STAFF REPORT

Final Staff Assessment (Part 1)

SUNRISE COGENERATION POWER PROJECT

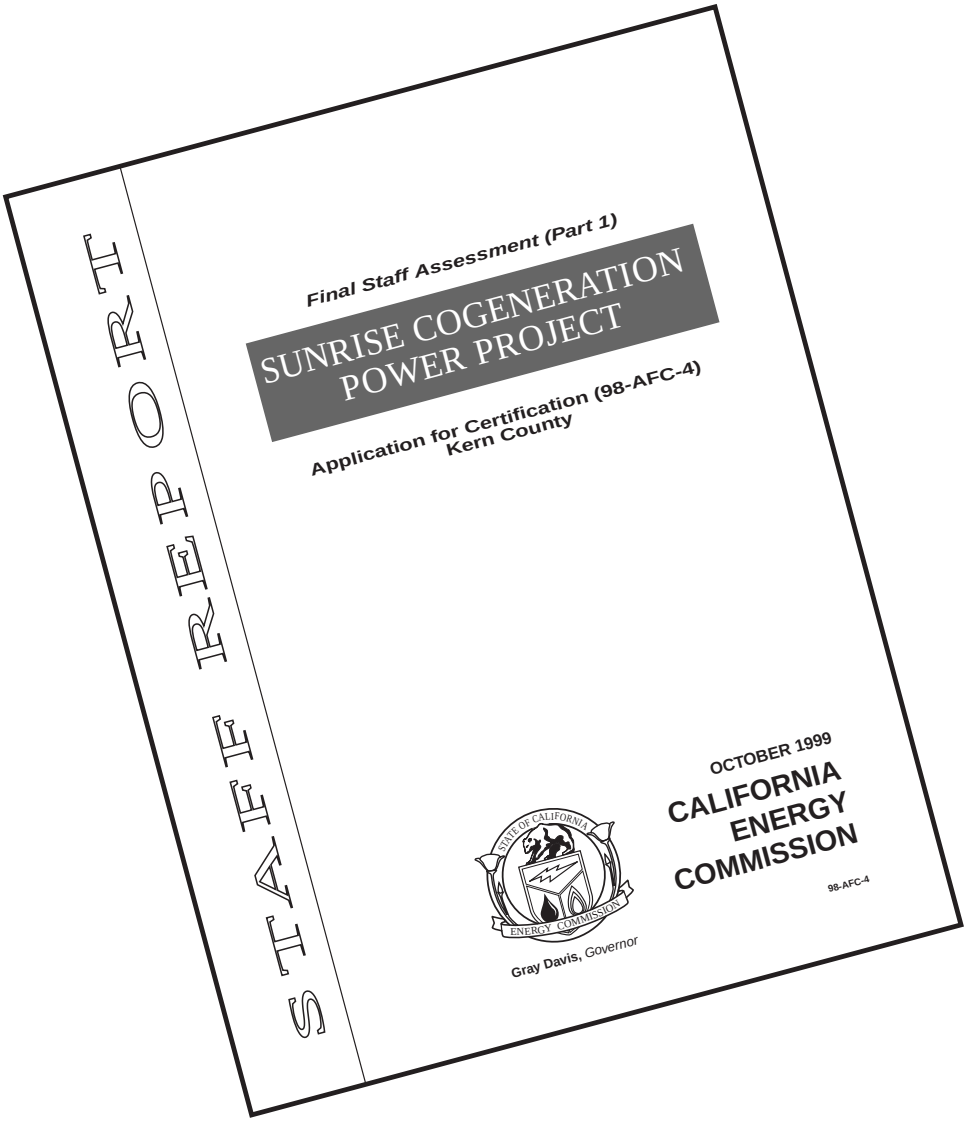
Application for Certification (98-AFC-4)
Kern County

OCTOBER 1999

CALIFORNIA ENERGY COMMISSION

Gray Davis, *Governor*

98-AFC-4



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EXECUTIVE SUMMARY

INTRODUCTION

This Final Staff Assessment (FSA), Part I contains the California Energy Commission (Energy Commission) staff's evaluation of the Sunrise Cogeneration and Power Company (SCPC) Application for Certification (98-AFC-4) for the Sunrise Cogeneration and Power Project (SCPP), for the following technical areas: Need Conformance, Hazardous Materials Management, Visual Resources, Waste Management, Transmission Line Safety and Nuisance, Land Use, Noise, Cultural Resources, Biological Resources, Facility Design, Geology/Paleontology, Reliability, Efficiency, Alternatives and General Conditions (includes Compliance Monitoring and general Facility Closure).

The remaining sections of staff's Final Staff Assessment (FSA) are expected to be issued as follows: Transmission System Engineering, Worker Safety and Fire Protection, and Socioeconomics on October 15, 1999; and, the Air Quality, and Public Health sections within three weeks of receipt, by staff, of the San Joaquin Valley Unified Air Pollution Control Distict's Determination of Compliance. Staff hopes to be able to file the Soils and Water Resources section at the same time it files the Air Quality and Public Health sections. Please see the Incomplete Analyses section below for more information.

The SCPP cogeneration plant and related facilities, such as the electric transmission line, natural gas pipeline and water lines are under the Energy Commission's jurisdiction and cannot be constructed or operated without the Energy Commission's certification. Staff is an independent party in the proceedings. The FSA contains analyses similar to those contained in environmental impact reports required by the California Environmental Quality Act (CEQA). It is not a Committee document nor is the FSA a preliminary or proposed decision on the proposal. The FSA presents staff's conclusions and proposed conditions that staff recommends apply to the design, construction, operation, and closure of the proposed facility, if certified.

BACKGROUND

On December 21, 1998, SCPC filed an AFC with the Energy Commission to construct and operate the SCPP. On February 17, 1999, the Energy Commission deemed the AFC data adequate, at which time staff began its analysis of the proposal. The analyses contained in this FSA are based upon information from: 1) the AFC; 2) subsequent amendments; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; 6) independent field studies and research, and 7) comments provided by the applicant and California Unions for Reliable Energy (CURE) on the staff's Preliminary Staff Assessment (PSA).

PROJECT DESCRIPTION

Sunrise will be located on a 20-acre parcel of land within the active Midway-Sunset Oil Field, approximately 3 miles northwest of the community of Fellows, and 35 miles southwest of Bakersfield, in western Kern County, California. State Highway 33, running northwest-southeast, is approximately 1.3 miles east of the site. SCPC will construct, own, and operate the SCPP. SCPC is a wholly-owned subsidiary of Texaco Inc. and is managed by the Texaco Global Gas & Power (TGGP) business unit whose purpose is to develop cogeneration and power projects throughout the world. Electrical energy produced from the proposed merchant power plant will be sold through the California Power Exchange (PX) to California's restructured electricity market, through other power exchanges, and/or to third parties under bilateral contracts. Steam produced by the project will be sold to Texaco California, Inc. (TCI) for thermally enhanced oil recovery. TCI (a wholly-owned subsidiary of Texaco Inc.) recently acquired additional oil field property in the Midway-Sunset Oilfield. The SCPP will be constructed on a schedule of approximately 15 months following certification by the Energy Commission with startup anticipated by May 2001. The project costs are estimated to be $175 - 195 million. The project is expected to create an average of 160 construction jobs and 24 permanent operational jobs.

The project, as proposed by SCPC, is a 320 megawatt, natural gas-fired, cogeneration facility. Electricity generated by Sunrise would be transmitted over an approximately 23.3-mile long, 230kV double-circuit transmission line to Pacific Gas and Electric Company's (PG&E) Midway Substation at Buttonwillow. The facility's consumptive fresh water requirements will be minimal, since the primary project water supply will be pretreated, produced water from the adjacent oil field operations. A small quantity of potable water and service water will be required for domestic purposes and possibly evaporative cooler makeup. Fuel for the natural gas-fired turbines would be provided through a 60-foot long,12-inch diameter pipeline interconnecting to the 20-inch natural gas pipeline serving the Texaco California, Inc. (TCI) Main Utility Corridor. The 20-inch natural gas pipeline, in turn, interconnects with the large interstate Kern River Gas Transmission/Mojave Pipeline Company (KRGTC/MPC) natural gas pipeline. A complete description of the project is contained in the **PROJECT DESCRIPTION** section of this FSA.

STAFF'S ASSESSMENT

Each technical area section of the FSA contains a discussion of impacts, mitigation measures and conditions of certification. The FSA includes staff's assessments of:

- the project's conformity with integrated assessment of need;
- 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 alternatives;
- project closure
- compliance of the project with all applicable laws, ordinances, regulations and standards (LORS) during construction and operation; and
- proposed conditions of certification, where these can be identified at this time.

COMPLETE ANALYSES

Staff believes its analysis of the power plant is substantially complete for the following 16 technical areas:

Need Conformance	Biological Resources
Hazardous Materials Management	Geology and Paleontological Resources
Transmission Line Safety & Nuisance	Facility Design
Land Use	Reliability
Noise	Efficiency
Visual Resources	Alternatives
Cultural Resources	Closure and Compliance
Waste Management	

INCOMPLETE ANALYSES

Seven technical areas are incomplete: air quality, public health, worker safety and fire protection, socioeconomics, traffic and transportation, soil and water resources, and transmission system engineering. Following is a discussion of the status of each section. Staff intends to hold one or more public workshops in late October 1999, to discuss air quality, public health, and soil and water resources.

AIR QUALITY AND PUBLIC HEALTH

The air quality and the closely related public health sections are awaiting receipt of the San Joaquin Valley Air Pollution Control District's (District) final Determination of Compliance (DOC). Release of the DOC has been delayed due to various reasons including, but not limited to, existing Notices of Violations (NOVs), hydrogen sulfide concerns, and the status of offsets. Staff will review and comment on the DOC and incorporate it into FSA for air quality. Because of the close relationship between the air quality and public health sections, the completion of the latter must rely upon the results of the former.

WORKER SAFETY AND FIRE PROTECTION; SOCIOECONOMICS

Prior to filing the worker safety and fire protection, and the socioeconomics sections, staff must address potential impacts on the Kern County Fire Department that may be posed by the 700 new oil production wells. Staff has initiated contact with KCFD regarding the matter and expects to file this section on October 15, 1999.

TRAFFIC AND TRANSPORTATION

The applicant provided staff with a long-delayed traffic study on September 23, 1999, and staff is awaiting Cal-Trans' comments on the study. Staff expects to file this section on October 15, 1999, after consideration of the Cal-Trans comments.

SOILS AND WATER RESOURCES

Staff expects to issue additional data requests in early October and to hold one or more workshops in late October 1999, to discuss water resources issues. At this time, staff has concerns about the chemical constituents of the proposed produced water (wastewater), and the process and permit structure under which Valley Waste operates.

TRANSMISSION SYSTEM ENGINEERING

The applicant submitted PG&E's Detailed Facility Study to the California Independent System Operator (Cal-ISO) on September 23, 1999. Staff expects to receive Cal-ISO's comments by October 8, 1999, and expects to file the transmission system engineering FSA section on October 15, 1999, with the traffic and transportation filing.

STAFF'S RECOMMENDATION

Although staff's assessment is complete in 15 areas, resolution of any remaining issues in the other seven will be crucial to the Energy Commission's Decision on this project. Until completion of the air quality, public health, worker safety and fire protection, socioeconomics, traffic and transportation, soil and water resources, and transmission system engineering FSA analyses, staff cannot be certain what changes may be required to its testimony. Therefore, at this time, staff is unable to recommend that the project be certified.

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INTRODUCTION

Marc S. Pryor

PURPOSE OF THIS REPORT

The Final Staff Assessment (FSA) presents the California Energy Commission (Energy Commission) staff's independent analysis of the Sunrise Cogeneration and Power Company's (SCPC) Application for Certification (AFC) for the Sunrise Cogeneration and Power Project (SCPP). The FSA is a staff document. It is neither a Committee document, nor a draft decision, nor proposed decision. The FSA describes the following:

a) the existing environment;
b) the proposed project;
c) whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations and standards (LORS);
d) the environmental consequences of the project including potential public health and safety impacts;
e) mitigation measures proposed by the applicant, staff, interested agencies, and intervenors which may lessen or eliminate potential impacts;
f) the proposed conditions under which staff recommends the project be constructed and operated, if certified;
g) project alternatives; and
h) project closure.

The analyses contained in this FSA are based upon information from: 1) the AFC; 2) subsequent amendments; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; 6) independent field studies and research; and 7) comments received regarding the analyses presented in staff's Preliminary Staff Assessment (PSA). Each proposed condition of certification is followed by a proposed means of "verification". The verification is not part of the proposed condition, but is the Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted requirements. The FSA presents conclusions and proposed conditions that apply to the design, construction, operation and closure of the proposed facility.

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

ORGANIZATION OF THE STAFF ASSESSMENT

This **INTRODUCTION** section of this FSA explains the purpose of the FSA and its relationship to the Energy Commission's siting process. The **PROJECT**

DESCRIPTION section provides a brief overview of the project including its purpose, location and major project components.

The need conformance, environmental and engineering evaluations of the proposed project follow the **PROJECT DESCRIPTION**. In the **NEED CONFORMANCE** section, staff assesses the project's conformity with the applicable Integrated Assessment of Need (***1996 Electricity Report***). In the environmental analysis, the project's environmental setting is described, environmental impacts are identified and their significance assessed, and the project's compliance with applicable laws is reviewed. The mitigation measures proposed by the applicant are reviewed for adequacy and conformance with applicable laws; if any remaining unmitigated impacts are identified, staff proposes additional mitigation measures. Staff also evaluates project alternatives. Staff's conclusions and recommendations are discussed, and proposed conditions of certification are included, if applicable. In the engineering analyses, the project is evaluated in each technical area with respect to applicable laws and performance objectives. Staff proposed modifications to the facility, if applicable, are listed. Each technical section ends with a discussion of conclusions and recommendations. Proposed conditions of certification are included, if applicable.

ENERGY COMMISSION SITING PROCESS

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

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

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

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

The staff prepares both a preliminary and final staff assessment. The Preliminary Staff Assessment (PSA) presents for the applicant, intervenors, agencies, other interested parties and members of the public, the staff's preliminary analysis, conclusions and recommendations. Where staff believes it is appropriate, the Final Staff Assessment (FSA) incorporates comments received from agencies, the public and parties to the siting case, comments made at the workshops, and comments received on the PSA. The FSA serves as staff's testimony on a proposal.

Staff uses the PSA to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the period between publishing the PSA and FSA, staff conducts workshops to discuss their findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshops and written comments, staff will refine its analysis, correct errors, and finalize conditions of certification to reflect areas where we have reached agreement with the parties.

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

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

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

conditions adopted by the Energy Commission. The proposed **Compliance Monitoring Plan and General Conditions** are included at the end of the FSA.

PROJECT DESCRIPTION

Marc S. Pryor

NATURE AND PURPOSE OF THE PROJECT

The Sunrise Cogeneration and Power Company (SCPC) proposes to construct and operate the Sunrise Cogeneration and Power Project (SCPP), a 320 megawatt (MW) natural gas-fired, cogeneration facility. The applicant's objective is to produce "thermal energy from the Sunrise Project, in the form of high pressure steam [that] will be provided to an adjacent thermal host, Texaco California, Inc. (TCI), for use in thermally enhanced oil recovery operations" (SCPC 1998a, p. 1-1). An additional project objective is to produce electricity for sale in California's newly deregulated electricity market.

PROJECT LOCATION

The power plant site is approximately 35 miles southwest of Bakersfield, 8 miles northwest of Taft, 7 miles southeast of McKittrick, 3 miles northwest of Fellows, and 2.5 miles south of Derby Acres. Taft has approximately 6,000 people, while McKittrick, Fellows, and Derby Acres are much smaller. State Highway 33 runs northwest-southeast approximately 1.3 miles east of the site.

PROJECT DESCRIPTION

BASIS OF ANALYSIS

JOINT BLUEPRINT Figure 1 defines the scope of the project. It was adopted by the Energy Commission Sunrise Committee, on June 4, 1999 and identifies the appropriate scope of the project analysis for the purpose of complying with the California Environmental Quality ACT.

POWER PLANT

PROJECT DESCRIPTION Figure 2 shows the vicinity of the proposed power plant. The power plant would be located on a 20-acre parcel of vacant land and is within an existing oil and gas production field. The vicinity is heavily developed and utilized by petroleum companies for natural gas and oil production. Numerous petroleum recovery and storage facilities, electric and petroleum transmission lines, and access roads characterize the area.

PROJECT DESCRIPTION Figure 3 shows a plan view of the proposed power plant site arrangement. The 320 MW cogeneration facility will consist of two General Electric Frame 7FA combustion turbine generators (CTGs) and two heat recovery steam generators (HRSGs). Each turbine will be equipped with dry low-NO_x (oxides of nitrogen) combustors, and the HRSGs will be equipped with anhydrous ammonia type selective catalytic reduction for emissions control.

Each CTG system will consist of a stationary, heavy duty, industrial CTG capable of producing approximately 165 MW of electricity at site conditions. Exhaust gas from each CTG will flow directly through an unfired “single-pass” HRSG with an SCR, before passing through an exhaust stack. Each HRSG will be designed to produce steam at operating conditions of approximately 574 °F and at 1,250 pounds per square inch gauge to TCI steam injection wells in the vicinity of the project. The injected steam will serve to lower the viscosity of crude oil in the oil-bearing strata and physically displace the crude in the direction of oil production wells, a process known as thermally enhanced oil recovery.

The Sunrise power plant will produce approximately 120,000 barrels of steam per day for enhanced oil recovery in the Midway-Sunset oil field. This amount of steam is sufficient for roughly 2,000 oil production wells and associated steam injection wells. Within the ¾-mile radius circle around the proposed power plant, which staff considers to be the sphere of influence of the steam produced by the power plant, roughly two-thirds (1,300 wells) of the oil production wells and steam injection wells currently exist. In addition to these existing oil production wells and steam injection wells, roughly one-third (700 wells) will be new and need to be constructed.

Water produced along with the crude oil from the production wells will be treated and reused as HRSG feedwater. Because of the “once-through” design of the HRSG, there is no boiler blowdown stream during normal operation.

Natural gas will be the only fuel used at the facility and will be supplied by the thermal host, TCI. The Sunrise project will receive gas via a 60 foot long 12-inch diameter gas pipeline from TCI’s main natural gas pipeline, which is currently under construction and will interconnect with TCI’s main utility corridor. The facility’s consumptive fresh water requirements will be minimal, since the primary project water supply will be pretreated, produced water from the adjacent oil field operations. It is intended that Western Kern Water District (WKWD) will supply secondary boiler feedwater when the TCI feedwater supply is interrupted. In addition, WKWD will supply a small quantity of potable water and service water required for domestic purposes and possibly evaporative cooler makeup. Wastewater will be routed to Valley Waste via TCI’s main utility corridor.

