesters and Al McCuen

INTRODUCTION

The Transmission System Engineering (TSE) analysis identifies whether the transmission facilities associated with the proposed project conform to all applicable laws, ordinances, regulations, and standards required for safe and reliable electric power transmission. It also assesses whether the applicant has accurately identified all interconnection facilities required as a result of the project.

Staff evaluated the proposed 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.

Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the "whole of the action," that may include facilities not licensed by the Energy Commission (California Code of Regulations (CCR), Title 14, §15378). Therefore, staff evaluated whether any new or modified transmission facilities are required for the project's interconnection to the electric grid and also beyond the project's interconnection with the existing transmission system that are required as a result of the power plant addition to the California transmission system.

Because Silicon Valley Power, the electrical department of the City of Santa Clara, is not part of the California Independent System Operator (Cal-ISO) grid, the Cal-ISO is not directly responsible for ensuring electric system reliability for the generator interconnection and does not plan to provide analysis and testimony for this project. The staff therefore has increased responsibility to evaluate the system reliability impacts of the project and provide conclusions and recommendations to the Energy Commission.

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 Electricity Coordinating Council (WECC) Reliability Criteria provide the performance standards used in assessing the reliability of the interconnected system. These Reliability Criteria require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. The WECC Reliability Criteria include the Reliability Criteria for Transmission System Planning, Power Supply Design Criteria, and Minimum Operating Reliability Criteria. Analysis of the WECC system is based to a large degree on WECC

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 (WECC 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 WECC’s Criteria for Transmission System Contingency Performance. The NERC planning standards provide for acceptable system performance under normal and contingency conditions. The NERC planning standards apply not only to interconnected system operation but also to individual service areas (NERC 1998).
- 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 WECC’s Criteria for Transmission System Contingency Performance and the NERC Planning Standards. The Cal-ISO Reliability Criteria incorporate the WECC Criteria and NERC Planning Standards. However, the Cal-ISO Reliability Criteria also provide some additional requirements that are not found in the WECC Criteria or the NERC Planning Standards. The Cal-ISO Reliability Criteria apply to all existing and proposed facilities interconnecting to the Cal-ISO controlled grid. It also applies when there are any impacts to the Cal-ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the Cal-ISO.

EXISTING FACILITIES AND RELATED SYSTEMS

The proposed PPP site is located in the City of Santa Clara in Santa Clara County, and would connect to the SVP network. The project would affect SVP transmission facilities and facilities in PG&E’s San Jose area. Several transmission lines cross the proposed project site, including:

- Scott – Kifer 115 kV transmission line
- Newark – Kifer 115 kV transmission line
- Kifer – San Jose B 115 kV transmission line
- Nortech – Kifer 115 kV transmission line (expected to be completed prior to PPP)
- Kifer – NAJ 60 kV transmission line.

In order to accommodate the PPP the applicant plans to move some of these lines and place others underground; and while this does affect the site plan, it will not affect TSE.

PROJECT DESCRIPTION

PPP is nominally rated at 122 MW and would produce a maximum of 147 MW. As proposed, PPP would connect to a new, three breaker switchyard on the project site that would loop in the existing Kifer – Scott 115 kV transmission line.

POWER PLANT SWITCHYARD

The new power plant design consists of two combustion turbine generators and one steam turbine generator. Each generator has a dedicated 13.8 kV to 115 kV step-up transformer (SVP 2002a, page 2-11). As proposed by the Applicant, the high voltage side of the transformers would connect to the new PPP switchyard through short overhead circuits. This configuration is acceptable.

The new PPP switchyard would be a three-breaker switchyard (SVP 2002a, page 6-1). This configuration is acceptable.

TRANSMISSION LINE

As proposed, the PPP will connect to the SVP electrical grid by looping the existing Kifer – Scott 115 kV line into a new switchyard. This interconnection would not require a new transmission line. This configuration is acceptable.

ANALYSIS

SYSTEM RELIABILITY

Introduction

SVP provided a System Impact Study and Facilities Study (SIS) for the PPP that studied the impacts of the proposed project on PG&E's and SVP's network. 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 PPP would not cause any overloads but would require the replacement of two 115 kV circuit breakers.