The applicant had originally proposed to dispose of the start-up/shut-down steam, or low quality steam, by routing it to two injection wells. Now, the applicant proposes to recirculate the low quality steam through a cooling coil in the feedwater storage tank and a pressure reducing valve to the boiler feedwater pumps and the HRSG’s[1]. This equipment will all be located within the Sunrise facility site.

TRANSMISSION LINE

Power will be generated by the CTGs at 18 kilovolt (kV) and stepped up by two transformers to 230 kV in a new substation (the Sunrise Substation) directly east of the cogeneration plant. The cogeneration plant interconnection to the regional

[1] In its September 2, 1999, comments on the Preliminary Staff Assessment (PSA), the applicant proposed serveral changes to the project.

transmission system will be at Pacific Gas & Electric's Midway substation, via an approximately 23-mile 230 kV line.

Multiple 230 kV transmission line alternatives are being considered to interconnect the Sunrise project to the California electric transmission grid. The preferred route, Route B, would connect the Sunrise project directly to Pacific Gas and Electric Company's (PG&E) Midway Substation near Buttonwillow.

PROJECT DESCRIPTION Figure 4 shows electric transmission line Route B. The transmission line would run from the power plant site to the northwest past the east side of the Midway-Sunset power plant, then north past the west side of the proposed La Paloma power plant and east of McKittrick, then northeast to the Midway substation in Buttonwillow. The first few miles of the route travel through an area containing heavy petroleum development. This development becomes less intense as the route nears and crosses State Route 33 south of McKittrick and travels through the McKittrick Valley and over the Elk Hills. The route then drops into the southern San Joaquin Valley, crossing irrigated agricultural land on its way to Midway Substation.

Routes D, E, and F parallel and are subsets of the B Route corridor and consist of consolidating one or more transmission lines planned by other developers with the Sunrise project transmission Line. Route D would connect the Sunrise project to a future Midway-Sunset Cogeneration company (MSCC) substation and then would connect MSCC and Midway with a joint-ownership transmission line. Route E would connect the Sunrise project and MSCC and then would connect MSCC to the proposed La Paloma Substation with a joint ownership line and then would connect all parties to Midway with a joint ownership transmission line. Route F would connect the Sunrise project to the proposed La Paloma Substation and then would connect La Paloma and Midway with a joint ownership transmission line.

Route A, formerly the preferred route, Route C, and Route G, discussed in the AFC and supplements are no longer considered viable alternatives and will not be discussed further in this document.

PROJECT DESCRIPTION Figure 5 shows a typical steel transmission line pole in the proposed tangent configuration.

CONSTRUCTION AND OPERATION

SCPC plans to begin construction immediately after certification, which is expected to occur no earlier than February 2000, and commercial operation by late spring of 2001. There will be a peak work force of approximately 255 construction jobs and about 24 permanent facility operations personnel.

JOINT BLUEPRINT Figure 1

PROJECT DESCRIPTION Figure 2

PROJECT DESCRIPTION Figure 3

PROJECT DESCRIPTION Figure 4

PROJECT DESCRIPTION Figure 5

NEED CONFORMANCE

Testimony of Ron Wetherall

INTRODUCTION

Under state law, the Energy Commission cannot certify a proposed electric generating facility unless it finds that the project conforms with the Integrated Assessment of Need contained in the Energy Commission's most recent *Electricity Report.* This analysis examines whether the Sunrise Cogeneration and Power Project (SCPP) conforms to the Energy Commission's Integrated Assessment of Need.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

STATE

CALIFORNIA CODE OF REGULATIONS

The Commissions Siting Regulations state "The presiding member's proposed decision shall contain the presiding member's recommendation on whether the application shall be approved, and proposed findings and conclusions on each of the following: (a) Whether and the circumstances under which the proposed facilities are in conformance with the 12-year forecast for statewide and service area electric power demands adopted pursuant to Section 25309(b) of the Public Resources Code." (Cal. Code of Regs., tit. 20, § 1752(a).)

PUBLIC RESOURCES CODE

The Energy Commission's Final Decision must include, among other things, "Findings regarding the conformity of the proposed facility with the integrated assessment of need for new resource additions determined pursuant to subdivision (a) to (f), inclusive, of Section 25305 and adopted pursuant to Section 25308 or, where applicable, findings pursuant to Section 25523.5 regarding the conformity of a competitive solicitation for new resource additions determined pursuant to subdivisions (a) to (f), inclusive, of Section 25305 and adopted pursuant to Section 25308 that was in effect at the time that the solicitation was developed." (Pub. Resources Code, § 25523(f).)

NEED CONFORMANCE CRITERION

In order to obtain a license from the Energy Commission, a proposed power plant must be found to be in conformance with the Integrated Assessment of Need. The criterion governing this determination, for projects deemed data adequate prior to July 1, 1999, are contained in the *1996 Electricity Report (ER 96)*, and are most succinctly described on page 72 of that document:

"In sum, the *ER 96* need criterion is this: during the period when *ER 96* is applicable, proposed power plants shall be found in conformance with the Integrated Assessment of Need (IAN) as long as the total number of megawatts permitted does not exceed 6,737."

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The Commission adopted *ER 96* on November 5, 1997. The SCPP Application for Certification (AFC) was found data adequate on February 17, 1999. *ER 96* is the most recently adopted *Electricity Report* and because it was adopted prior to the SCPP AFC being found data adequate, the need conformance criterion of *ER 96* applies to the SCPP. Staff therefore evaluated the project based on the *ER 96* Need Conformance Criterion.

RECOMMENDATIONS

The SCPP shall be in conformance with the *ER 96* integrated assessment of need as long as the total number of megawatts permitted under *ER 96*, including this project's capacity, if approved, does not exceed 6,737 at the time of project approval.

HAZARDOUS MATERIALS MANAGEMENT

Testimony of Rick Tyler

INTRODUCTION

The purpose of this analysis is to determine if the proposed Sunrise Cogeneration and Power Project (SCPP or Sunrise) (SCPP, 1998a) will 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, California Energy Commission (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 accept a reasonable level of risk as a condition of employment. Workers are thus not afforded the same level of protection normally provided to the public. Further, workers are provided special protective equipment and training regarding such exposure (see staff's **Worker Safety and Fire Protection analysis).**

The only hazardous material proposed for use at the SCPP facility in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j), is anhydrous ammonia. The use of anhydrous ammonia also poses the principal risk of off-site impacts in the event of a major accidental release associated with the project. Anhydrous ammonia is a liquefied gas stored at elevated pressure, which has a high internal energy. The energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release which can rapidly introduce large quantities of the material to the ambient air, where it can be transported in the atmosphere and result in high down-wind concentrations.

Other hazardous materials stored in smaller quantities, such as mineral and lubricating oils, corrosion inhibitors, water conditioners and hydrogen, will be present at the proposed facility. However, these materials pose no significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, and/or their environmental mobility. Although no natural gas is stored, the project will also involve the construction and operation of a natural gas pipeline and handling of large amounts of natural gas. Natural gas poses risk of both fire and explosion. The natural gas pipeline is addressed in staff's **Facility Design** analysis.

Sunrise will also require the transportation of anhydrous ammonia to the facility. Analysis of the potential for impact associated with such deliveries is addressed in staff's **Traffic and Transportation** analysis.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

FEDERAL

The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III and Clean Air Act of 1990 established a nationwide emergency planning and response program, and imposed reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials. The Act (codified in 40 C. F. R., § 68.110 et seq.) requires the states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of these Acts are reflected in the California Health and Safety Code, section 25531 et seq.

STATE

The California Health and Safety Code, section 25534, directs facility owners who store or handle acutely hazardous materials in reportable quantities, to develop a Risk Management Plan (RMP) and to 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 pre-existing 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 requirement supersedes the California Risk Management and Prevention Plan (RMPP).

Title 8, California Code of Regulations, section 5189, requires facility owners to develop and implement effective safety management plans to insure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

California Health and Safety Code, section 41700, requires that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

California Government Code, section 65850.2, restricts the issuance of an occupancy permit to any new facility involving the handling of acutely hazardous materials until the facility has submitted an RMP to the administering agency with jurisdiction over the facility.

LOCAL AND REGIONAL

The Uniform Fire Code (UFC) contains provisions regarding the storage and handling of hazardous materials. These provisions are contained in Articles 79 and 80. The latest revision to Article 80 was in 1997 (UFC, 1997). These articles contain minimum setback requirements for the 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 **Facility Design** portion of this document.

SETTING

SITE AND VICINITY DESCRIPTION

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:

- The local meteorology;
- Terrain characteristics; and
- The location of population centers and sensitive receptors relative to the project.

Staff considered these factors, as discussed below, in assessing the potential public health impacts of 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 Application for Certification (AFC) (SCPP 1998a, AFC Chapter 8.1). This data indicates that wind speeds below one meter per second and temperatures exceeding 100 ^{o}F are not uncommon for the project area. Therefore, staff suggested that the applicant use category F stability (stagnated air, very little mixing), one meter/second wind speed and an ambient temperature of 100 ^{o}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. Additional modeling of more likely accident scenarios and more realistic meteorological conditions were also evaluated.

TERRAIN CHARACTERISTICS

The location of elevated terrain (terrain above the power plant stack height) is often an important factor to be considered in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The principal risk of accidental release at this facility is associated with anhydrous ammonia. Accidental releases of anhydrous ammonia typically result in denser than air plumes. Thus, elevated terrain has no important effect on 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. Figure 8.6-2 (SCPP 1998a) shows the locations of both populated areas and sensitive receptors in the project vicinity.

IMPACTS

The Energy Commission staff has determined that anhydrous 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:

ANHYDROUS AMMONIA

Anhydrous ammonia will be used in controlling the emission of oxides of nitrogen (NOx) from the combustion of natural gas in the facility. The accidental release of anhydrous ammonia can result in hazardous down-wind concentrations of ammonia gas.

To assess the potential impacts associated with an accidental release of ammonia, staff typically evaluates where four “bench mark” exposure levels of ammonia gas occur off-site. These include: 1) the lowest concentration posing a risk of lethality, 2,000 ppm; 2) the Immediately Dangerous to Life and Health level (IDLH) of 300 ppm; 3) the Emergency Response Planning Guideline (ERPG) level 2 of 200 ppm, which is also the RMP level 1 criterion used by EPA and California; and 4) the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm. (A detailed discussion of the exposure criteria considered by staff and their applicability to different populations and exposure-specific conditions is provided in Appendix A of this analysis.) If the exposure associated with a potential release would exceed 75 ppm at any public receptor, staff will presume that the potential release poses a risk of significant impact. However, staff may also assess the probability of occurrence of the release and/or the nature of the potentially exposed population. Staff may, based on such analysis, determine that the likelihood and extent of potential exposure are not sufficient to support a finding of potentially significant impact.

The AFC (SCPP 1998a, Chapter 8.12) provided the results of modeling for a worst case accidental release of anhydrous ammonia. The worst-case release scenario is associated with a postulated spontaneous catastrophic storage tank failure. The AFC provides an analysis of an alternative accidental release during the transfer of ammonia from a delivery vehicle to the storage tank. In conducting this analysis, it was assumed that winds of 1.5 meter per second and category F stability would exist at the time of the accidental release. This screening analysis is designed to predict the maximum possible impacts based on distance from the storage tank without regard to specific direction of transport. Although no analysis of potential exposure was provided for the worst-case scenario, staff used the results from the alternative scenario to roughly estimate worst-case impacts. Staff estimates that a worst-case accidental release in conjunction with pessimistic meteorological conditions (wind one meter per second directly toward a receptor, category F stability) could result in exposures exceeding 1500 PPM at the nearest residence and on State Highway 33, approximately one mile from the Sunrise facility. However, the probability of this scenario occurring is extremely low. Analysis of the alternative scenario assuming a more probable release was also provided and suggested concentrations of 300 ppm at the nearest residence and on Highway 33 (SCPP 1998a). As a result of concerns regarding exposure at the nearest residence and on Highway 33, staff requested that the Sunrise Cogeneration and Power Project (SCPC) provide an analysis of the probability of occurrence associated with the worst case release scenario (CEC, 1999f). SCPC's response to staff's request (SCPP 1999e) concluded the probability of the worst-case event is 4.8 in 10,000,000 per year of operation or 1.5 in 100,000 assuming a project life of 30 years.

Staff also evaluated the probability of occurrence for both the worst case scenario and the alternative case. Data from the Canvey Study (Lees, 1998) indicated that the spontaneous failure rate of of pressure vessels is between 1 in 100,000 per year and 1 in 10,000 per year. However, this data was based on tank failures occurring prior to 1978 when the study was conducted. This population of tanks is not representative of the tank proposed for use at the Sunrise facility. Stress corrosion cracking was the primary cause of the spontaneous pressure vessel failures reflected in the results of the Canvey study. The proposed tank will be designed to a newer standard of construction better addressing the causes of past stress corrosion failures and will also be designed to California's seismic 4 standard, increasing the tank wall thickness. Thus, design of the tank to comply with the requirements applicable to seismic 4 zones will not only address risk of tank failure associated with earthquake but will also significantly reduce the probability of failure from corrosion cracking. Staff, therefore, estimates the maximum spontaneous failure rate for the proposed tank is less than 1 in 100,000 per year.

The worst case scenario also reflects the concurrent occurrence of category F stability and one meter per second wind speeds and assumes winds directly toward a specific receptor. From data presented in Air Quality Appendix A of the AFC (SCPP, 1998a, Appendix A, Meteorological Data For Fellows, 1992) staff determined that the probability of occurrence of category F stability, winds below one meter per second and winds in a direction of the nearest receptor and Highway 33 is less than 0.2%. Thus, the maximum risk of a worst case impact is significantly

lower than 2 in 10,000,000 per year and less than 0.6 in 1,000,000 over an assumed 30 year project life. This estimate ignores the effect of designing the tank to comply with seismic zone 4 requirements, as there is not sufficient data on failure rates of such designs. Staff, therefore, concludes that the worst case impact is not plausible.

Data from the Rijnmond Report (Lees, 1998) indicted that the probability of occurrence for the alternative release scenario or a smaller release from the storage tank is about 10 times more likely than the postulated worst case release. The same frequency of occurrence of worst-case meteorology would apply to both the worst case and alternative scenario. Based on this, staff estimates that the probability of occurrence for the alternative scenario is about 6 in 1,000,000 over the life of the project. While this risk cannot be considered negligible, staff does not feel it is large enough to be considered significant.

In addition to spontaneous tank failure, an accidental release of ammonia can also result from human error and external events. The primary human errors associated with release from fixed storage facilities occur during transfer operations. Staff believes that the potential for accidental releases will be reduced to insignificant levels by the implementation of safety management practices included in the RMP and Process Safety Management (PSM) for the facility. These plans will be reviewed by the California Occupational Safety and Health administration (Cal-OSHA), the local Administering Agency (Kern County Environmental Health Department), EPA, and Energy Commission staff prior to the handling of anhydrous ammonia at the facility.

The external hazards potentially affecting the ammonia storage tank at this facility include earthquakes, fires, explosions and turbine overspeed failure. Staff concludes that the earthquake damage is sufficiently addressed by seismic code requirements. Staff has also determined that no fire, explosion, or overspeed hazards threaten the storage tank at its proposed location.

California Unions for Reliable Energy (CURE) has made several comments regarding staff's analysis above. In their comments (CURE 1999g) they assert the following:

1. The Probability of Catastrophic Tank Failure is Greater Than One In One Million

   In reaching this conclusion CURE makes two erroneous assertions. First CURE mistakenly equates probability of accidental releases with probability of spontaneous tank failure. Secondly CURE asserts that the risk of impact is significant because it exceeds one in one million.

   The probability of spontaneous tank failure is an estimate of the frequency of pressure vessel failure in the absence of any precipitating event. This cannot be equated to the probability of accidental releases caused by all types of equipment failure, external events and human errors. The magnitude of releases caused by events other than tank failure are typically much lower than those associated with tank failure. Staff believes that other releases, not

associated with tank failure, are more correctly characterized by the postulated alternative accidental release scenario. This scenario assumed a release of 320 pounds per minute based on a loading line and excess flow valve failure. Normally the excess flow valve in the loading line would actuate at 50 pounds per minute. Staff further believes that all other mechanisms of tank failure caused by external hazards, faulty design, improper maintenance, and human error are addressed by applicable design codes and administrative controls.

Staff evaluated the potential external hazards, including proximity of flammable and explosive materials, proximity of rotating equipment capable of producing projectiles, and proximity of airports. Staff found that the only plausible external hazard is the potential of an earthquake-caused failure. However, this hazard is mitigated through design of the vessel to applicable seismic codes. The failures of tanks due to faulty construction and workmanship reflected in the failure estimates world wide are addressed by the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code which requires 100% testing of welds, hydrostatic testing of the tank after construction and periodic testing of the tank life. The ASME Boiler & Pressure Vessel Code is one of, if not the most, comprehensive codes applicable to pressure vessel design in the world. It is also more stringently enforced than similar codes in many other countries. Staff is aware of only one spontaneous failure of a pressure vessel built to a code that approximates the ASME code. This pressure vessel failed as a result of a weld repair of a stress corrosion crack. All of the causes of this tank failure are addressed in the current ASME Code. Based on this, staff believes that use of the 1 in 100,000 failure rate from the Canvey Study is appropriate. In fact the more recent Rijnmond Study estimated a spontaneous catastrophic failure rate of 1 in 1,000,000 per year. Based on this, staff believes that the 1 in 100,000 per year should be viewed as an upper bound estimate of spontaneous tank failure.

While CURE states that these comments address spontaneous tank failure, they raise several concerns that are related to other accidental release causes. Staff believes that other accidental release scenarios would be more probable, but would have lesser consequences and are adequately addressed by existing regulatory programs. The failure rate estimates in both the Canvey and Rijnmond Studies were also based on experience prior to implementation of major new regulatory requirements designed to reduce the risk of accidental releases of hazardous materials. These include the federal requirements to develop Risk Management Plans, state requirements to develop Accidental Release Plans and state requirements to develop Process Safety Management Plans. Staff believes that these programs will significantly reduce the risk of operator error. The effect of these programs is not yet reflected in the available estimates of accidental release occurrence.

2. Adequate Mitigation Must Be Required For Significant Ammonia Impacts

CURE also argues that staff has previously used a criterion of 1 in 1,000,000 as a significance level and that further mitigation is therefore required. Staff has not used the 1 in 1,000,000 risk level to evaluate significance. Staff uses the 1 in

1,000,000 as a de-minimis cutoff. Thus, risks below this level are viewed as categorically insignificant. Staff has never argued that mitigation is automatically required at risk levels above 1 in 1,000,000. For risks above this level staff considers refinement of risk analyses, feasibility of mitigation and the magnitude of potential impacts and may, or may not, recommend additional mitigation. It should also be noted that risks of individual mortality in the range of 1 in 10,000 per year at the fence line have frequently been considered acceptable by other regulatory authorities. A risk level of 1 in 1,000,000 per year has been deemed tolerable for events having the potential to result in up to 100 fatalities (AICHE, 1998). Staff does not agree that further mitigation is required.

NATURAL GAS

Natural gas, which will be used as a fuel by the project, poses a fire and/or explosion risk as a result of its flammability. While natural gas will be used in significant quantities, it will not be stored on-site. The risk of a fire and/or explosion from natural gas 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. 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.

The facility will also require the installation of a short natural gas pipeline that could result in accidental release of natural gas. However, the nearest residence is over one mile from the gas line. It is therefore very unlikely that an accidental release would have any significant effect on the public. The design of the natural gas pipeline is discussed in staff's **Facility Design** analysis. It is staff's belief that the distance separating the public from the gas line and equipment utilizing natural gas, precludes the potential for significant impact, in the event of an accidental release.

CUMULATIVE IMPACTS

As proposed, the facility will cause only a very small risk of off-site impacts. There are no other facilities handling hazardous materials in the project vicinity that pose risks at locations affected by the SCPP. Due to the limited area affected by any releases, there will be no additive effects. Thus the direct impacts of the project will not add to any existing accidental release risks.

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 which poses a risk to surrounding populations, staff will coordinate with the California Office of Emergency Services, Kern County Environmental Health Department, and the California Department of Toxic

Substances Control (DTSC) to ensure that any unacceptable risk to the public is eliminated. Funding for such emergency action can be provided by federal, state or local agencies until the cost can be recovered from the responsible parties (O.E.S. 1990)

MITIGATION

With the exception of potential impacts associated with using anhydrous ammonia, the proposed project poses no significant risk of public impact from accidental release of hazardous materials at the proposed facility. While the use of anhydrous ammonia does pose some very small risk of impact, staff does not believe that the risk is sufficient to require further mitigation.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSION

Staff's evaluation of hazardous materials handling and use for the proposed project indicates that they pose minimal potential for significant impacts on the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable LORS. In response to Health and Safety Code, section 25531 et seq., the applicant will be required to submit an RMP. The EPA, Kern County Environmental Health Department and Energy Commission staff will evaluate the RMP, including the hazardous materials storage and handling systems and the risk assessment provided by the applicant, and indicate whether they are satisfied with the proposed facilities. To insure adequacy of the RMP, Energy Commission staff's proposed conditions of certification require that the RMP be submitted for concurrent review by the Kern County Environmental Health Department and staff. In addition, Energy Commission staff 's proposed conditions of certification also require that confirmation of Kern County Environmental Health Department's approval be submitted prior to delivery of any hazardous materials to the facility. With adoption of Energy Commission 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 certification, presented herein, to ensure that the project is designed, constructed and operated to comply with applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous material in reportable quantities, as specified in Title 40, C. F.R. Part 355, Subpart J, section 355.50, not listed in Appendix B unless approved in advance by the CPM.

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

HAZ-2 The project owner shall provide a Risk Management Plan and a Process Safety Management Plan to Kern County Environmental Health Department and the CPM for review at the time the plans are first submitted to the U.S. Environmental Protection Agency (EPA) and the California Occupational Safety and Health Administration (Cal-OSHA). The project owner shall reflect all recommendations of the Kern County Environmental Health Department and the CPM in the final plan. A copy of the final plans, reflecting all comments, shall be provided to the Kern County Environmental Health Department and the CPM once approved by EPA and Cal-OSHA.

Verification: At least sixty (60) days prior to the delivery of anhydrous ammonia to the facility, the project owner shall provide the final plans listed above to the CPM for approval.

REFERENCES

AIChE (American Institute of Chemical Engineers). 1989. Guidelines For Technical Management of Chemical Process Safety, AIChE, New York, NY 10017.

AIChE (American Institute of Chemical Engineers). 1994. Guidelines For Implementing Process Safety Management Systems, AIChE, New York, NY 10017.

API (American Petroleum Institute). 1990. Management of Process Hazards, API Recommended Practice 750; American Petroleum Institute, First Edition, Washington, DC, 1990.

Baumeister, T. and L.E. Marks. 1967. Standard Handbook for Mechanical Engineers; McGraw-Hill, New York, NY. (Tables 24 and 43).

Calabrese, E.J. 1978. Pollutants and High Risk Groups. John Wiley and Sons, New York.

CURE (California Unions for Reliable Energy) 1999g. Comments on the California Energy Commission Preliminary Staff Assessment. Submitted to the California Energy Commission on September 2, 1999.

EPA (Environmental Protection Agency). 1987. Technical Guidance for Hazards Analysis, Environmental Protection Agency, Washington, DC, 1987.

EPA (Environmental Protection Agency). 1988. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Environmental Protection Agency, Research Triangle Park, NC, 1988.

FEMA (Federal Emergency Management Agency). 1989. Handbook of Chemical Hazard Analysis Procedures, Federal Emergency Management Agency, Washington, DC, 1989.

Lees, F.P. 1998). Loss Prevention in the Process Industries, Vols. I, II and III. Second Edition, Butterworths.

NFPA (National Fire Protection Association). 1987. NFPA 85A, Prevention of Furnace Explosions in Fuel Oil and Natural Gas Fired Single Burner Boiler Furnaces, National Fire Protection Association, Batterymarch Park, Quincy, MA, 1987.

NRC (National Research Council). 1979. Ammonia. Subcommittee on Ammonia. Committee on Medical and Biologic Effects of Environmental Pollutants. Division of Medical Sciences, Assembly of Life Sciences, National Research Council (NRC), Baltimore, Maryland, University Park Press (NTIS No. PB 278-027).

Perry. 1973. Perry's Chemical Engineers' Handbook, Sixth Edition, McGraw-Hill, USA.

SCPP (Sunrise Cogeneration and Power Project). 1998a. Application for Certification, Sunrise Cogeneratrion and Power Project (98-AFC-4). Submitted to the California Energy Commission, December 21, 1998.

SCPP (Sunrise Cogeneration and Power Project) 1999e. Data Responses – SET ONE. Submitted to the California Energy Commission on March 16,1999.

SCPP (Sunrise Cogeneration and Power Project/King). 1998f. Data Responses, Set 1A. Submitted to the California Energy Commission on April 15, 1999.

USOSHA (United States Occupational Safety and Health Administration). 1993. Process Safety Management / Process Safety Management Guidelines For Compliance. U.S. Department of Labor, Washington, DC.

BASIS FOR STAFF'S USE OF 75 PPM AMMONIA EXPOSURE CRITERIA

Staff uses a criterion of 75 ppm to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this criterion is not consistent with the 200 ppm criterion 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 are implemented and actions are taken 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. 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 Limits (STPELs) to determine the potential for significant impact. These limits are designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at these levels should not result in "serious sequelae" 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 of the general public to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events, and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75 ppm STPEL.

HAZARDOUS 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 protect nearly all segments of general population from irreversible acute or late effects. One time accidental exposure
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. work shifts
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 min.	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin)

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)
* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.
** The (NRC 1979) describes a study involving young animals which suggests greater sensitivity to acute exposure in young animals. The (WHO 1986) warns that the young, elderly, asthmatics, those with bronchitis and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

REFERENCES

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.

AIHA, 1989, American Industrial Hygienists Association, Emergency Response Planning Guideline, Ammonia, (and Preface) AIHA, Akron, OH.

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 number 94-116.

WHO, 1986, World health Organization, Environmental Health Criteria 54, Ammonia, WHO, Geneva, Switzerland.

ABBREVIATIONS

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

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam

INTRODUCTION

According to Sunrise Cogeneration Power Company (SCPC), the energy produced at the proposed Sunrise Cogeneration and Power Project (SCPC) will be transmitted to the existing PG&E power grid through a 23.3-mile double circuit, 230 kV overhead line. The preferred route (identified by SCPC as Route B, along with its much shorter branch routes, D, E, and F) was chosen to allow for connection, along the way, with other projects proposed for the area. Such interconnections will reduce the number of lines needed to transmit energy from these proposed projects to the existing PG&E power grid (SCPP 1999k pages 1-1, and 2-1). Operating the proposed line could create several health and safety hazards as described by SCPC (SCPP 1998a pages 6-26 through 6-38; SCPP 1999k pages 2-11 through 2-22). Such hazards will be reduced through compliance with laws, ordinances, regulations and standards (LORS) identified by SCPC as applicable to the proposed project (SCPP 1998a pages 6-23, 6-24, 6-39 and 6-40).

The purpose of staff's analysis is to assess the proposed transmission line design and operation for appropriate incorporation of measures necessary for compliance with LORS dealing with the issues listed below. If found satisfactory, staff will recommend that the line be approved as proposed; if not, staff will recommend design revisions to further mitigate the health and safety hazards that could result. These issues relate primarily to the physical presence of the line, or secondarily to the physical interactions of its electric and magnetic fields, as will be discussed later. They are listed as follows:

- Aviation safety
- Interference with radio-frequency communication
- Audible noise
- Fire hazards
- Hazardous shocks
- Nuisance shocks
- 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 transmission lines as proposed for the Sunrise project.

FEDERAL

AVIATION SAFETY

Any hazard to area aircraft relates to the potential for collision with the line in the navigable air space. The applicable LORS are intended to ensure the distance and visibility necessary to avoid such collision.

- Title 14, Part 77 of the Federal Code of Regulations (CFR), "Objects Affecting the Navigation Space". Provisions of these regulations specify the criteria used by the Federal Aviation Administration (FAA) for determining whether a "Notice of Proposed Construction or Alteration" is required for potential obstruction hazards. The need for such a notice depends on factors related to the height of the structure, the slope of an imaginary surface from the end of nearby runways to the top of the structure, and the length of the runway involved. Such notification allows the FAA to ensure that the structure is located to avoid any significant collision hazard to area aviation.

- FAA Advisory Circular (AC) No. 70/460-2H, "Proposed Construction and or Alteration of Objects that may Affect the Navigation Space". This circular informs each proponent of a project that could pose an aviation hazard of the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA.

- FAA AC No. 70/460-1G, "Obstruction Marking and Lighting". This circular describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.

INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. The level of 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 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 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. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line

voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The FCC requires each line operator to mitigate all complaints about interference on a case-specific basis. Staff usually recommends specific conditions of certification to ensure compliance with this FCC requirement. Since electric fields cannot penetrate the soil and other objects, underground lines do not produce the radio noise associated with overhead lines.

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 by the electric field induced by the line in the antenna of a radio signal receiver.

Several design and maintenance options are available for minimizing these electric field-related impacts. When incorporated in the line design and operation, such measures also serve to reduce the line-related audible noise discussed below.

AUDIBLE NOISE

As with radio noise, any audible noise from a transmission line 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. Since (as with communications interference), the noise level depends on the strength of the line electric field, the potential for occurrence can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during wet weather and from lines of 345 kV or higher. It therefore, is generally not expected at significant levels from lines of less than 345 kV, such as the one proposed for Sunrise. 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-ft right-of-way.

FIRE HAZARDS

The fires 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.

- General Order 95 (GO-95), CPUC, “Rules for Overhead Electric Line Construction”. This order specifies tree-trimming criteria to minimize the potential for power line-related fires.

- Title 14 Section 1250 of the California Code of Regulations, “Fire Prevention Standards for Electric Utilities”. This code specifies utility-related measures for fire prevention.

HAZARDOUS SHOCKS

The hazardous shocks addressed by the following regulations and standards are those that could result from direct or indirect contact between an individual and the energized line. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

- GO-95, CPUC. "Rules for Overhead Line Construction". These rules specify uniform statewide requirements for overhead line construction regarding ground clearance, grounding, maintenance and inspection. Implementing these requirements usually ensures the safety of the general public and utility and non-utility workers.

- GO-128 "Rules for Construction of Underground Electric Supply and Communications Systems". Provisions of this order establish requirements and minimum standards for the safe construction of underground AC power and communications circuits.

- Title 8, CCR, Section 2700 et seq., "High Voltage Electric Safety Orders". These safety orders establish essential requirements and minimum standards for safely installing, operating, and maintaining electrical installations and equipment. Compliance with the distancing requirements in this order will prevent hazardous shocks among utility and non-utility workers during activities around the line.

- National Electrical Safety Code, (NESC) Part 2: Safety Rules for Overhead Lines. Provisions in this part of the code specify the national safe operating clearances applicable in areas where the line might be accessible to the public. Such requirements are intended to minimize the potential for direct or indirect contact with the energized line.

LOCAL

There are no local laws or regulations specifically aimed at the physical structure or dimensions of electric power lines to limit their obstruction or hazardous shock hazards, or eliminate the interactive effects of their electric or magnetic fields. All the noted LORS are implemented industry wide in the country to ensure that lines are uniformly constructed to reflect existing health and safety information while ensuring efficiency and reliability.

SETTING

The proposed transmission line will be routed through an area with several power lines of 69 kV, 115 kV, 230 kV and 500 kV. Many of these lines are located within one mile of the line, as shown by SCPC (SCPP 1998a, pages 6-1 through 6-13; SCPP 1999m pages 2-2, 2-9, 2-10, 2-21 and 2-22). The line will run parallel to, and cross under some of these lines along its route. Electric and magnetic fields from the line will therefore contribute to any cumulative EMF exposures in the impact area of fields from these other lines. The interactive effects of these existing fields

have been considered by SCPC in calculating the strengths of fields from the Sunrise line.

The line will traverse agricultural and industrial areas, open spaces and oil and gas fields. Its placement within vacant land and adjacent to existing utility corridors, as feasible, is intended to minimize location around residences or public-use areas. The closest residences along the route will be 400 ft or more away (SCPP 1999m page 3.6-2). The right-of-way will be about 100 ft, but may be reduced to a minimum of 75 ft in some areas, depending on land use or other constraints (SCPP 1998a pages 6-3, and 6-20, SCPP 1999k page 2-3). Since the line will be connected to the existing PG&E transmission system, it will be designed according to PG&E's field-reducing design guidelines (SCPP 1999k page 2-20).

Individuals in the project area may be exposed to line-related fields for varying periods of time. The level of each exposure would depend on the distance from the line. Short-term exposure could occur while in transit or during short-term activities around the line. The general magnitude of such short-term exposures is well established, being generally lower than exposures from the use of common household appliances, such as hair dryers, toaster ovens, microwave ovens and electric shavers. Such exposures have not caused any significant health concerns in the past and are not the reason for the present concern about EMF exposure. As will be more fully discussed later, such concern is over the possibility of health effects from long-term, generally lower-level exposure which is most commonly associated with living in houses near a line. Since such houses are normally located beyond the edge of the right-of-way, the long-term exposure at issue can be assessed from field strength estimates obtained for areas beyond the edge of the right-of-way. The continuing challenge is to meaningfully interpret such exposures in light of present uncertainty about possible health significance at any given level.

PROJECT DESCRIPTION

Project Description Figure 1 shows the route proposed for the transmission line as it travels to interconnect with the existing PG&E grid. As detailed by SCPC (SCPP 1999k pages 2-1 through 2-11), the line will consist of the components listed below.

- The main section in Route B connecting the Sunrise Project directly to PG&E's Midway substation near Buttonwillow.

- A branch section within Subset Route D connecting the Sunrise Project to the future Midway-Sunset Cogeneration Company substation.

- A branch section within Subset Route E connecting the Sunrise Project to both the Midway-Sunset Cogeneration Company project and the proposed La Paloma project.

- A branch section within Subset Route F connecting the Sunrise Project to only the proposed La Paloma Project.

The line will be constructed with tubular steel poles as shown in Project Description Figure 4. These poles will keep the transmission line at least 30 ft from the ground in keeping with PUC's requirements and will be placed approximately 1,000 ft apart.

The main section of the line from the power plant to the PG&E power grid will be solely owned by the SCPC. This section will be designed for future operation as a double circuit line, but will be operated as a single circuit line in the initial period. This means that the two circuits will be connected together to create a single circuit line for this initial phase. Normal double-circuit operation will begin with interconnection to the other proposed projects if the connections are made. The conductor configuration and current flow pattern (phasing) were chosen to maximize the cancellation effects of fields from the line's conductors and the conductors from the existing Midway-Sunset line, which closely parallels much of the proposed right-of-way (SCPP 1999k pages 2-11 and 2-13).

IMPACTS

As noted in the LORS section, GO-95, GO- 128 and Title 8, CCR, Section 2700 et seq., provide the minimum regulatory requirements necessary to avoid the direct or indirect contact previously discussed in connection with hazardous shocks and aviation hazards. Of secondary concern in project evaluation are the field-related impacts manifesting as nuisance shocks, electric and magnetic field exposure, and radio noise and communications interference, as also discussed earlier. These impacts are reduced through specific field-reducing design guidelines developed for each utility service area in the state. As will be more fully discussed later, these guidelines were established to ensure uniformity in EMF reduction approach, in light of present knowledge on field effects and the potential impacts of field control measures on line operations. The extent of such measures, together with the related field strengths, will vary according to environmental and other local conditions bearing on line safety, efficiency, reliability and maintainability. When the ground-level strengths of such fields are calculated, they can be used to assess each line for appropriate implementation of applicable field-reducing measures. The impacts of most concern in terms of indirect effects are nuisance shocks and electric and magnetic field exposure. These secondary impacts are assessed for every project in addition to the primary issues of aviation safety, and hazardous shocks.

NUISANCE SHOCKS

The field-related nuisance shocks around transmission lines are non-hazardous but unpleasant experiences caused by current flow at levels generally incapable of causing significant physiological harm. Such currents are induced by the fields from the line. The shocks most commonly occur when an individual touches a metal object electrically charged by these fields. For modern high-voltage lines, shocks of this type are effectively minimized through grounding procedures specified in the National Electrical Safety Code and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). As with lines of the type proposed, SCPC will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

Staff will recommend specific conditions of certification to ensure that such grounding is made within the right-of-way by both SCPC and property owners.