System Impact Study and Facilities Study Summary

The SIS analyzed the effects of PPP on the transmission interconnection and system, and included the following scope:

- Steady State Power Flow Study: These studies were conducted using PG&E 2004 Summer Peak and off-peak Full Loop Base Cases. The study analyzed adverse

[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].)

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 (SVP 2002a, Appendix 6 and SVP 2002b, page s-3). The SIS is intended to analyze the PPP project, as well as other proposed generation projects in the generation queue ahead of PPP, 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:

The SIS identifies a single line overload, the Kifer – Scott 115 kV line. The Kifer – Scott 115 kV line is scheduled to be reconductored before the operation of the PPP and would occur whether or not the PP is built. Other overloads identified in the SIS actually occur without the PPP and are decreased when the PPP is operating.

2. Dynamic Stability Study:
   The PPP will not adversely impact the stable operation of the transmission system.

3. System Protection Study
   The PPP will overstress one 115 kV circuit breaker at the Newark substation and one 115 kV circuit breaker at the San Jose Station B substation. Breaker replacements generally occur within the fence line of the existing substation and therefore replacement of the breakers would not result in any environmental impacts.

STUDY CONCLUSIONS

The SIS indicates that the interconnection of the PPP would have no significant transmission impacts. The single identified overloaded line would be reconductered even if the PPP were not built. The dynamic stability analysis showed that the PPP would not adversely impact the stable operation of the network. The short circuit duty study indicated that two circuit breakers would need to be replaced.

TRANSMISSION ALTERNATIVES

The project as proposed would have no transmission system impacts and actually improves the operation of the existing system. Thus, no transmission or interconnection alternatives were studied.

CUMULATIVE IMPACTS

The operation of the PPP in conjunction with existing and anticipated generation projects in California would not have significant negative cumulative impacts. The PPP

proposed location in the San Jose Area places the project near a significant load center and actually improves the operation of the existing transmission network.

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 SVP, 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.[2]

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 STAFF ASSESSMENT

Staff is not aware of any public comments regarding Transmission System Engineering.

CONCLUSIONS AND RECOMMENDATIONS

The proposed switchyard and the facilities connecting the Pico Power Project (PPP) to the Silicon Valley Power grid will be adequate, and that no additional transmission

[2] These are mere examples, many more exist.

facilities would be required for the interconnection and operation of the proposed project. 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 Studies performed by Silicon Valley Power (SVP) and Pacific Gas & Electric (PG&E) for the PPP indicate that no downstream facilities will be required as a result of the construction and operation of the PPP. In fact the project will eliminate an existing contingency overload. Staff concludes that power plant switchyard and outlet facilities will comply with LORS, assuming the Conditions of Certification **TSE-1** through **TSE-4** are implemented.

Staff proposes the following conditions of certification to insure system reliability and conformance with LORS.

CONDITIONS OF CERTIFICATION

TSE-1 The owner of the power plant switchyard and outlet facilities shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS including the requirements a) through g) listed below.

a) The PPP switchyard shall consist of three 115 kV circuit breakers.

b) The power plant switchyard and outlet lines shall meet or exceed the electrical, mechanical, civil, and structural requirements of SVP interconnection standards, CPUC General Orders 95 (GO-95) or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations, Articles 35, 36, and 37 of the “High Voltage Electric Safety Orders,” National Electric Code (NEC), and related industry standards.

c) Breakers and buses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

d) 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.

e) Termination facilities at the plant switchyard shall comply with applicable SVP interconnection standards.

f) The project conductors shall be sized to accommodate the full output from the project.

g) The owner of the power plant switchyard and outlet facilities shall provide any modified Detailed Facility Interconnection Study (DFIS) including a description of facility upgrades, operational mitigation measures, and/or Remedial Action Scheme (RAS) or Special Protection System (SPS) sequencing and timing if applicable.

Verification: At least 60 days prior to the start of rough grading of transmission facilities, the owner of the power plant switchyard and outlet facilities shall submit to the CPM for approval:

a) Electrical one line diagrams signed and sealed by a registered professional electrical engineer in responsible charge (or other approval acceptable to the CPM), a route map, and an engineering description of equipment and the configurations covered by the requirements a) through g) above.

b) The Detailed Facilities Study (if modified) (if it has not otherwise previously been provided to the Energy Commission) and a signed letter from the owner of the power plant Switchyard and Outlet facilities stating that the mitigation measures are acceptable. Substitution of equipment and substation configurations shall be identified and justified by the project owner for CPM approval.

TSE-2 The owner of the power plant switchyard and outlet facilities shall request approval to implement any changes that may not conform to the requirements a) through g) of **TSE-1**, and have not received CPM approval. 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 CPM.

Verification: At least 60 days prior to the construction of transmission facilities, the owner of the power plant switchyard and outlet facilities shall inform the CPM of any impending changes that may not conform to requirements a) through g) of **TSE-1** and request approval to implement such changes.

TSE-3 The project owner shall provide notice to the Cal-ISO prior to synchronizing the facility with the California transmission system:

a) 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
b) At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the Cal-ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the Cal-ISO letter to the CPM when it is sent to the Cal-ISO one week prior to initial synchronization with the grid. The project owner shall contact the Cal-ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the Cal-ISO Outage Coordination Department shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

TSE-4 he owner of the power plant switchyard and outlet facilities shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8 of the California Code of Regulations, Articles 35, 36, and 37 of the “High Voltage Electric Safety

Orders," SVP's interconnection standards, NEC, related industry standards and these conditions. In case of non-conformance, the project owner shall inform the CPM in writing, within 10 days of discovering such non-conformance, and describe the proposed corrective actions.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM:

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; and a statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders," and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.

b) An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the 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 responsible registered engineer in charge.

REFERENCES

NERC (North American Electric Reliability Council). 1998. NERC Planning Standards, September 1997.

WECC (Western Electricity Coordinating Council) 2001. NERC/WECC Planning Standards, June 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.

SVP (Silicon Valley Power). 2002a. Application for Certification, October 2002.

SVP (Silicon Valley Power). 2002b. Supplement in Response to Data Adequacy Comments, October 2002.

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.

ISO Independent System Operator

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.

WECC Western Electricity Coordinating Council

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Lance Shaw

INTRODUCTION

The project General Conditions Including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with 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 elements that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions;
- establish requirements for facility closure plans.
- 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 assuring 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 construction 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; or

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” begins after the completion of start-up and commissioning, where the power plant has reached reliable steady-state production of electricity at the rated capacity. For example, at the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The CPM will oversee the compliance monitoring and shall be responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;
2. resolving complaints;
3. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;
4. documenting and tracking compliance filings; and
5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management.

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 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, 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

The project owner is responsible for ensuring that the general compliance conditions and all of the other conditions of certification that appear in the staff assessment sections are satisfied. The general compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, conditions of certification, or ownership. Failure to comply with any of the conditions of certification or the general compliance conditions may result in reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate. A summary of the General Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section. The designation after each of the following summaries of the General

Compliance Conditions (**COM-1, COM-2,** etc.) refers to the specific General Compliance Condition contained in **Compliance Table 1.**

Construction Milestones, Compliance Condition of Certification 1 (COM-1)

The Monthly Compliance Report is the vehicle for notifying the CPM of applicable construction milestones, or for amending previously established milestones, for pre-construction and construction phases of the project. The project owner may also send a letter, an e-mail message, or make a phone call to notify the CPM of planned changes to the milestones.

I. ESTABLISH PRE-CONSTRUCTION MILESTONES TO ENABLE START OF CONSTRUCTION WITHIN ONE YEAR OF CERTIFICATION

1. Obtain site control
2. Obtain financing
3. Mobilize site
4. Begin rough grading for permanent structures (start of construction)

II. ESTABLISH CONSTRUCTION MILESTONES FROM DATE OF START OF CONSTRUCTION

1. Begin pouring major foundation concrete
2. Begin installation of major equipment
3. Complete installation of major equipment
4. Begin gas pipeline construction
5. Complete gas pipeline interconnection
6. Begin T-line construction
7. Complete T-line interconnection
8. Begin commercial operation **within three years of the Commission's final decision**

The CPM will negotiate the above-cited pre-construction and construction milestones with the project owner based on an expected schedule of construction. The CPM may agree to modify the final milestones from those listed above at any time prior to or during construction if the project owner demonstrates good-cause for not meeting the originally-established milestones.