ELECTRIC AND MAGNETIC FIELD EXPOSURE

The previously noted possibility of health effects of electric and magnetic fields has increased public fear in recent years about living near high-voltage lines. Both fields occur together whenever electricity flows, hence the general practice of considering both as EMF exposure. As noted by SCPC (SCPP 1998a pages 6-36, 8.6-14 through 8.6-17), the available evidence as evaluated by CPUC and other regulatory agencies 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 reduce such fields where feasible, until the issue is better understood. The challenge has been to establish when, and how far to reduce them.

While there is considerable uncertainty about the EMF/health effects issue, the following facts have been established from the available information and have been used to establish existing policies.

- Any health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns relate to 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.

In light of the present health uncertainty, some regulatory agencies have opted for regulations ensuring that fields from new lines are similar to those from existing lines. Some of them (Minnesota, Florida, New York, Montana New Jersey) have set specific environmental limits on one or both fields in this regard. These limits are, however, not based on any specific health effects. All regulatory agencies believe, as does staff, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

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 as the previously noted radio noise, audible noise and nuisance shocks. The present focus is on the magnetic field because only it can penetrate building 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 transmission and other high-voltage power lines, staff considers it important for perspective, to again consider the previously noted fact that an individual in a home could be exposed for short periods to much stronger

fields while using some common household appliances (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 the power line environment.

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 required specific EMF-reducing design guidelines of all utilities under its jurisdiction. The CPUC further established specific limits on the resources to be used in each case for field strength 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. Utilities not within the jurisdiction of the CPUC voluntarily comply with these CPUC requirements.

In keeping with this CPUC policy, staff requires a showing that each proposed line will be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local issues bearing on safety, reliability efficiency and maintainability. It, therefore, is up to each applicant to ensure that such measures are applied in ways, and to an extent, without significant impacts on line operation. The extent of such applications will be reflected by the ground-level field strengths as measured during operation. When estimated or measured for the line, such field strengths can be used by staff and other regulatory agencies for comparison with fields of lines of similar voltage and current-carrying capacity. Such 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 the proposed line will be designed according to PG&E's EMF-reducing guidelines, their fields are required under existing CPUC policies to be similar to fields from similar lines in the PG&E service area. A condition of certification, **TLSN-3**, is proposed by staff to ensure implementation of the reduction measures necessary.

PROJECT SPECIFIC IMPACTS

The direct impacts from locating and operating the transmission line as proposed are the primary and secondary impacts previously discussed in terms of obstruction

hazards to area aircraft and the action of line-related electric and magnetic fields. The issues involved are addressed separately.

AVIATION SAFETY

As noted by SCPC (SCPP 1998a page 6-29; SCPP 1999k pages 2-13 and 2-14) the only major aviation center in the vicinity of the proposed project area is Meadows Field Airport in Bakersfield, approximately 23 miles away. Two smaller local airports, the Taft-Kern County Airport, and the Elk Hills Buttonwillow Airport are between 2 and 4 miles from the proposed route. An FAA "Notice of Construction or Alteration" will not be required for the proposed power line, according to existing regulatory criteria. From its consideration of all issues related to distance from the identified routes and FAA safety requirements, staff is in agreement with SCPC (SCPP 1999k page 2-14) that the proposed line will not pose a significant hazard to area aviation.

INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION

Experience has shown that spark gap discharges are mostly responsible for any radio interference around the type of transmission line proposed. For a line constructed according to GO 52, such interference is generally avoided through appropriate maintenance, which minimizes occurrence of the structural gaps involved. SCPC intends to institute such a maintenance program according to accepted industry practice and will mitigate any line-related noise when it occurs or is reported (SCPP 1998a page 6-33; SCPP 1999k page 2-17). The previously noted provisions of the related FCC regulations are important in requiring each project owner to ensure mitigation of any such interference to the satisfaction of the affected individual. SCPC intends to mitigate any such complaints on a case-specific basis (SCPP 1998a page 6-33; SCPP 1999k page 2-17). SCPC has further noted that the line's corona-reducing design would be adequate to prevent any radio noise-related complaints. This is as staff expects for a line of the voltage proposed. Staff has proposed a condition of certification, **TLSN-2**, to require mitigation of any interference-related complaints on a case-specific basis, as required by the FCC. **TLSN-1** is also proposed by staff to require compliance with GO-52, also intended to prevent radio interference. Such compliance will ensure that there are no significant effects.

AUDIBLE NOISE

According to information from SCPC (SCPP 1998a pages 6-29 and 6-30; SCPP 1999k pages 2-14 and 2-15), even the low-corona design for the line could produce some corona-related noise especially during foul weather. However, the calculated foul-weather noise level of less than 50 dB at the edge of the right-of-way is less than the levels generally associated with complaints, for example, in the service area of the Bonneville Power Authority (BPA). The fair-weather level of less than 30 dB would not add significantly to existing noise levels under normal conditions. SCPC therefore, does not expect the noise from the proposed line design to generate any complaints in the area. Staff is in agreement with SCPC's conclusions regarding the noise level expected for the line voltage and the conductor configuration proposed. For an assessment of the noise from the

aspects of the project's operations, please refer to staff's analysis in the **Noise** section.

FIRE HAZARDS

The proposed line will be routed through a primarily agricultural area where adequate fire prevention and suppression measures will be implemented, as required by related regulations (SCPP 1998a page 6-38; SCPP 1999k, page 2-22). Compliance with the requirements of GO-90, and Title 14 CCR Section 1250 will ensure the clearance necessary to prevent fires possible from direct contact between the transmission line, trees and other objects. Compliance with condition of certification **TLSN-4,** as staff proposes, will prevent accumulation of combustible materials that would contribute to such fires.

HAZARDOUS SHOCKS

SCPC has stated their intention to comply with the requirements of GO-95, NESC, and Title 8, CCR Section 2700 et seq., to prevent hazardous shocks resulting from direct or indirect human contact with the overhead energized line. Therefore, they do not expect the proposed line to pose any such hazards to humans (SCPP 1999k pages 2-21 and 2-22). Staff does not expect such a hazard from the line as proposed and proposes a condition of certification, **TLSN-1**, to ensure implementation of the measures necessary.

NUISANCE SHOCKS AND ELECTRIC AND MAGNETIC FIELDS

SCPC calculated the maximum electric and magnetic field strengths across the 100-ft right-of-way for the proposed line. (SCPP 1999k pages 2-17 through 2-20; SCPP 1999m page 3.6-2). Staff has verified the accuracy of SCPC's calculations with regard to parameters and assumptions bearing on field strengths and dissipation, and exposure assessment. Such calculations can allow staff to assess the potential contribution of the line to area electric and magnetic fields during operations.

For the proposed line design, a maximum magnetic field strength of 50 mG was calculated for the area directly underneath the line, while a 10-mG was calculated for the edge of the right-of-way. These values, as noted by SCPC, are much lower than for fields from similar lines and significantly below the levels established by states with regulatory limits on such fields.

A maximum electric field strength of 1.5 kV/m was calculated for the area directly under the line. This is similar to fields from lines of similar voltage and design. Experience has shown nuisance shocks to be mostly associated with field strengths significantly greater than 1.6 kV/m in the transmission line environment. This 1.5 kV/m-field will diminish to around 0.024 kV/m at the edge of the right-of-way. Nuisance shocks of any significance are not expected, especially in light of the grounding measures to be implemented (SCPP 1999k page 2-21). Condition of certification **TLSN-3** is proposed by staff to verify that the fields are reduced to the extent proposed by the applicant while conditions of certification **TLSN-5** and **TLSN-6** are proposed to ensure the preventive measures necessary for nuisance shock mitigation in the case of property owners along the route.

CUMULATIVE IMPACTS

When two or more power lines are located close to one another, the cancellation effects of their interacting fields could reduce their respective contributions to total EMF exposure in their field impact areas. Such interaction could also be additive, increasing cumulative exposures. Existing methods allow the interactive effects of such fields to be reflected in the estimates obtained for such fields in their area of overlap.

In addition to the field strength values expected for the proposed line design, SCPP provided electric and magnetic field profiles across the proposed route to reflect the interactive effects of fields from the Sunrise project and lines associated with the existing and proposed area projects. The lines considered include the existing 115 kV, 230 kV and 500 kV PG&E lines, and the 230 kV lines associated with the proposed Midway-Sunset and La Paloma projects. These field strength profiles show that the proposed line will contribute to total exposures at, or below levels typical of such lines. SCPC intends to route the line along existing utility corridors, to the extent feasible (SCPP 1999k page 2-19). This is in keeping with current state policy encouraging the routing of new power lines within existing utility corridors.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Since electric or magnetic field health effects have neither been established nor ruled out for lines such as proposed for the Sunrise project, the public health significance of any project-related field exposure cannot be characterized with certainty. The long-term, mostly residential magnetic exposure at the root of the present health concern will likely occur in the area beyond the edge of the right-of-way. Project-related exposures estimates for such areas are significantly below levels associated with similar lines in the PG&E service area. This is due to SCPC's application of EMF-reducing measures to levels beyond PG&E's guidelines for the line voltage involved (SCPP 1999k page 2-20). These field strengths are significantly lower than levels established by states with specific regulatory limits for such fields. The 400-ft distance to the nearest residence along the identified routes would further serve to reduce long-term exposure to levels much below the relatively low values calculated for the edge of the right-of-way.

Any nuisance shocks from such lines will be minimized through grounding and other measures to be implemented by SCPC. Compliance with GO-90, GO-128 and Title 8, Section 2700 et seq. of the California Code of Regulations, will ensure the safety of humans around the line. Since the line will be located away from all area airports, any hazard to area aviation will be small. The use of an electric field-reducing conductor configuration together with an appropriate line maintenance program will minimize the potential for interference with radio-frequency communication.

RECOMMENDATIONS

Since the impacts of concern to staff will be mitigated to levels staff considers acceptable for lines of the type proposed, staff recommends approval for the route identified. If such approval is granted, staff recommends that the Commission adopt the following conditions of certification to ensure implementation of the measures necessary to achieve the field levels assumed for the line by the applicant.

CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed transmission line according to the requirements of GO-95, GO-52 and Title 8, Section 2700 et seq. of the California Code of Regulations.

Verification: Thirty days before start of transmission line construction, or a shorter time period as mutually agreed to by the project owner and the Project Compliance Manager (CPM), the project owner shall submit to the Commission's CPM a letter signed by a California registered engineer affirming that the transmission line will be constructed according the requirements of GO-95, and Title 8, Section 2700 et seq. of the California Code of Regulations.

TLSN-2 The project owner shall make every reasonable effort to identify and correct, on a case-specific basis, all complaints of interference with radio or television signals from operation of the line and related facilities. In addition to any transmission repairs, the relevant corrective actions should include, but shall not be limited to, adjusting or modifying receivers, repairing, replacing or adding antennas, signal amplifiers, filters, or lead-in cables.

The project owner shall maintain written records for a period of five years, of all complaints of radio or television interference attributable to operation together with the corrective action taken in response to each complaint. All complaints shall be recorded to include notations on the corrective action taken. Complaints not leading to a specific action, or for which there was no resolution should be noted and explained. The record shall be signed by the project owner and also the complainant, if possible, to indicate concurrence with the corrective action or agreement, with the justification for a lack of action.

Verification: All reports of line-related complaints shall be summarized and included in the Annual Compliance Report to the CPM.

TLSN-3 The project owner shall engage a qualified consultant to measure the strengths of the line electric and magnetic fields before and after the line is energized. Measurements should be made at appropriate points along the route to allow verification of design assumptions relative to field strengths. Measurements shall be completed 6 months after the line is energized. The areas to be measured should include the facility switchyard and any residences within 100 feet of the right-of-way.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after measurements are completed.

TLSN-4 The project owner shall ensure that combustible material in close proximity to the energized conductors (e.g. tree branches) is cleared from the right-of-way as required under the provisions of GO 95 and Title 14 Section 1250 of the California Code of Regulations.

Verification: The project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way, in a report to be filed at completion of construction and yearly after that, for a period of five years.

TLSN-5 The project owner shall send a letter to all owners of property within 100 feet or adjacent to the right-of-way at least 60 days prior to first transmission of electricity.

Protocol: The letter shall consist of the following:

- A discussion of the nature and operation of a transmission line.
- A discussion of the project owner's responsibility for grounding existing fences, gates and other large permanent chargeable objects identified during transmission line construction within the right-of-way regardless of ownership.
- A discussion of the property owner's responsibility for grounding and to notify the project whenever the property owner adds or installs a metallic object.
- A statement recommending against fueling motor vehicles or other mechanical equipment underneath the line.

Verification: The project owner shall submit the proposed letter to the CPM for review and approval 30 days prior to mailing to the property owners and shall maintain a record of correspondence (notification and response) related to this requirement, in a compliance file at the plant site. The project owner shall notify the CPM in the first Monthly Compliance Report that letters have been mailed and that copies are on file.

TLSN-6 The project owner shall ensure the grounding of any ungrounded permanent metallic objects identified during transmission line construction within the right-of-way, regardless of ownership. Such objects shall include fences, gates, and other large permanent chargeable objects. These objects shall be grounded according to procedures specified in the National Electrical Safety Code.

In the event of a refusal by the property owner to permit such grounding, the project owner shall so notify the CPM. Such notification shall Include, when

possible, the owner's written objection. Upon receipt of such notice, the CPM may waive the requirement for grounding the object involved.

Verification: At least 10 days before the line is energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

REFERENCES

Sunrise Cogeneration and Power Project (SCPP) 1998a. Application for Certification, Sunrise Cogeneration Power Project. (98-AFC-4). Submitted to the California Energy Commission, December 21, 1998.

Sunrise Cogeneration Power Project 1999k.Transmission Alternatives, Supplement Two, Submitted May 21, 1999

Sunrise Cogeneration Power Project 1999m. Transmission Supplement Two, Errata pages, Submitted June 4, 1999

Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and Above

Energy Commission Staff, 1992 High Voltage Transmission Lines: Summary of Health Effects Studies. California Energy Commission Publication, P700-92-002

National Institute of Environmental Health Services 1998. An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. A Working Group Report, August, 1998.

LAND USE

Testimony of Amanda Stennick

INTRODUCTION

This assessment of land use impacts for the Sunrise Cogeneration and Power Project (SCPP) focuses on two main issues: the conformity of the project with local land use plans, ordinances and policies; and the potential of the proposed project to have direct, indirect, and cumulative land use impacts with existing and planned uses. Indirect land use impacts such as noise, traffic, visual resources, air quality, biology, transmission line safety and nuisance, or public health are discussed in those specific areas.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

KERN COUNTY GENERAL PLAN

The general plan is the legal document that acts as a constitution for land use and development in Kern County. It consists of the seven mandatory elements: land use, circulation, open space, conservation, housing, safety and seismic safety, and noise; and four optional elements: recreation, energy, hazardous waste management, and public services and facilities. The following land use designations of the Kern County General Plan are specific to the proposed project.

LAND USE DESIGNATIONS

NONJURISDICTIONAL LAND

State and Federal Land. All property under the ownership and control of various state and federal agencies.

RESOURCE

Intensive Agriculture

Applies to areas devoted to the production of irrigated crops or having the potential for such use. Other agricultural uses may be consistent with the intensive agriculture designation. Minimum parcel size is 20 acres gross. Permitted uses include, but are not limited to:

- Primary: irrigated cropland, orchards, vineyards, ranch and farm facilities, etc.; one single-family dwelling unit.
- Compatible: livestock grazing, water storage, mineral and petroleum exploration and extraction, and public utility uses, etc., pursuant to provisions of the Zoning Ordinance.

Extensive Agriculture

Applies to agricultural uses involving large amounts of land with relatively low value-per-acre yields. Minimum parcel size is 80 acres gross, except lands not under Williamson Act Contract, in which case the minimum parcel size shall be 20 acres gross. Permitted uses include, but are not limited to:

- Primary: livestock grazing, dry land farming, ranching facilities, wildlife and botanical preserves, timber harvesting, etc.; one single-family dwelling unit.

- Compatible: irrigated croplands, water storage or ground water extraction, recharge areas, mineral, aggregate, and petroleum exploration, recreational activities, etc.

Mineral and Petroleum

Applies to area, which contains producing, or potentially productive, petroleum fields and mineral deposits. Uses are limited to activities directly associated with resource extraction. Minimum parcel size is 5 acres gross. Permitted uses include, but are not limited to:

- Primary: mineral and petroleum exploration and extraction.

- Compatible: extensive and intensive agriculture, mineral and petroleum processing, pipelines, power transmission facilities, communication facilities, equipment storage yards, and one single-family dwelling unit (subject to a Conditional Use Permit).

RESOURCE MANAGEMENT

Includes primarily open space lands containing important resource values such as wildlife habitat, scenic values, or watershed recharge areas. Other lands may include undeveloped, non urban areas that do not warrant additional planning within the foreseeable future because of current or anticipated population levels or marginal physical development. Minimum parcel size is 20 acres gross, except land subject to a Williamson Act Contract, in which case the minimum parcel size must be 80 acres gross. Permitted uses include, but are not limited to:

- Primary: Recreational activities, livestock, grazing, dry land farming, ranching facilities, wildlife and botanical preserves, and timber harvesting; one single family dwelling unit.

- Compatible: Irrigated croplands, water storage or groundwater recharge areas, mineral, aggregate, and petroleum exploration and extraction, and open space and recreational uses; one single family dwelling, land within development areas subject to significant physical constraints, and state and federal land which have been converted to private ownership.

SOLID WASTE FACILITIES

Includes existing or planned public, semi-public, or private solid waste facilities. Permitted uses include, but are not limited to the following:

- Primary: Sanitary landfills, large volume transfer stations, waste-to-energy facilities, and non-hazardous oily waste disposal fields.

- Compatible: Small volume transfer stations and septic disposal fields.

PHYSICAL CONSTRAINTS

Includes overlay zones denoting physical constraints. Those applicable include:

- Seismic Hazard: Includes the Alquist-Priolo Special Study Zone and other active fault zones.

- Flood Hazard: Based on the Flood Hazard Boundary Maps of the US Department of Housing and Urban Development and the Kern County Water Agency. These areas include, for example, flood channels and watercourses, riverbeds, and gullies. Development within these areas is subject to review by the County and will include conformity with adopted ordinances.

The following tables indicate the Kern County General Plan land use designations and existing land uses of the proposed project and transmission line corridor. Sunrise has eliminated Alternative Transmission Line Route A because it is not commercially viable.