III. A FINDING THAT THERE IS GOOD CAUSE FOR FAILURE TO MEET MILESTONES WILL BE MADE IF ANY OF THE FOLLOWING CRITERIA ARE MET:

1. The change in any milestone does not change the established commercial operation date milestone.
2. The milestone will be missed due to circumstances beyond the project owner's control.

3. The milestone will be missed, but the project owner demonstrates a good-faith effort to meet the project milestone.
4. The milestone will be missed due to unforeseen natural disasters or acts of God that prevent timely completion of the milestones.
5. The milestone will be missed due to requirements of the California ISO to maintain existing generation output.

Unrestricted Access, COM-2

The CPM, responsible Energy Commission staff, and delegate agencies or consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

Compliance Record, COM-3

The project owner shall maintain project files onsite or at an alternative site approved by the CPM, for the life of the project unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all "as-built" drawings, all documents submitted as verification for conditions, and all other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files.

Compliance Verification Submittals, COM-4

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by the CPM, and in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

1. reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;
2. providing appropriate letters from delegate agencies verifying compliance;
3. Energy Commission staff audits of project records; and/or
4. Energy Commission staff inspections of mitigation or other evidence of mitigation.

Verification lead times (e.g., 90, 60 and 30-days) associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter**

subject line shall identify the involved condition(s) of certification by condition number and include a brief description of the subject of the submittal. The project owner shall also identify those submittals **not** required by a condition of certification with a statement such as: "This submittal is for information only and is not required by a specific condition of certification." When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All submittals shall be addressed as follows:

Compliance Project Manager
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

If the project owner desires Energy Commission staff action by a specific date, they shall so state in their submittal and include a detailed explanation of the effects on the project if this date is not met.

Pre-Construction Matrix and Tasks Prior to Start of Construction COM-5

Prior to commencing construction a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's **first** compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be in the same format as the compliance matrix referenced above.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times (e.g., 30, 60, 90 days) for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

Project owners frequently anticipate starting project construction as soon as the project is certified. 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 is at the owner's own risk. Any approval by Energy Commission staff is subject to change based upon the Final Decision

COMPLIANCE REPORTING

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the 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, COM-6

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all compliance conditions in a spreadsheet format. The compliance matrix must identify:

1. the technical area;
2. the condition number;
3. a brief description of the verification action or submittal required by the condition;
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. the expected or actual submittal date;
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable; and
7. the compliance status of each condition, e.g., “not started,” “in progress” or “completed” (include the date).

Satisfied conditions do not need to be included in the compliance matrix after they have been identified as satisfied in at least one monthly or annual compliance report.

Monthly Compliance Report, COM-7

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the **Key Events List. The Key Events List Form is found at the end of this section.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and five copies of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Monthly Compliance Report;
3. an initial, and thereafter updated, compliance matrix showing the status of all conditions of certification and pre-construction and construction milestones (fully satisfied conditions do not need to be included in the matrix after they have been reported as closed);
4. a list of conditions and milestones that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;
5. a list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;
6. a cumulative listing of any approved changes to conditions of certification;
7. a listing of any filings submitted to, or permits issued by, other governmental agencies during the month;
8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification or milestones;
9. a listing of the month's additions to the on-site compliance file;
10. any requests to dispose of items that are required to be maintained in the project owner's compliance file; and
11. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolve complaints, and the status of any unresolved complaints.

Annual Compliance Report, COM-8

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall identify the reporting period and shall contain the following:

1. an updated compliance matrix showing the status of all conditions of certification (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;
3. documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Annual Compliance Report;
4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;

5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
6. a listing of filings submitted to, or permits issued by, other governmental agencies during the year;
7. a projection of project compliance activities scheduled during the next year;
8. a listing of the year's additions to the on-site compliance file;
9. an evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see General Conditions for Facility Closure addressed later in this section]; and
10. a listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved complaints, and the status of any unresolved complaints.

COM-9, Construction and Operation Security Plan

At least 30 days prior to commencing construction, a site-specific Security Plan for the construction phase shall be developed and maintained at the project site. At least 60 days prior to the initial receipt of hazardous materials on-site, a site-specific Security Plan and Vulnerability Assessment for the operational phase shall be developed and maintained at the project site. The project owner shall notify the CPM in writing that the Plan is available for review and approval at the project site.

Construction Security Plan

The Construction Security Plan must address:

1. site fencing enclosing the construction area;
2. use of security guards;
3. check-in procedure or tag system for construction personnel and visitors;
4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
5. evacuation procedures.

Operation Security Plan

The Operations Security Plan must address:

1. permanent site fencing and security gate;
2. use of security guards;
3. security alarm for critical structures;
4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;
5. evacuation procedures;
6. perimeter breach detectors and on-site motion detectors;
7. video or still camera monitoring system;

8. fire alarm monitoring system;
9. site personnel background checks [Site personnel background checks are limited to ascertaining that the employee's claims of identity and employment history are accurate. All site personnel background checks must be consistent with state and federal law regarding security and privacy.]; and
10. site access for vendors and requirements for Hazardous Materials vendors to conduct personnel background security checks. [Site access for vendors must be strictly controlled. Consistent with recent state and current federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleet and employ only drivers properly licensed and trained. The project owner is required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous materials conduct personnel background checks on any employee involved in the transportation and delivery of hazardous materials to the power plant. All vendor related personnel background checks will be consistent with site personnel background checks, as per above, including state and federal law regarding security and privacy.].

In addition, in order to determine the level of security appropriate for this power plant, the project owner shall prepare a Vulnerability Assessment and implement site security measures addressing hazardous materials storage and transportation consistent with US EPA and US Department of Justice guidelines [Chemical Vulnerability Assessment Methodology (July 2002)]. The level of security to be implemented is a function of the likelihood of an adversary attack, the likelihood of adversary success in causing a catastrophic event, and the severity of consequences of that event. This Vulnerability Assessment will be based, in part, on the use and storage of certain quantities of acutely hazardous materials as described by the California Accidental Release Prevention Program (Cal-ARP, Health and Safety Code section 25531). Thus, the results of the off-site consequence analysis prepared as part of the Risk Management Plan (RMP) will be used to determine the severity of consequences of a catastrophic event and hence the level of security measures to be provided.

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

Confidential Information, COM-10

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Docket with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

Department of Fish and Game Filing Fee, COM-11

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 Siting Division Project Manager (PM), not the CPM, at the time of project certification and shall be made payable to the California Department of

Fish and Game. The PM 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, COM-12

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:

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html

Any changes to the telephone number shall be submitted immediately to the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies to the CPM of all complaint forms, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt,. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure and unplanned permanent closure**.**

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unplanned closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

GENERAL CONDITIONS FOR FACILITY CLOSURE

Planned Closure, COM-13

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months prior to commencement of closure activities (or other period of time agreed to by the CPM). The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;
2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;
3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and
4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

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.

Unplanned Temporary Closure/On-Site Contingency Plan, COM-14

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less that 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

Unplanned Permanent Closure/On-Site Contingency Plan, COM-15

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the unlikely event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental control when conducting project monitoring.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider. Moreover, to ensure compliance with the terms and conditions of certification and applicable LORS, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission

pursuant to Title 20, California Code of Regulations, section 1230 et seq., but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by current law or regulations.

Informal Dispute Resolution Procedure

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1230 et seq., but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The procedure encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be referred to the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter and within seven working days of the CPM's request, provide a written report 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:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;
2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;
3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and
4. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum that fairly and accurately identifies the positions of all parties and any conclusions reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint or a request for an investigation with the Energy Commission's General Counsel. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1230 et seq.

The Commission Chair, upon receipt of a written request stating the basis of the dispute, may grant a hearing on the matter, consistent with the requirements of noticing provisions. The Energy Commission shall have the authority to consider all relevant facts involved and make any appropriate orders consistent with its jurisdiction (Cal. Code Regs., tit. 20, §§ 1232-1236).