GENERAL PLAN LAND USE DESIGNATIONS WITHIN THE STUDY AREA

Location or Linear Facility	Land Use Designation
Sunrise Cogen and Power Plant	Extensive Agricultural
Transmission line corridor	Extensive Agriculture/ Mineral and Petroleum
Steam Injection and Production Wells	Extensive Agriculture/ Mineral and Petroleum

EXISTING LAND USES WITHIN THE STUDY AREA

Location or Linear Facility	Existing Land Uses
Sunrise Cogen and Power Plant	Undeveloped/Oil Wells/Abandoned Steam Units
Transmission line corridor (B,D,E,F)	BLM lands/ Lokern Natural Area/California Aqueduct/West Side Canal/ Kern County Flood Levee/Agricultural lands/Oil Production/Undeveloped/Residential/ PG&E Midway Substation
Steam Injection and Production Wells	Undeveloped/Oil Wells

LAND USE PLANS AND POLICIES RELATED TO THE SUNRISE COGENERATION AND POWER PLANT

The following provisions of the Kern County General Plan are specific to the proposed project. Please refer to the **Socioeconomic Resources, Air Quality, Noise, Public Health,** and **Hazardous Materials** sections of the Final Staff Assessment (FSA) for a discussion of the applicable policies of the Public Facilities Element of the Kern County General Plan. Please refer to the **Biological Resources, Cultural and Paleontological Resources** sections of the FSA for a discussion of the applicable policies of the U.S. Fish and Wildlife Service and the Caliente Resource Management Plan.

NONJURISDICTIONAL LAND

- Coordination and cooperation will be promoted among the County, the incorporated cities and the various special districts where their planning decisions and actions affect more than a single jurisdiction (Policy No. 1).

- Land under state and federal jurisdiction will be considered as land designated for “Resource Management” on the General Plan map (Policy No. 4).

PHYSICAL CONSTRAINTS

- Kern County will not permit new developments to be sited on land that is environmentally unsound to support such development (Policy No. 1).

- Development will not be allowed in natural hazard areas, pending the adoption of ordinances that establish conditions, criteria and standards in order to minimize risk to life and property posed by those risks (Policy No. 2).

- Zoning and other land use controls will be used to regulate and, in some instances, to prohibit development in hazardous areas (Policy No. 3).

- New development will not be permitted in areas of landslide or slope instability as designated in the Safety and Seismic Safety Element of the General Plan, and as mapped on the Kern County Seismic Hazard Atlas (Policy No. 6).

- Regardless of percentage of slope, development on hillsides will be sited in the least obtrusive fashion, thereby minimizing the extent of topographic alteration required (Nonjurisdictional Land - Policy No. 1, p. 1 - Policy no. 9)

- Development proposed in areas with steep slopes will be reviewed for conformity to the adopted Hillside Development Ordinance to ensure that appropriate stability, drainage, and sewage treatment will result (Policy No. 10).

- Designated flood channels and watercourses, such as creeks, gullies, and riverbeds, will be preserved as resource management areas or, in the case of the urban areas, as linear parks (Policy No. 12).

- New development will be required to demonstrate the availability of adequate fire protection and suppression facilities (Policy No. 13).

- Kern County will evaluate the potential noise impacts of any development-siting action or of any applications it acts upon that could significantly alter noise levels in the community and will require mitigative measures where significant adverse effects are identified (Policy No. 14).

- The air quality effects of a proposed land use will be considered when evaluating development proposals (Policy No. 15).

- Kern County will disapprove projects found to have significant adverse effects on Kern County's air quality, unless the Board of Supervisors, Board of Zoning Adjustment, or the Director of Planning and Development Services, acting as Hearing Officer or Parcel Map Advisory Agency makes findings under CEQA (Policy No. 16).

RESOURCE

- Areas designated agricultural use, which include Class I and II agricultural soils with surface water delivery systems, will be protected against residential and commercial subdivision and development activities (Policy No. 1).

- Areas identified by the Soil Conservation Service as having high range-site value will be reserved for extensive agricultural use, or as resource reserves if located within a County water district (Policy No. 2).

- In areas with a Resource designation on the General Plan map, only industrial activities which directly and obviously relate to the exploration, production, and transportation of the particular resource will be considered to be consistent with this plan (Policy No. 4).

- Development will be constrained, pending adoption of ordinances which establish conditions, criteria, and standards, in areas containing valuable resources in order to protect the access to and economic use of these resources (Policy No. 9).

- Agriculture and other resources will be considered a compatible use in areas designated for Mineral and Petroleum Resource uses on the General Plan until such time as the oil activities become too intensive to enable other resource uses to continue (Policy No. 10).

- Rivers and streams in the County are important visual and recreational resources and wildlife habitats. Areas of riparian vegetation along rivers and streams, will therefore, be preserved when feasible to do so (Policy No. 11).

- The County will maintain and enhance air quality for the health and well-being of County residents by encouraging land uses which promote air quality and good visibility (Policy No. 13).

- Habitats of threatened or endangered species should be protected to the greatest extent possible (Policy No. 14).

- Areas designated as Resource Reserve, Extensive Agriculture, and Resource Management which are presently under Williamson Act Contracts will have a minimum parcel size of 80 acres until such time as a contract expires or is canceled, at which time the minimum parcel size will become 20 acres (Policy No. 15).

- The County will encourage development of alternative energy sources by tailoring its Zoning and Subdivision Ordinances and building standards to reflect Alternative Energy Guidelines published by the California State Energy Commission (Policy No. 17).

General Provisions

- Prior to issuance of any development or use permit, the County shall make the finding, based on information provided by California Environmental Quality Act (CEQA) documents, staff analysis, and the applicant, that adequate public or private services and resources are available to serve the proposed development. The developer shall assume full responsibility for costs incurred in service extensions or improvements that are required as a result of the proposed project (Policy No. 3).

- The air quality implications of new development will be considered in approval of major developments or area wide land use designations (Policy No. 15).

- The County will promote the preservation of designated historic buildings and the protection of cultural resources which provide ties with the past and constitute a heritage value to residents and visitors (Policy No. 16).

- Maintain the County's inventory of areas of potential cultural and archaeological significance (Implementation G).

Energy Element of the Kern County General Plan

- The County shall encourage the development and upgrading of transmission lines and associated facilities (e.g., substations) as needed to serve Kern County's residents and access the County's generating resources, insofar as transmission lines do not create significant environmental or public health and safety hazards (Policy No. 1).

- The County shall review proposed transmission lines and their alignments for conformity with the Land Use Element of the Kern County General Plan (Policy No. 2).

- In reviewing proposals for new transmission lines and/or capacity, the County shall assert a preference for upgrade of existing lines and use of existing corridors where feasible (Policy No. 3).

- The County shall work with other agencies in establishing routes for proposed transmission lines (Policy No. 4).

- The County shall discourage the siting of aboveground transmission lines in visually sensitive areas (Policy No. 5).

- The County should encourage new transmission lines to be sited/configured to avoid or minimize collision and electrocution hazards to raptors (Policy No. 6).

- The County should monitor the supply and demand of electrical transmission capacity locally and statewide (Implementation A).

- The County shall continue to maintain provisions in the Zoning Ordinance and update as necessary to provide for transmission line development (Implementation B).

McKittrick Rural Community Plan

The McKittrick Rural Community Plan has been developed using the criteria, goals, policies, and implementing ordinances of the Kern County General Plan. Programs and document framework for the McKittrick Plan are the same as those used in the Kern County General Plan.

Buttonwillow Community Development Plan

Open Space

- Encourage continuing dual use of transmission line easements as open space or possibly greenbelt areas (Implementation. P. 23).

- Continuance of land use contracts under the provisions of the Williamson Act and maintenance of the A (Exclusive Agricultural) zoning classification for agricultural lands (Implementation, P. 25).

- Encourage continuance of land use contracts under the provisions of the California Land Conservation Act of 1965, as amended, and commonly referred to as “The Williamson Act” (Implementation, P. 30).

KERN COUNTY ZONING CODE

The Kern County Zoning Ordinance was adopted in July 1997. The ordinance implements the Kern County General Plan by applying development standards and construction requirements on land as it is developed within the unincorporated areas of the county. The following divisions of the Kern County Zoning Ordinance apply to the project.

ZONING DISTRICTS

EXCLUSIVE AGRICULTURE (A)

Areas that are suitable for agricultural uses. This designation is designed to prevent the encroachment of incompatible uses onto agricultural lands and the premature conversion of such lands to non-agricultural uses. Permitted uses in the “A” District are limited primarily to agriculture and other activities compatible with agriculture.

LIMITED AGRICULTURE (A-1)

Areas that are suitable for a combination of estate-type residential development, agricultural uses, and other compatible uses.

LOW-DENSITY RESIDENTIAL (R-1)

Areas that are suitable for traditional smaller lot, single-family homes and compatible uses. Maximum density is limited to ten dwelling units per net acre.

MEDIUM-DENSITY RESIDENTIAL (R-2)

Areas that are suitable for single-family duplex, and other medium-density, multifamily residential uses. Maximum density is limited to 16 dwelling units per net acre.

FLOODPLAIN COMBINING DISTRICT (FP)

Applied to those areas lying within Zone A on the Flood Insurance Rate Maps (FIRM). Permitted uses in an FP District are those uses permitted by the base district with which the FP District is combined.

NATURAL RESOURCE (NR)

Lands with this designation are productive or potentially productive petroleum, mineral, or timber resource areas; the designation is designed to prevent the encroachment of incompatible uses onto such lands. Uses in the “NR” District are limited to resource exploration, production and transportation, and to compatible activities.

The following table indicates the zoning designation of the project site and land within the areas of the proposed transmission line corridor.

Project Zoning Designations And Affected Land Area

Location or Linear Facility	Zoning Designations
Sunrise Project	A
Transmission Line Routes, B, D, E, F	A, A1,FP,NR, R-1, R-2
Valley Acres Substation	A
Steam Production and Injection Wells	A, A-1, NR

The following chapters of the Kern County Zoning Ordinance apply to the project. Section 19.80.30 of Chapter 19.80 (Special Development Standards – Commercial and Industrial Districts); Sections 19.82.030 and 19.82.090 of Chapter 19.82 (Offstreet Parking - Design and Development Standards); and Section 19.86.060 of Chapter 19.86 (Landscaping Standards – Industrial Uses).

SETTING

The proposed project is located in western Kern County, about 35 miles southwest of Bakersfield, California. The applicant proposes to lease 20 acres of an existing 80-acre parcel from Texaco California Inc. (TCI). The proposed 20-acre parcel would be situated within the Midway-Sunset oil field, about three miles northwest of the community of Fellows and 2.5 miles south of Derby Acres. State Highway 33 is about 1.3 miles east of the site. The vicinity of the site is heavily developed and utilized by Texaco and other petroleum companies for natural gas and oil production. Numerous petroleum recovery and storage facilities, electric and petroleum transmission facilities, and access roads characterize the area. There are no parks, recreational, educational, religious, agricultural areas, health care facilities, or commercial uses on the site or within a one-mile radius of the site. Please refer to the **Project Description** section of this FSA for a map showing the regional location of the project.

TRANSMISSION LINES

At this time, a jointly developed transmission line is being discussed with Energy Commission staff and other project proponents (La Paloma and Midway-Sunset) in western Kern County. A jointly developed transmission line would reduce environmental impacts and congestion-related substation costs. However, no options have been agreed to at this time. The originally proposed Route A is no longer being considered because of commercial reasons. The preferred Route is comprised of Route B and subsets, D, E, and F and is hereafter referred to as the transmission corridor. Each of the Route B options (B, D, E, F), follows the same corridor alignment but reflects different potential partnership arrangements among the Midway Sunset and La Paloma projects. All transmission alternatives under consideration would result in a direct interconnection to the Midway Substation in Buttonwillow. Please refer to the **Project Description** section of the FSA for a complete description of the transmission line corridor.

Several residences near the community of Buttonwillow and Mirasol Avenue south of Buerkle Road are located within one-half mile of the transmission line corridor. No other sensitive receptors are located within this proposed corridor. Please refer to the **Transmission Line Safety and Nuisance** section of the FSA for a discussion of potential impacts.

Sunrise is proposing to obtain permission for use of the transmission line corridor from private and public landholders through purchase of rights-of-way and easements. Landowners along the proposed transmission corridors are listed in the Sunrise Application For Certification (AFC). Sunrise states that negotiations with private landowners are on hold pending final approval of the preferred route. Sunrise has submitted applications with the U.S. Department of Energy and the U.S. Bureau of Land Management for easements and rights-of-way permits.

AGRICULTURAL RESOURCES

Information contained in the AFC states that no land within one mile of the proposed project and Valley Acres Substation is Prime, Unique, or Farmland of Statewide Importance as defined by the California Department of Conservation. Land in the vicinity of the project is defined by the California Department of Conservation as grazing land. Therefore, no agricultural lands will be taken out of production for construction of the power plant site and Valley Acres Substation.

Land within one-quarter mile of the proposed the transmission line corridor is zoned Exclusive Agriculture (A) and Limited Agriculture (A-1). However, eighteen miles of the twenty-three mile route are not currently in agricultural production (Radian1999). The transmission line corridor will cross seven parcels in this area that are under Williamson Act contracts but are not currently farmed. These parcels are not irrigated and do not qualify as Prime Farmland by the California Department of Conservation.

Placement of aboveground transmission lines by private utilities under Williamson Act contracts is permitted by right under the Kern County Zoning Ordinance.

IMPACTS

DIRECT IMPACTS

DEPARTMENT OF CONSERVATION'S DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

A January 21, 1999 letter from Department of Conservation's Division of Oil, Gas, and Geothermal Resources (Division) states that the proposed project is located within the administrative boundaries of the Midway-Sunset and Buena Vista oil fields. Review of the AFC by the Division determined that there are numerous plugged, abandoned, idle, producing and injection wells within proximity of the project site and the project's proposed linear facilities (transmission line, poles, and

conductors). As stated in the AFC, discretionary approval from the Division will be required to obtain a Permit to Conduct Class II Oil Well Operations. At this time, Sunrise has not submitted a Notice of Intention to the Division Office in Bakersfield. Please refer to the **Transmission Line Safety and Nuisance** section of the FSA for a discussion of compliance with LORS, impacts and proposed mitigation in this area.

CONSTRUCTION OF POWER PLANT AND SWITCHYARD

The project site is situated on land within an existing oil and gas production field and comprises twenty acres of an existing 80-acre parcel. As stated above, Sunrise proposes to lease the twenty acres from TCI. The project site is zoned Exclusive Agriculture (A). Kern County has determined that the project qualifies as a cogeneration facility primarily intended for steam production used for production of oil or gas and is permitted by right under the Kern County Zoning Ordinance. Thus, the project requires no discretionary permits from the county. However, the physical layout of the project and associated infrastructure would still have to comply with requirements set forth in the Kern County Zoning Ordinance (please refer to **MITIGATION,** below for a discussion of proposed mitigation measures). Construction of the proposed project would not result in a change in land use in the area. There are no parks, recreational areas, schools, churches, health care facilities, or commercial uses on the site or within a one-mile radius of the site. Some residences within the communities of Fellows and Derby Acres may experience short-term construction impacts such as increased noise, dust, traffic and vehicle emissions. Please refer to the **Noise, Traffic and Transportation,** and **Air Quality** sections of the FSA for a discussion of potential impacts and associated mitigation in these areas.

CONSTRUCTION OF TRANSMISSION LINES

A total of 175 transmission poles will be used for the transmission line corridor. Information in the AFC states that about 0.05 acre of land will be used for 25 poles, therefore approximately 0.35 acre of land will be used for construction of the 175 poles. The proposed route will traverse lands zoned “A” (Exclusive Agriculture) and the Limited Agriculture (A-1). Under the Kern County Zoning Ordinance, transmission lines in the “A” and A-1 districts are permitted by right, and require no discretionary permits from the county. Because of the insignificant amount of land used for construction, Energy Commission staff does not consider this an adverse impact to land use or agricultural production.

As stated in the AFC, portions of the transmission line corridor will traverse BLM lands within the Caliente Resource Management Area. The area encompasses about 590,000 acres of public land and 450,000 acres of federal-reserved mineral estate land. The Caliente Resource Management Area was established for the protection and recovery of threatened and endangered species and to promote oil and gas production. The sub-region of the Caliente Resource Management Area affected by the project is the Lokern Area of Critical Concern. Please refer to the **Biological Resources** section of the FSA for a discussion of the Caliente Resource Management Area and Lokern Area of Critical Concern, potential impacts and associated mitigation.

PROJECT INDIRECT IMPACTS

CONSTRUCTION OF STEAM INJECTION AND PRODUCTION WELLS

In addition to providing electricity to California's energy market, the Sunrise project will provide thermal energy in the form of steam to the adjacent thermal host (TCI) for use in enhanced oil recovery. TCI is managed by Texaco North American Production (TNAP), whose business plans call for expansion of oil production in the Midway-Sunset oil field. The new steam injection and production wells are directly served by the project and its related facilities. The Kern County Zoning Ordinance states that resource extraction and energy development uses are permitted by right in the Agriculture Exclusive (A), the Limited Agriculture (A-1), and the Natural Resource (NR) zoning districts and require no discretionary permits from the county. For this reason, Energy Commission staff does not consider construction of steam injection and production wells an adverse impact to land use. Energy Commission staff notes that the permitting authority for production wells is the Department of Conservation's Division of Oil, Gas, and Geothermal Resources, and the permitting authority for steam generators is the San Joaquin Valley Unified Air Pollution Control District. Sunrise has provided copies of all permits as submitted under California Unions for Reliable Energy (CURE) Data Responses, Set 1A.

CUMULATIVE IMPACTS

In general, Energy Commission staff considers conversion of agricultural lands to non-agricultural uses, and changes in land use patterns to be significant cumulative impacts.

The vicinity of the site is heavily developed and utilized by Texaco and other petroleum companies for natural gas and oil production. Numerous petroleum recovery and storage facilities, electric and petroleum transmission facilities, and access roads characterize the project area. Continued development of the Midway Sunset oilfield by TCI and other oilfield operators is expected over the next several years. In general, existing land use in western Kern County is characterized by oil fields and natural resource development, with land designated and zoned for agricultural use, grazing, resource extraction, and energy development uses.

In addition to the proposed project, other regional projects include La Paloma, six miles north of Sunrise, and Elk Hills, eight miles northeast of Sunrise. Because La Paloma and Elk Hills are located within existing oil fields, no conversion of agricultural lands or changes in land use patterns are expected to occur as a result of construction and operation.