Post Certification Changes to the Energy Commission Decision: Amendments, Insignificant Project Changes and Verification Changes, COM-16

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, or 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 not require changing the language in a condition of certification, have a potential for significant environmental impact, nor 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 EVENTS LIST

PROJECT: Pico Power Project

DOCKET #: 02-AFC-3

COMPLIANCE PROJECT MANAGER: Lance Shaw

EVENT DESCRIPTION	DATE
Certification Date/Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

GENERAL CONDITIONS TABLE 1
COMPLIANCE SECTION
SUMMARY of GENERAL CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COM-1	Construction Milestones	The project owner shall establish specific performance milestones for pre-construction and construction phases of the project.
COM-2	Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COM-3	Compliance Record	The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COM-4	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed or the project owner or his agent.
COM-5	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until the all of the following activities/submittals have been completed: ▪ property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, ▪ a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, ▪ all pre-construction conditions have been complied with, ▪ the CPM has issued a letter to the project owner authorizing construction.
COM-6	Compliance Matrix	The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COM-7	Monthly Compliance Report including a Key Events List	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.

CONDITION NUMBER	SUBJECT	DESCRIPTION
COM-8	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.
COM-9	Security Plans	Prior to commencing construction, the project owner shall submit a Construction Security Plan. Prior to commencing operation, the project owner shall submit an Operation Security Plan.
COM-10	Confidential Information	Any information the project owner deems confidential shall be submitted to the Commission's Dockets Unit.
COM-11	Dept of Fish and Game Filing Fee	The project owner shall pay a filing fee of $850 at the time of project certification.
COM-12	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COM-13	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least 12 months prior to commencement of a planned closure.
COM-14	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COM-15	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COM-16	Post-certification changes to the Decision	The project owner must petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

ATTACHMENT A

COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME: **Pico Power Project** AFC Number: 02-AFC-3
COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number:
Date and time complaint received: Indicate if by telephone or in writing (attach copy if written): Date of first occurrence:
Description of complaint (including dates, frequency, and duration):
Findings of investigation by plant personnel: Indicate if complaint relates to violation of a CEC requirement: Date complainant contacted to discuss findings:
Description of corrective measures taken or other complaint resolution: Indicate if complainant agrees with proposed resolution: If not, explain: Other relevant information:
If corrective action necessary, date completed: Date first letter sent to complainant: _____(copy attached) Date final letter sent to complainant: _____(copy attached)
This information is certified to be correct. Plant Manager's Signature: _____ Date:

(Attach additional pages and supporting documentation, as required.)

PREPARATION TEAM

PICO POWER PROJECT
PREPARATION TEAM

Executive Summary ..... Matt Trask

Introduction ..... Matt Trask

Project Description ..... Matt Trask

Biological Resources ..... Stuart Itoga

Cultural Resources ..... Dorothy Torres

Haz Materials and Worker Safety/Fire Protection ..... Geoff Lesh and Rick Tyler

Land Use ..... David Flores

Noise and Vibration ..... Steve Baker

Public Health and Transmission Line Safety and Nuisance ..... Obed Odoemelam, Ph. D.

Socioeconomics ..... Amanda Stennick

Soil and Water Resources ..... Tony Mediati and Linda Bond

Traffic and Transportation ..... James Adams

Visual Resources ..... Eric Knight

Visible Plume Analysis ..... William Walters

Waste Management ..... Ellen Townsend-Hough

Facility Design ..... Shahab Khoshmashrab, Al McCuen and Steve Baker

Geology and Paleontology ..... Patrick Pilling, Ph.D.,P.E.

Power Plant Efficiency ..... Kevin Robinson

Power Plant Reliability ..... Kevin Robinson

Transmission System Engineering ..... Mark Hesters

Compliance Monitoring and Facility Closure ..... Lance Shaw

Project Assistant ..... Angela Hockaday

Support Staff ..... Raquel Rodriguez, Evelyn Johnson and Pat Owen

DECLARATIONS & RESUMES