As stated above, under the Kern County Zoning Ordinance, transmission lines in the A and A-1 districts are permitted by right, and require no discretionary permits from the county. Thus, Energy Commission staff does not consider the construction and operation of transmission lines for the La Paloma and Elk Hills projects to be significant adverse cumulative impacts to land use in the area. In addition, because La Paloma and Elk Hills are not cogeneration projects, absent the Commission's jurisdiction, both projects would require a conditional use permit from

Kern County. (Please refer to the Final Staff Assessment (FSA) for La Paloma on conditions of approval consistent with Kern County's zoning ordinance and general plan.) For these reasons, Energy Commission staff finds that the La Paloma, Sunrise, and Elk Hills projects will not have a significant adverse cumulative impact on land use in western Kern County.

TCI MAIN UTILITY CORRIDOR

Please refer to the **PROJECT DESCRIPTION** section of the FSA, or section 2.0 of the AFC for a complete physical description of the TCI Main Utility Corridor. The TCI Main Utility Corridor extends from the northwest boundary of the Midway-Sunset oil field to about two miles northwest of Fellows, for a distance of about 4.5 miles. Land use within the corridor is primarily oil and gas production, and open space. Zoning in this area is Agriculture Exclusive (A) and Limited Agriculture (A-1). The Kern County Zoning Ordinance states that resource extraction and energy development uses are permitted by right in the Agriculture Exclusive (A) and the Limited Agriculture (A-1) zones. For this reason, Energy Commission staff does not consider the TCI Main Utility Corridor an adverse cumulative impact to land use.

CONSISTENCY WITH LAND USE PLANS, POLICIES, AND REGULATIONS

The project site is designated Extensive Agricultural in the Kern County General Plan. Based on policies in the Kern County General Plan, the project is compatible with this land use designation. The site is zoned Exclusive Agriculture (A). Under the Kern County Zoning Ordinance, a cogeneration plant is permitted by right in the Agriculture Exclusive (A) and the Limited Agriculture (A-1) zones, and therefore, requires no discretionary permits from the county. The proposed transmission line route will traverse lands zoned Exclusive Agriculture and Limited Agriculture. The Kern County Zoning Ordinance states that transmission lines in these zones are permitted by right, and require no discretionary permits from the county. The Kern County Zoning Ordinance states that utility substations are permitted by right in the Exclusive Agriculture and Limited Agriculture zones, and require no discretionary permits from the county. In addition, the Kern County Zoning Ordinance states that resource extraction and energy development uses are permitted by right in the Agriculture Exclusive (A) and the Limited Agriculture (A-1) zones and require no discretionary permits from the county. However, the physical layout of the project and associated infrastructure would still have to comply with requirements set forth in the Kern County Zoning Ordinance. Therefore, to satisfy certain provisions of Chapters 19.12, 19.86, and 19.82 of the Kern County Zoning Ordinance, Energy Commission staff has required Sunrise to prepare a site plan that includes provisions to satisfy the fourteen requirements of the Kern County Zoning Ordinance (please refer to **MITIGATION**, below).

In addition, the project proposes development on a twenty-acre portion of an eighty-acre parcel of record. To satisfy provisions of the Subdivision Map Act, the Kern County Planning Department determined that TCI, landowner for the Sunrise Project site, file an application for a lot line adjustment to create the twenty-acre

parcel for the project. TCI filed the application on July 13, 1999. Kern County is expected to take action on this request on August 10, 1999. Energy Commission staff finds that with approval of the lot line adjustment and proposed condition of certification **LAND-1**, Sunrise will comply with all federal, state, and local applicable laws, ordinances, regulations, standards, plans and policies.

FACILITY CLOSURE

PLANNED 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. Facility closure would have to comply with all applicable policies in the Kern County General Plan and ordinances in effect at the time of closure.

UNEXPECTED TEMPORARY CLOSURE

This unplanned 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

This unplanned 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.

In February 1997, the Compliance Office of the Energy Commission conducted a Plant Closure Survey. The survey was sent to various local and state agencies to determine whether these agencies had any regulations or compliance procedures regarding the closure of power plants and other large industrial facilities. At that time, Kern County responded that they had no requirements for a closure plan and no requirements for site restoration. At present, Kern County has no specific requirements regarding closure and site restoration. However, they have requested that any closure plans required by the Energy Commission be subject to an advisory review by Kern County. In that way, Kern County could provide site/project specific comments at that time (Rickels 1999).

MITIGATION

Under the Kern County Zoning Ordinance, a cogeneration plant is permitted by right in the Agriculture Exclusive (A) and the Limited Agriculture (A-1) zones, and therefore, requires no discretionary permits from the county. However, the physical layout of the project and associated infrastructure would still have to comply with requirements set forth in the Kern County Zoning Ordinance. Therefore, to satisfy certain provisions of Chapters 19.80, 19.82, and 19.86 of the Kern County Zoning

Ordinance, Energy Commission staff has required Sunrise to prepare a site plan that includes provisions to satisfy the following fourteen requirements of the Kern County Zoning Ordinance.

1. Prior to the issuance of any building or grading permits, the method of water supply and sewage disposal shall be as required by the Kern County Environmental Health Services Department.

2. Fire suppression requirements, access and fire protection facilities shall be as required by the Kern County Fire Department.

3. Prior to the issuance of any building or grading permits, a plan for the disposal of drainage waters originating on site and from adjacent road rights-of-way shall be reviewed by the Kern County Engineering and Survey Services Department/Floodplain Management Section, if required and commented on. Easements or grant deeds shall be given to the County of Kern for drainage purposes or access thereto, as necessary.

4. The development shall comply with any requirements of the San Joaquin Valley Unified Air Pollution Control District.

5. All obstructions, including utility poles and lines, trees, pole signs, or similar obstructions, shall be removed from the ultimate road rights-of-way in accordance with Section 18.55.030 of the Land Division Ordinance. Compliance with this requirement is the responsibility of the applicant and may result in significant financial expenditures.

6. A minimum of 8 on-site parking spaces shall be provided at the plant site.

7. All vehicle parking and maneuvering areas around the four power islands shall be surfaced with a minimum of two inches of Asphalt Concrete paving or material of higher quality.

8. All vehicle parking and maneuvering areas around the switchyard shall be surfaced with one of the following: three inches of decomposed granite, three inches of compacted rock dust, three inches of gravel, or three inches of a material of a higher quality.

9. Vehicle parking spaces shall be 9 feet by 20 feet or larger in size and shall be designated by white painted stripes, except as provided in Sections 19.82.030 and 19.82.040 of the Zoning Ordinance.

10. Parking lot or site illumination shall be directed away from adjoining properties and public roads.

11. A comprehensive landscaping and maintenance irrigation plan shall be approved by the Planning Director in accordance with the requirements of Chapter 19.86 of the Zoning Ordinance. A minimum of five percent of the total developed area shall be landscaped and continuously maintained in good condition. If the required parking area contains more than ten spaces, a minimum of 5 percent of the interior parking area shall be landscaped, with trees planted at a ratio of one tree per ten spaces. Parking area landscaping, if necessary, shall be in accordance with Section 19.82.090 of the Zoning Ordinance and may be used in the calculation of total landscaping requirements. Landscaping shall be installed or bonded for prior to occupancy of the building or site.

12. During all on-site grading and construction activities, adequate measures shall be implemented to control fugitive dust.

13. All trash receptacles shall be screened in such a manner so that they are not visually obtrusive from any off-site location.

14. The areas devoted to outside storage shall be treated with a dust binder or other dust control measure, as approved by the Director of the Kern County Planning Department. Screening, if required by the base district regulations, shall also be provided.

CONCLUSION AND RECOMMENDATION

Energy Commission staff's analysis indicates that the project by itself, and cumulatively, will have no land use impacts that cannot be mitigated to a level below significance. If staff's conditions of certification are implemented, the project will comply with all applicable laws, ordinances, regulations, standards, plans and policies. Energy Commission staff is proposing conditions of certification in **Biology**, **Transmission Line Safety and Nuisance, Noise, Traffic and Transportation,** and **Air Quality** that that will mitigate any impacts in these areas to a level below significance. If the Commission certifies the proposed project, staff recommends that it adopt the following condition of certification.

PROPOSED CONDITIONS OF CERTIFICATION

LAND USE-1 Prior to the start of construction, the project owner shall submit a site plan for the project to Kern County for their review and comment, and to the California Energy Commission Compliance Project Manager (CPM) for review and approval. The site plan shall comply with all applicable provisions of Chapters 9.12, 19.86, and 19.82 of the Kern County Zoning Ordinance. The project owner shall provide a letter of comment from the Kern County Planning Director stating that the project is consistent with the provisions of the Kern County General Plan and Zoning Ordinance.

Protocol: The project owner shall submit to the CPM for review and approval a site plan, including a landscaping plan. The project owner shall submit a letter from the Kern County Planning Director stating that the site plan conforms to Kern County's Zoning Code and has been approved by the County. If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan. The landscaping shall not be planted before the plan is approved. The project owner shall notify the CPM when the landscaping has been planted and is ready for inspection.

At least 60 days prior to the start of any ground disturbance related to construction, the project owner shall submit the proposed landscape plan and a copy of the letter of comment from the Kern County Planning Director to the CPM for review and approval. The project owner shall submit any required revisions within 30 days of notification by the CPM. The project owner shall complete installation of the landscaping by the end of the first planting season following first electricity generation.

The project owner shall notify the CPM within seven days after the landscaping is planted that the landscaping is ready for inspection.

REFERENCES

Chu, Min (Chu 1999). Engineer with Department of Conservation, Division of Oil, Gas, and Geothermal Resources. Conversation with Amanda Stennick on March 22, 1999.

Department of Conservation, Division of Oil, Gas, and Geothermal Resources (Division 1998a). Letter dated August 4, 1998 regarding request for Agency review of the La Paloma Generating Project Application for Certification (96-AFC-2) located in Kern County.

Department of Conservation, Division of Oil, Gas, and Geothermal Resources (Division 1998b). Letter dated December 21, 1998 regarding La Paloma Generating Project mitigation for powerline and pipeline linear routes.

Department of Conservation, Division of Oil, Gas, and Geothermal Resources (Division 1998c). Letter dated August 26, 1999 regarding Sunrise Notices of Intention to Drill two Class II injection wells. As of this letter, the notices to drill have not been received by the Bakersfield Office.

Kern County General Plan, adopted March 1982. Revised March 1994.

Kern County Zoning Ordinance, July 1997.

Kern (Kern County Planning Department/Rickels) 1999b. Letter regarding Submission of Revised Section 8.4 Land Use. Submitted to the California Energy Commission on February 19, 1999.

Kern (Kern County Planning Department/Rickels) 1999a. Revisions to Section 8.4 – consistant with the requirements of Kern County. Submitted to the California Energy Commission on February 11, 1999.

Rickels, David. Senior Planner, Kern County Planning Department. Conversations with Amanda Stennick during December 1998 and January 1999.

Rickels, David. Senior Planner, Kern County Planning Department. March 18, 1999 FAX to Amanda Stennick regarding La Paloma facility closure plans.

SCPP(Sunrise Cogeneration and Power Project) 1998a. Application for Certification, Sunrise Cogeneration and Power Company (98-AFC-4). Submitted to the California Energy Commission, December 21, 1998.

SCPP (Sunrise Cogeneration & Power Project/King) 1999e. Data Responses – SET ONE. Submitted to the California Energy Commission on March 31, 1999.

SCPP (Sunrise Cogeneration & Power Project/King) 1999f. CURE Data Responses (Set One). Submitted to Adams Broadwell & Joseph on April 8, 1999.

SCPP (Sunrise Cogeneration and Power Project/King) 1999g. Data Responses, Set 1A. Submitted to the California Energy Commission on April 15, 1999.

SCPP (Sunrise Cogeneration and Power) 1999h. Data Responses, Set 1B (Attachment: Proof of Service). Submitted to the California Energy Commission on April 30, 1999.

SCPP (Sunrise Cogeneration and Power) 1999i. CURE Data Responses, 1A. Submitted to Adams, Broadwell & Joseph (CURE) on May 5, 1999.

SCPP (Sunrise Cogeneration and Power) 1999j. Transmission Alternatives, Supplement One. Submitted to California Energy Commission on May 5, 1999.

CEC/SCPP (California Energy Commission/K. Bergquist and Sunrise Cogeneration & Power Project/J. Harris) 1999a. Joint Blueprint (98-AFC-4). Submitted to the California Energy Commission on May 21, 1999.

SCPP (Sunrise Cogeneration and Power Project) 1999k. Transmission Alternatives, Supplement 2. Submitted to the California Energy Commission on May 21, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999m. Transmission Supplemental 2 – Sections 3.0, 4.0, remaining Appendices and Errata. Submitted to the California Energy Commission on June 4, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999n. Data Responses – Set 2. Submitted to the California Energy Commission on June 15, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999q. Responses to California Energy Staff Questions During June 14, 1999 Workshop. Submitted to the California Energy Commission on June 30, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999r. Comments on the California Energy Commission Preliminary Staff Assessment. Submitted to the California Energy Commission on September 2, 1999.

NOISE

Testimony of Kisabuli

INTRODUCTION

The construction and operation of any power plant creates noise. The character and loudness of this noise, the times of day or night during which it is produced, and the proximity of the facility to sensitive receptors combine to determine whether a proposed project will meet applicable noise control laws and ordinances, and whether it will exhibit significant adverse environmental impacts.

The purpose of this analysis is to identify the likely noise impacts from the Sunrise project and to recommend conditions to ensure that the resulting noise impacts will comply with applicable laws and ordinances, and will be adequately mitigated.

Before certifying the Sunrise project, the Energy Commission must find that the project:

1. will likely be built and operated in compliance with all applicable noise laws, ordinances, regulations and standards; and

2. will present no significant adverse noise impacts, or none that have not been mitigated to the extent feasible.

For a description of the terms used to describe noise and methods to measure and evaluate noise, please see **"NOISE: Appendix A"**.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

Under the Occupational Safety and Health Act of 1970 (29 USC § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations (29 CFR § 1910.95) that establish maximum noise levels to which workers at a facility may be exposed. These 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 during which the worker is exposed. (Please see **Noise: Appendix A, Table A4** immediately following this section.) OSHA regulations also dictate hearing conservation program requirements and workplace noise monitoring requirements.

There are no federal laws governing offsite (community) noise.

STATE

Similarly, there are no state regulations governing offsite (community) noise. Rather, state planning law (Gov. Code, § 65300) requires that all counties and cities prepare and adopt a General Plan. Government Code section 65302(f) requires that a noise element be prepared as part of the General Plan. This element is to "address existing and foreseeable noise problems…." Other state laws, ordinances, regulations and standards (LORS) include the California Environmental Quality Act (CEQA) and the California Occupational Safety and Health Act (Cal-OSHA).

CAL-OSHA

As a result of the passage of Cal-OSHA the California Occupational Safety and Health Administration (Cal-OSHA) has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, § 5095 et seq.) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards described above.

CEQA

CEQA requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. The applicable CEQA Guidelines (Cal. Code Regs., tit. 14, §15000 et seq., Appendix G §XI) explain that 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 ground vibration or ground-borne noise levels.

(c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

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

LOCAL

KERN COUNTY GENERAL PLAN - NOISE ELEMENT

Kern County has established environmental noise limits based on the land use of the property receiving the noise. The permissible noise levels are outlined below.

NOISE: Table 1
Kern County General Plan-Noise Element

Land Use Category	Maximum Permissible Sound Level		
	L_{50} (Day)	L_{50} (Night)	CNEL
Non-sensitive Land Uses	65	60	75
Moderately Sensitive Land Uses	60	55	70
Sensitive Land Uses	55	45	65
Highly Sensitive Land Uses	50	40	60

The noise sensitive receptors near the Sunrise project site include residences within Derby Acres. According to the Kern County Noise Element, these single-family rural dwellings would be classified as Highly Sensitive Land Uses. As such, the maximum allowable noise level from the Sunrise project at the residential properties is the L_{50} (Night) of 40 dBA.

SETTING

A few industrial installations, permanent and temporary (mobile) offices, are dispersed around the site. The closest of these is approximately 200 feet north of the site. There are two houses adjacent to each other, on the east of Highway 33. These two houses are located about 1.3 miles east of the site. The two houses are the nearest sensitive receptors to the site and are classified as Sensitive Land Uses under the Kern County General Plan – Noise Element. There are no schools, hospitals or other sensitive receptors within a 2-mile radius (identified by staff as an area outside which construction and operation of a powerplant project is not likely to cause noise impacts). Please see the Project Description section for more details on the site and setting.

AMBIENT NOISE SURVEY

On September 26 and 27, 1998, ambient noise was monitored for 25 continuous hours both in Derby Acres (Site 1, located at 23351 Arnold Avenue) and at the Sunrise project site (Site 3). Site 1 is approximately 13,300 feet (2.5 miles) from the Sunrise project site.

In addition to the 25-hour monitoring, a brief measurement of noise levels was obtained at Site 2, along Highway 33 at the two houses during the afternoon of September 25, 1998. The results of the noise monitoring are presented below.

NOISE: Table 2
24-Hour Composite Noise Survey Results

	Overall 24-Hour Noise Level A-weighted, decibels)		
Monitoring Location	L_{eq}	L_{dn}	CNEL
Derby Acres site (Site 1)	48.8	52.1	52.3
Highway 33 site (Site 2)	61.5*	--	--
Proposed facility site (Site 3)	53.9	57.6	57.7

*This L_{eq} value was a 53-minute spot check and not a 24-hour composite.

Noise levels at both Sites 1 and 3 show considerable variations during the monitoring period. Figure 8.5-2 (SCPP 1998a, AFC page 8.5-8) shows the hourly-average noise levels at the project site, while Figure 8.5-3 (SCPP 1998a, AFC page 8.5-10) shows the corresponding noise levels in Derby Acres, during the 25-hour monitoring period. Table 8.5-5 (SCPP 1998a, AFC page 8.5-11) summarizes the noise data obtained at Site 2, adjacent to Highway 33.

NOISE IMPACTS

The construction and normal operation of the Sunrise project can create noise impacts.

CONSTRUCTION NOISE IMPACTS

Construction of the project is expected to take up to 15 months (SCPP 1998a, AFC Page 8.5-16), with varying degrees of activity occurring during the different phases of construction. Construction phases include: 1) excavation; 2) concrete pouring; 3) steel erection; 4) mechanical/electrical component installation; and 5) clean up.

Construction noise impacts should be typical of power plant construction activities. Major noise sources associated with most large industrial construction include: air compressors, track hoes, backhoes, graders, bulldozers, scrapers, front-end loaders, cranes, generators, boom tracks and various trucks and smaller vehicles. The exact noise levels are a complex function of the actual noise levels emitted from each major noise-emitting piece of equipment, and their relative location and orientation within the construction area, their operating load, etc. To estimate the plant construction noise impacts, the composite noise levels listed in Noise: Table 3 below are used.

NOISE: Table 3
Construction equipment and composite site noise levels.

Construction Phase	Noise Construction Equipment	Equipment Noise Level (dBA)	Composite Site Noise Level @ 50 ft. (dBA)
Excavation	Pile driver Dump truck Rock drill	101 91 98	89
Concrete pour	Truck Concrete mixer	91 85	78
Steel erection	Derrick crane Jack hammer	88 88	87
Mechanical	Derrick crane Pneumatic tools	88 86	87
Clean-up	Truck Steam blow (unmuffled)	91 110 @ 1,000'	89

Source: EPA, 1971 and Barnes, 1976.

The composite noise levels were based on intensive noise monitoring during the construction of 15 actual power plants. The noise monitoring for the composite levels was done at locations selected to avoid undue excess attenuation from atmospheric conditions and terrain. The construction equipment were characterized as typical.

One important consideration in using these data is that the measurements are over 20 years old. Thus, they probably overestimate actual construction noise since there has been a trend towards quieter equipment in the intervening years. In spite of this consideration, these data are comprehensive and have the advantage of integrating significant variability to arrive at an average impact from each phase of construction.

For each phase of construction, the composite noise levels (as defined in Noise: Table 3 above) were used to predict noise levels at Derby Acres (Site 1) and at the Highway 33 site (Site 2). No additional attenuation due to vegetation, wind or temperature gradient was assumed. Noise: Table 4 presents a summary of the results.

NOISE: Table 4
Maximum Estimated Construction Noise Levels.

	Maximum estimated noise levels at receptors during construction (in dBA)			
	Highway 33 (Site2)		**Derby Acres (Site 1)**	
Construction Phase	**L_{eq}**	**L_{50}**	**L_{eq}**	**L_{50}**
Excavation, site preparation	40	37	32	29
Concrete pouring	36	33	28	25
Steel erection	40	37	32	29
Mechanical, electrical	35	32	27	24
Clean-up	30	27	22	19

COMMUNITY NOISE EXPOSURE

The L_{50} values are well below the limits delineated in the Kern County General Plan Noise Element. Periodically, some noise will be higher than the levels presented above, but the overall sound should be lower because of attenuation and the trend toward quieter construction equipment in the intervening decades since the data in Noise: Table 3 was developed.

Construction noise is not specifically covered under the Kern County General Plan Noise Element. However, the results of the noise modeling indicate that construction noise is not expected to be audible at the sensitive receptors. Staff recommends that noisy construction be performed only during the daytime hours (see **NOISE-6**, below for definition of daytime hours), thereby preventing impacts at night, when quiet is most important.

Staff has proposed a noise complaint process (see **NOISE-1** and **NOISE-2**, below) that will allow any person suffering annoyance from noise to address the problem with the applicant. Staff has also proposed a condition (see **NOISE-6**, below) to restrict noisy construction work to daytime hours.

Staff believes no significant adverse community noise impacts are likely to occur due to construction of the power plant.

WORKER NOISE EXPOSURE

A reference distance of 100 feet was used to evaluate on-site construction noise levels and their potential impacts on workers. The noise levels will vary significantly depending on whether a worker is closer to or conducting a noisy activity, but the L_{eq} levels are projected to average between 75 and 85 dBA during the first four phases of construction. Undoubtedly, some workers will occasionally be exposed to noise levels above 85[1] dBA during construction. The applicant recognizes the need to protect construction personnel from noise hazards (SCPP 1998a, AFC page 8.5-18). The applicant predicts that construction noise levels will not reach levels that require worker protection, but will put in place a hearing conservation program for employees who may be exposed to high levels of noise. To ensure that workers are adequately protected, staff has proposed a condition of certification (see proposed Condition of Certification **NOISE-3**, below).

LINEAR FACILITIES

Transmission line construction will occur in land where agricultural and oil production are the only uses. Activity at each structure location will be limited in time throughout the duration of the transmission line construction. Structure erection requires only a few days to complete. Thus, any receptor along the corridor will only be exposed to noise for a brief period before construction moves on to the next structure. In view of the short potential exposure and the lack of sensitive receptors along the corridor, the transmission line construction noise was not modeled.

[1] OSHA does not consider noise levels of 85 dBA or less hazardous to employee health.

In addition, such work is customarily performed during the daytime, and would cause no impacts at night, when quiet is most important. Staff has proposed a noise complaint process (see **NOISE-1** and **NOISE-2**, below) that will allow any person suffering annoyance to address the problem with the applicant. Staff has also proposed a condition (see **NOISE-6**, below) to restrict noisy construction work to daytime hours.

Staff believes no significant adverse noise impacts are likely to occur due to construction of the transmission line.

INDIRECT AND CUMULATIVE NOISE IMPACTS

There are no industrial developments planned near the project site during the construction period of the project. With no other project planned in the area during the construction of the Sunrise project, there will not be any cumulative impacts in the project area during construction.

The development of the 700 new wells will cause indirect impacts. The new wells will be developed after the construction of Sunrise; therefore, there will not be any indirect or cumulative noise impacts during the construction of the powerplant project. For a discussion of the possible indirect and cumulative noise impacts after project construction, see below.

MITIGATION MEASURES

Due to the large buffer between the site and sensitive receptors, no noise mitigation will be required for normal plant construction activities.

Construction workers may be exposed to significant noise levels, occasionally exceeding 85 dBA. An effective hearing conservation program, noise monitoring, and hearing protection required under **NOISE-3** will constitute effective mitigation measures to safeguard employee health.

OPERATION NOISE IMPACTS

Noise levels due to the operation of the Sunrise project were modeled based on the list of the project's major equipment. This equipment and its associated far-field octave-band noise levels are listed in the AFC (SCPP 1998a, AFC Table 8.5-6). The far-field noise data are measured or estimated noise levels after applying noise control measures to the equipment. For example, each combustion turbine will be equipped with an outdoors-acoustic enclosure with silenced ventilation paths and the turbine inlet will be equipped with a silencer.

COMMUNITY NOISE IMPACTS

In modeling the noise impacts to the sensitive receptors, the major pieces of equipment were assumed to operate continuously. Only attenuation due to spherical wave divergence and standard atmospheric absorption was included in the modeling protocol.

Noise: Table 5 represents the maximum sound predicted from the modeling for each receptor site. In addition, the maximum cumulative (ambient plus project noise) impact for the sensitive receptor is also presented.

NOISE: Table 5
Maximum Estimated Noise Levels at Sensitive Receptors

Receptor Location	Distance (feet)	Existing L_{eq} (dBA)	Maximum Project Impact	Maximum Cumulative L_{eq} (dBA)	Maximum Cumulative L_{dn} (dBA)
Derby Acres (Site 1)	13,330	48.8	22.3	48.8	52.1
Highway 33 site (Site 2)	7,040	53.9	30.3	53.9	57.6

Compared with the ambient noise level measured in Derby Acres, noise from the operation of the proposed project would be inaudible during all but the quietest period

During its operating life, the project will represent essentially a steady, continuous and broadband noise source day and night. Occasional short-term increases in noise level will occur as steam relief valves open to vent pressure, or during startup or shutdown as the plant transitions to and from steady-state operation. At other times, such as when the plant is shut down for lack of dispatch or for maintenance, noise levels will decrease.

The project owner proposes that no prominent tonal noise emissions will be present. The generators, transformers, and combustion turbine compressor inlet produce tonal sound levels; however, the generator enclosure and combustion turbine inlet silencers will be designed to reduce the tonal emissions from these sources to levels below the general plant noise. In addition, the transformer tonal noise emissions will be below the broadband plant noise. Therefore, any equipment tonal emissions will not be distinctly audible at any off-site locations.

The cumulative impact in Derby Acres of the maximum noise levels from the project (22.3dBA) does not exceed the Kern County limit of 45 dBA for nighttime L_{50}. The nighttime L_{50} measured in Derby Acres was 43.2 dBA (from L_{eq} of 48.8 dBA). With the addition of the maximum L_{eq} predicted by the modeling, the nighttime L_{50} in Derby Acres would remain at 43.2 dBA.

The L_{eq} impact from the project at the residences on Highway 33 is estimated to be 30.3 dBA. During the field noise survey, the nighttime L_{50} measured at the site (Site 2) was 51.4 dBA. Adding the maximum L_{eq} predicted by the modeling, the nighttime L_{50} at the Highway 33 residences would not change. Although the existing and cumulative noise at the Highway 33 residences is above the Kern County desirable maximum L_{50}, this 1.4-dBA increase would not be audible. These residences are also located outside the 5-dBA-impact contour (SCPP 1998a, AFC Figure 8.5-1); a threshold Energy Commission staff uses to determine whether noise impacts are significant. Since this impact is considered insignificant, no further analysis was performed.

Based on the above analysis, noise levels during operation of the Sunrise project are not expected to have a significant impact on sensitive noise receptors. As the calculations and modeling results suggest, off-site noise levels will not require mitigation.

The applicant has committed to incorporating noise mitigation measures into the design of the project that will ensure that noise levels from the plant at the receptor, the residences within Derby Acres, will be below 40 dBA L_{50} (SCPP 1998a, AFC, Page 8.5-15) under normal operating conditions. Since 40 dBA L_{50} is such a low noise level, and in fact, is quieter than the ambient noises typically encountered in the neighborhood of the project, staff agrees that this is a feasible approach to ensuring that project noise impacts do not exceed legal limits. This will likely not present a significant adverse noise impact to the community.

NOISE IMPACTS TO WORKERS

The near-field data indicate that the noise levels within the Sunrise project site could average 80 dBA (within 100 feet). Because of the predicted site noise levels, employees working at the facility, and in close proximity to noise sources, will be required to participate in a hearing conservation program.

In addition, specific plant areas may require noise surveys to determine where hearing protection is required.

The applicant will identify those locations in the plant and those pieces of equipment likely to produce hazardous noise levels, and has committed to complying with all applicable noise protection laws, regulations and requirements. Administrative procedures and hearing protection measures will be put in place to ensure that workers' hearing is adequately protected. Staff has proposed conditions (see proposed Condition of Certification **NOISE-5**, below) to ensure compliance.

Compliance with OSHA noise exposure regulations will be achieved through selection of quiet equipment when available, monitoring to determine areas with high noise levels, marking of identified high noise level areas with signs and yellow painted stripes on the floor, implementation of a hearing conservation program for all employees that are likely to be exposed to noise levels exceeding 85 dBA over an 8-hour work day, provision of hearing protection devices and training on their use, and a requirement to wear hearing protection in designated high noise level areas.

LINEAR FACILITIES

No significant noise impacts are expected from the operation and maintenance of the transmission line and substation. The proposed transmission routes B, D, E and F are removed from noise-sensitive receptors by at least 1,000 feet throughout most of the routes. However, there are houses within 400 feet of the route B alignment just south the Midway Substation in an area with many transmission lines.

Due to the relatively low voltage transmitted by the line, minimal noise will be produced. In the constrained location (near the houses south of the Midway Substation), noise levels are estimated to be a maximum of about 53 dBA during the rainy season and about 30 dBA in fair weather at the edge of the 100-foot right-of-way (ROW). Assuming no excess attenuation due to atmospheric or vegetative absorption (a conservative assumption), the maximum noise level would attenuate to about 35 dBA at the 400-foot distance (the location of the nearest houses). This noise level would be inaudible at the nearest houses.

This noise level is below the L_{50} nighttime standard of 40 dBA. Excess attenuation (due to atmospheric or vegetative absorption) would serve to further reduce this impact; therefore, there will be no audible noise from the transmission lines at the closest houses. Normal maintenance noise (vehicle-based inspection) will be infrequent and will not present a significant noise impact potential.

INDIRECT EFFECTS

TEMPORARY EFFECTS

Texaco California, Inc. (TCI) plans to develop 700 new wells (production and steam injection wells) within a 3/4-mile radius of the project site that may be served by Sunrise. Each new well is developed over a two-to-three-day period and 24 hours a day. Only one well is developed at a time.

Preliminary calculations by Tim Reinhardt (consultant to Sunrise) indicate that a conservative calculated impact at the Hwy 33 receptor will be 35-55 dBA from the nearest well drilling, and 24-44 dBA from the farthest well drilling. In Derby Acres, the impacts range from 25 to 46 dBA from the nearest drilling and 20-40 dBA from the farthest drilling. These assume a 1,000 hp (2,500 hp engine) drill rig with a steady-state noise level of 85 dBA at three feet from each engine, with short term peaks of up to 105 dBA (based on occupational exposure data from Gary Drilling Co.) The nearest drilling is assumed to be 3/4 mile closer to the receptors than the center of the project site, and the farthest drilling is 3/4 mile farther. No excess attenuation due to atmospheric absorbency or vegetation/terrain was considered. If excess attenuation is used, the impacts to the sensitive receptors are likely to be at the low end of each range.

To substantiate Tim Reinhardt's calculations, field measurements were performed. Measurement of an hourly L_{eq} of about 52 dBA at 9:45 p.m., on September 12, 1999 was recorded while a drill rig approximately 1/4 mile away was operating continuously. Using this value from a "typical" drill rig, an estimate of the noise impact is expected to be 34-45 dBA at Hwy 33 (range: farthest to nearest drilling) and similarly 30-35 dBA at Derby Acres. These measured values correlate well with the above preliminary calculation. Again, because these values neglect atmospheric absorbency and excess attenuation due to vegetation and terrain, noise should be inaudible during most periods of well drilling.

Well drilling will occur in land where agricultural and oil production are the only uses. Well drilling requires only a few days to complete. Thus, any receptor will

only be exposed to noise for a brief period before construction moves on to the next well. In view of the low noise levels produced, the short potential exposure, and the fact that the nearest receptor will be more that 1/2-mile from the nearest well, the noise from well drilling is not likely to cause any significant noise impacts.

PERMANENT EFFECTS

No significant noise impacts are expected from the operation and maintenance of the new wells (oil production and steam injection wells).

Staff has proposed a noise complaint process (see **NOISE-1** and **NOISE-2**, below) that will allow any person suffering annoyance to address the problem with the applicant. Staff believes no significant adverse noise impacts are likely to occur due to development of the new wells.

CUMULATIVE IMPACTS

Requisites to the discussions of cumulative impacts are nearby projects existing or planned. Existing or planned projects in the vicinity of the Sunrise project include Elk Hills, Midway-Sunset and La Paloma projects. However, they are located outside the two mile radius staff has identified as the area in which additional projects could cause cumulative impacts. Similarly, there are no existing or planned projects within a two-mile radius of the Sunrise project to result in cumulative noise impacts. Therefore, the Sunrise project will not create adverse cumulative noise impacts or be adversely impacted by the noise from any adjacent existing or future development.

TONAL AND INTERMITTENT NOISES

One possible source of noise annoyance would be strong tonal noises, individual sounds that, while not louder than the permissible levels, stand out in sound quality. To ensure the avoidance of such tonal sound, the noise control design of the Sunrise project can be balanced to bring as many noise sources as possible to the same relative sound level, causing them all to blend without any one source standing out. Another potentially annoying source of noise from a power plant is the intermittent or occasional actuation of steam relief valves. The hissing noise from these valves can be largely mitigated by the installation of adequate mufflers. To ensure that adequate measures are taken to mitigate tonal and intermittent noise sources, staff has proposed measures (see proposed Condition of Certification **NOISE-4**, below) to ensure that tonal and intermittent steam relief noises are not allowed to cause a problem.

MITIGATION MEASURES

The potential noise mitigation measures described by the applicant are typical for such an application. They include (to be employed as required):

1. provide standard outdoor/weather enclosures for the combustion turbine generator packages; and

2. provide air inlet silencers for the combustion turbines.

These sorts of noise attenuation measures have been employed for years on similar facilities, and their noise control abilities are well known. Staff has proposed measures (see proposed Condition of Certification **NOISE-4** below) to ensure that these noise mitigation measures are carried out, and that they are effective.

FACILITY CLOSURE

Upon closure of the facility, all operational noise will cease; no further adverse impacts from operation will be possible. The remaining potential noise source will be that caused by dismantling of the structures and equipment, and any site restoration work that may be performed. Since this noise will be similar to that caused by the original construction of the Sunrise project, it can be treated similarly. That is, noisy work can be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise laws, ordinances, regulations and standards then in existence would apply; applicable Conditions of Certification included in the Energy Commission Decision would also apply unless properly modified.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Staff concludes that the Sunrise project will likely be built and operated to comply with all applicable noise laws, ordinances, regulations and standards. Staff further concludes that the Sunrise project will likely present no significant adverse noise impacts. The Sunrise project will likely represent an unobtrusive, nearly undetectable addition to existing noise levels.

RECOMMENDATIONS

Staff recommends the following:

POWER PLANT

The applicant shall conduct an occupational noise survey. The operational noise survey shall be conducted only after the facility has achieved at least 80% of the plant rated output capacity, but no later than 30 days after the plant reaches 80% of its rated capacity. The survey should attempt to verify that workers are not exposed to noise intensities exceeding those identified by Cal-OSHA.

If such exposures are found to occur, the applicant could implement measures such as the following:

1. Place signs in conspicuous locations clearly warning employees that: (a) specified areas are in excess of the Cal-OSHA noise standards; and (b) access to such areas shall be limited only to workers that are using proper hearing protective devices.

2. Train personnel in the proper use of individual hearing protective devices, the training to be provided by a person familiar with the use and care of such devices.

3. As needed, employ engineering and administrative controls to reduce employee exposure to noise.

COMMUNITY

Follow-up Evaluation of Plant Noise: Following completion of the Sunrise project, and after a suitable period of runtime operation, the applicant will make field noise measurements at key locations (where possible use the same location as pre-construction noise survey). The field noise measurements will be used to compare the plant noise emissions with pre-construction noise survey levels and also to verify that no new pure-tone noise components are introduced (see proposed Condition of Certification **NOISE-4** below).

Should the measurements show any unusual or unexpected noise emissions levels, the project owner shall check equipment operation or test the effectiveness of the noise control treatment. The cause of the unusual or unexpected noise shall be corrected or modified as soon as possible, then the community noise measurements repeated. Copies of the measurement report shall be submitted to the Energy Commission staff.

The applicant shall also employ the noise complaint resolution procedure outlined in the Condition of Certification (see proposed Condition of Certification **NOISE-2** below) in order to document any noise complaints.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of rough grading, the project owner shall notify all residents within Derby Acres, by mail or other effective means, of the commencement of the Sunrise project construction. 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 Sunrise 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 also be posted at the Sunrise project site during construction in a manner visible to passersby. This telephone number shall be maintained until the Sunrise project has been operational for at least one year.

Verification: The project owner shall transmit to the Compliance Project Manager (CPM) in the first monthly construction report following the start of rough

grading, a statement signed by the project manager attesting that the above notification has been performed, describing the method of that notification, and including a sample letter, poster or other notice, as appropriate. This statement shall also attest that the telephone number has been established and posted at the site, and also provide the telephone number.

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

Protocol: The project owner shall:

1. use the Noise Complaint Resolution Form (see below for an example), or functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;

2. attempt to contact the person(s) making the noise complaint within 24 hours;

3. conduct an investigation to determine the source of noise related to the complaint;

4. if the noise is project related, take all feasible measures to reduce the noise at its source; and

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

Verification: Within 30 days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form, or similar instrument approved by the CPM, with Kern County and with the CPM documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a 30-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is finally implemented.

NOISE-3 Prior to the start of the Sunrise project construction, the project owner shall submit to the CPM for review 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 standards.

Verification: At least 30 days prior to the start of rough grading, the project owner shall submit to the CPM the above referenced program. The project owner shall make the program available to OSHA upon request.

NOISE-4 Upon the Sunrise project first achieving an output of 80 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey, utilizing the same monitoring sites employed in the pre-project ambient noise survey as a minimum. The survey shall also include the octave band pressure levels to ensure that no new pure-tone noise components have been introduced. No single piece of equipment shall be allowed to stand out as a dominant source of noise that draws complaints. Steam relief valves shall be adequately muffled to preclude noise that draws complaints. The noise contributed by the Sunrise project operation at the nearest residence in Derby Acres shall not exceed 40 dBA L_{50} under normal operating conditions. If the results from the survey indicate that power plant noise levels are in excess of 40 dBA L_{50} at the nearest residence, additional mitigation measures shall be implemented to reduce noise to a level of compliance with this limit. The mitigation measures (to be employed as required) may include:

1. Provide standard outdoor/weather enclosures for the combustion turbine generator packages;

2. Provide air inlet silencers for the combustion turbines;

Protocol: The measurement of power plant noise for purposes of demonstrating compliance with this Condition may alternatively be made at an acceptable location closer to the plant (e.g. 400 to 1,000 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the nearest sensitive receptor in Derby Acres. However, notwithstanding the use of this alternative method for determining the noise level, the character of plant noise shall be evaluated at the nearest sensitive receptor to determine the presence of pure tones or other dominant sources of plant noise.

Verification: Within 30 days after first achieving an output of 80 percent or greater of rated output, the project owner shall conduct the above described noise survey. Within 30 days after completing the survey, the project owner shall submit a summary report of the survey to Kern County and the CPM. Included in the report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. Within 30 days of completion of installation of these measures, the project owner shall submit to the CPM a summary report of a new noise survey, performed as described above and showing compliance with this condition.

NOISE-5 The project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility. The survey shall be conducted within thirty (30) days after the facility is operating at an output of 80% of rated capacity or greater, and shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations sections 5095-5100 (Article 105) and Title 29, Code of Federal Regulations, Part 1910. 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 state and federal regulations.

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

NOISE-6 In order to avoid adverse noise effects, any construction activity likely to cause noise complaints such as pile driving, excavation and grading (earth movement), concrete pouring and steel erection shall be restricted to the hours of: 7 a.m. to 7 p.m. on weekdays and from 8 a.m. to 6 p.m. on weekends and holidays.

Verification: The project owner shall transmit to the CPM in the first Monthly Construction Report a statement certifying that the above restrictions will be observed throughout the construction of the project.

NOISE COMPLAINT RESOLUTION FORM

Sunrise Cogeneration and Power Project
(98-AFC-4)

NOISE COMPLAINT LOG NUMBER _____

Complainant's name and address:

Phone number: _____

Date complaint received: _____
Time complaint received: _____

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

Initial noise levels at 3 feet from noise source _____ dBA Date: _____
Initial noise levels at complainant's property: _____ dBA Date: _____

Final noise levels at 3 feet from noise source: _____ dBA Date: _____
Final noise levels at complainant's property: _____ dBA Date: _____

Description of corrective measures taken:

Complainant's signature: _____ Date: _____

Approximate installed cost of corrective measures: $ _____
Date installation completed: _____
Date first letter sent to complainant: _____ (copy attached)
Date final letter sent to complainant: _____ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: _____

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

REFERENCES

Barnes, Power Plant Construction Noise Guide, 1976.

CEC (California Energy Commission/McCuen) 1999mm. Memo regarding New Transmission Alternatives. May 27, 1999.

CEC (California Energy Commission/Kisabuli) 1999pp. The Sunrise project Data Responses – A Conversation with Robert Stepheson, Black & Veatch. May 27, 1999.

Cunniff, Patrick F., Environmental Noise Pollution. John Wiley & Sons, 1992.

DHS (California Department of Health Services), Office of Noise Control. *Model Community Noise Control Ordinances*, 1977.

Edison Electric Institute. Electric Power Plant Environmental Noise Guide, 1984.

Kryter, Karl D. The Effects of Noise on Man. Academic Press, N.Y., 1970.

Peterson and Gross (Peterson, Arnold P. G. and Ervin E. Gross, Jr.). Handbook of Noise Measurement, 7th ed. GenRad, Concord, MA., 1974.

SCPP (Sunrise Cogeneration and Power Project) 1998a. Application for Certification, Sunrise Cogeneration and Power Company (98-AFC-4). Submitted to the California Energy Commission, December 21, 1998.

SCPP (Sunrise Cogeneration and Power Project/Soares/King) 1999b. Supplementary AFC Material in Response to Data Adequacy Worksheets. Submitted to the California Energy Commission on January 28, 1999.

Suter, Alice H., "Noise Sources and Effects: A New Look." Sound and Vibration, January 1992.

Thumann, Albert and Richard K. Miller, Fundamentals of Noise Control Engineering. Prentice-Hall, 1986.

U.S. EPA, 1971, Noise from Construction Equipment and Operations. Prepared by Bolt et al. Beranek, and Newman, Boston, MA.

U.S. EPA, 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. 550/9-74-004. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. Washington, DC.

NOISE: APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

Noise levels can be measured in a number of ways. One common measurement, the equivalent sound level (L_{eq}), is the long-term A-weighted sound level that is equal to the level of a steady-state condition having the same energy as the time-varying noise, for a given situation and time period. (See NOISE: Table A1, below.) A day-night (L_{dn}) sound level measurement is similar to L_{eq}, but has a 10 dB weighting added to the night portion of the noise because noise during night time hours is considered more annoying than the same noise during the day.

NOISE Table A1
Definition of Some Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dB	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level L_{eq}	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 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}	The Average A-Weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: California Department of Health Services 1976.

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

NOISE Table A2 Typical Environmental and Industry Sound Levels			
Source and Given Distance from that Source	A-Weighted Sound Level in Decibels (dBA)	Environmental Noise	Subjectivity/ Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		
Very Loud Music	110	Rock Music Concert	Very Loud
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')			
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	Quiet
Large Transformer (200')	40		
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
	0		
Source: Peterson and Gross 1974			

SUBJECTIVE RESPONSE TO NOISE

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

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

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

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

With regard to increases in A-weighted noise levels, knowledge of the following relationships (Kryter 1970) can be helpful in understanding the significance of human exposure to noise.

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

2. Outside of the laboratory, a 3-dB change is considered a barely noticeable difference.

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

4. A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

COMBINATION OF SOUND LEVELS

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

NOISE Table A3 Addition of Decibel Values	
When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Thumann, Table 2.3

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

NOISE Table A4
OSHA Worker Noise Exposure Standards

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

Source: OSHA Regulation

RELATIONSHIPS

$L_{dn} = 10 \log (1/24)[15x10^{(Ld/10)} + 9x10^{(Ln+10)/10}]$

<u>Note:</u> the 10-dB weighting added to the nighttime noise level. Daytime and nighttime are 15 hours (0700~2200 hrs) and 9 hours (2200~0700 hrs) respectively. L_d and L_n are the L_{eq} values over the 15 and 9 hours respectively. L_{dn} does not contain any consideration for tonal sounds, since it is derived from L_{eq} measurements.

CNEL is essentially the same as L_{dn}, except that different time segments are used in computation. The 24-hour period is divided into three segments instead of two. The day period (0700~1900 hours), evening (1900~2200 hours) and night (2200~0700 hours). The evening period is assigned 5-dB weighting and the nighttime is assigned 10-dB weighting. The extra 5 dB weighting during the evening results in higher values for CNEL that L_{dn}, but the difference is not statistically significant.

NOISE ATTENUATION

$[L_p]$ (at x = r) = $[L_p]$(at r = y) – 20log(x/y).

Where: x = distance to point where noise level is to be determined.
y = reference point.

Δ_{Loss} = 20log (x/y).

Special case where x = 2y
Δ_{Loss} = 20log (2y/y). = 20log (2) = 6

$\therefore$ As we double the distance, from a point source in free space, the noise level decreases by 6 dB

VISUAL RESOURCES

Testimony of Gary D. Walker

INTRODUCTION

Visual resources are the natural and cultural features of the environment that can be viewed. Visual quality is the value of visual resources. Scenic resources are visual resources that contribute positively to visual quality.

This analysis focuses on whether the Sunrise Cogeneration and Power Project (SCPP) will cause significant adverse visual impacts and whether the project will conform with applicable laws, ordinances, regulations and standards (LORS). The determination of the potential for significant impacts to visual resources resulting from the proposed project is required by the California Environmental Quality Act (CEQA) and the Energy Commission's power plant siting regulations, Title 20, California Code of Regulations, section 1701 et seq. The determination of the conformance of the proposed project with applicable LORS is required by Public Resources Code section 25525.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL AND STATE

Segments of the proposed transmission line rights-of-way are located on both federal and state lands. The U.S. Bureau of Land Management (BLM) manages the federal lands, and the California Department of Fish and Game (CDFG) manages the state. See the **Biological Resources, Land Use, Paleontological Resources** and **Cultural Resources** sections of this PSA for further discussion. No roadway in the project vicinity is a designated or eligible State Scenic Highway. Therefore, no federal or state regulations pertaining to scenic resources are applicable to the project.

LOCAL

COUNTY OF KERN

GENERAL PLAN

Kern County has no specific policies on visual or aesthetic resources that apply to the SCPP. However, these issues are addressed in the Kern County General Plan, Open Space Element, and are implemented by the Kern County Planning and Development Services Department (Kern County, 1994). This element of the General Plan requires public notification and review of any projects that may adversely impact visual resources. The SCPP is generally consistent with the land use designation for the area, and therefore is considered consistent with associated visual resource planning purposes and General Plan requirements. The County does have landscaping requirements for approval of a building permit, which will be required for this project (see **LAND USE** section).

PROJECT DESCRIPTION

The SCPP consists of a nominal 320 megawatt (MW) natural gas-fired cogeneration, a 230 kilovolt (kV) switchyard, a 230 kV transmission line, a natural gas supply pipeline, a water supply line, a wastewater line, and a steam line.

POWER PLANT

PROJECT DESCRIPTION Figure 3 shows the site arrangement for the project**.** **VISUAL RESOURCES Figure 1** shows elevations of the proposed power plant. The most visually prominent elements of the power plant would be within the two power islands, particularly the two HRSG stacks which would be approximately 100 feet tall and 19 feet in diameter. The two combustion turbine inlet air filters would be approximately 56 feet tall and 53 feet across. The feedwater storage tank would be approximately 40 feet tall and 67 feet wide (SCPP 1999r).

The facilities in the rest of the power train are generally less than 30 feet high. The other plant facilities include storage tanks, switchyard, buildings and parking areas. The yard tanks will be vertical, cylindrical, and steel, and will vary from 12 to 30 feet high. The switchyard and control building will vary from 14 to 16 feet high. The common services building will be 20 feet high. The other two plant buildings will be 12 feet tall and single story.

TRANSMISSION LINE

The power generated at the facility would be transmitted over a double circuit 230 kV transmission line running within the Route B corridor from the plant site to the Midway Substation near Buttonwillow (see **PROJECT DESCRIPTION Figure 2**). Proposed Routes D, E, and F are options within the Route B corridor. Route D would connect the Sunrise transmission line to a future Midway-Sunset Cogeneration Company (MSCC) substation and then would connect MSCC and Midway with a joint-ownership transmission line. Route E would connect the SCPP and MSCC and then would connect MSCC to the proposed La Paloma Substation with a joint ownership transmission line and then would connect all parties to Midway with a joint ownership transmission line. Route F would connect the SCPP to the proposed La Paloma Substation and then would connect La Paloma and Midway with a joint ownership transmission line (SCPP 1999k, p.2-1).

Variations 1, 2, 3, and 4 (SCPP 1999k, CORR-1 through CORR-3) could be used with any of the four major options (B, D, E, or F).

Route B is 23.3 miles long, requiring approximately 170 poles. Route D is 23.7 miles long, requiring approximately 175 poles. Route E is 24.2 miles long. Route F is also 24.2 miles long (SCPP 1999k, pp.2-4 through 2-10).

VISUAL RESOURCES Figure 1
Facility Elevations

A number of combinations of parallel transmission lines are possible, depending on whether the proposed transmission line is combined with the planned Midway-Sunset 230 kV Line #2 and/or the proposed La Paloma 230 kV transmission line. The applicant has provided figures showing profiles of the various potential combinations of lines along different segments of the corridor (SCPP 1999k, Figures S-P1 through S-P9).

The basic tangent structure for the proposed line would be a single shaft tubular galvanized steel pole with shield wire arms (see **PROJECT DESCRIPTION Figure 4**). The poles would vary between 100 and 170 feet in height. The poles would be gradually tapered with a diameter of 72 inches at the base reducing to 24 inches at the top (SCPP 1998a, p.8.11-24).

OTHER LINEAR FACILITIES

The project would require construction of a 60-foot gas line interconnection to the new TCI gas pipeline. The TCI oilfield operations would provide boiler feedwater for the project from the TCI corridor approximately 600 feet west of the proposed power plant. The wastewater line from the power plant to the TCI corridor and the steam line from the power plant to the TCI steam distribution system would be colocated with the water supply line. The cogeneration facility would be accessed from Shale Road to the east by a series of existing paved and unpaved oilfield roads and a new 20-foot wide asphalt road (SCPP 1998a, p.1-16). Because of the short length of all of these facilities, because they would be either below ground or close to it, and because they would be in a developed oil production area with no nearby sensitive viewers, they would cause no significant visual impacts and are not discussed further in this analysis.

SETTING

REGIONAL SETTING

PROJECT DESCRIPTION Figure 1 shows the regional setting of the project. The power plant site is located within the Midway Sunset Oil Field in western Kern County, on the southwestern edge of the greater San Joaquin Valley. More specifically, the site is on the western side of smaller Midway Valley at the foot of the Temblor Range, with Elk Hills to the northeast. This rural area contains several energy development-related facilities and a low population density.

The valley is relatively flat and is vegetated by sparse grasslands, saltbush scrub, and alkali sink scrub. Streams in the region are generally ephemeral, running only during periods of rainfall. The nearest notable watercourse is Buena Vista Creek, south of the power plant site. The nearest body of water is Buena Vista Lake, 11.5 miles northeast of Taft.

PROJECT AREA SETTING

POWER PLANT

PROJECT DESCRIPTION Figure 2 shows the vicinity of the proposed power plant. The power plant would be located on a vacant 20 acre parcel and is within an existing oil and gas production field. The vicinity is heavily developed and utilized by petroleum companies for natural gas and oil production. Numerous petroleum recovery and storage facilities, electric and petroleum transmission lines, and access roads characterize the area. Several transmission lines exist within one mile of the power plant site. They are mounted on wooden poles varying approximately between 30 and 100 feet in height. Existing vegetation is low-growing. The proposed linear facilities, with the exception of the electric transmission line, are in the immediate vicinity of the power plant site.

The power plant site is approximately 8 miles northwest of Taft, 7 miles southeast of McKittrick, 3 miles northwest of Fellows, and 2.5 miles south of Derby Acres. Taft has approximately 6,000 people, while McKittrick, Fellows, and Derby Acres are much smaller. State Highway 33 runs northwest-southeast approximately 1.3 miles east of the site. No designated scenic highways, roads, or corridors are in the project vicinity.

ELECTRIC TRANSMISSION LINE

PROJECT DESCRIPTION Figure 2 shows the general route for the proposed electric transmission line. The transmission line would run from the power plant site to the northwest past the east side of the Midway-Sunset power plant, then north past the west side of the proposed La Paloma power plant and east of McKittrick, then northeast to the Midway Substation in Buttonwillow (population approximately 1300). The first few miles of the route travel through an area containing heavy petroleum development. This development becomes less intense as the route nears and crosses State Route 33 south of McKittrick and travels through the McKittrick Valley and over the Elk Hills. The route then drops into the southern San Joaquin Valley, crossing irrigated agricultural land on its way to Midway Substation.

VIEWSHED

POWER PLANT SITE

VISUAL RESOURCES Figure 2 shows the location of the viewshed for the power plant. Because of the relatively flat terrain and the short height of vegetation, views are fairly expansive and distant in the area. The power plant would be visible from up to three miles away, although topography would block some areas within this range from view. The site is not visible from the community of Fellows. The site is visible from SR 33 and other local roads. The nearest residence is on Highway 33, approximately 1.3 miles from the power plant site (SCPP 1999e, Data Response 71).

VISUAL RESOURCES Figure 2

Power Plant Viewshed

ELECTRIC TRANSMISSION LINE

VISUAL RESOURCES Figures 3a, b, c, d, and e show the detailed route of the proposed electric transmission line. The proposed electric transmission line would be visible for up to three miles for its entire route, although topography would block some areas within this range from view.

SCENIC FEATURES AND VIEW CORRIDORS

No designated scenic highways, roads, or corridors are in the project vicinity.

SENSITIVE RECEPTORS

Potentially sensitive receptors include residences and travelers on SR 33 and SR 58.

KEY OBSERVATION POINTS

Visual resource effects on each group of sensitive receptors were evaluated from representative Key Observation Points (KOPs). **VISUAL RESOURCES Table 1** identifies the KOPs. **VISUAL RESOURCES Figure 2** shows the location of KOP 1.

VISUAL RESOURCES Table 1
Key Observation Points

KOP Number	Description
1	From State Route 33 looking west toward the power plant site.
2	From State Route 33 south of McKittrick looking north toward the proposed electric transmission line route.
3	From the southern edge of McKittrick, looking south toward the proposed electric transmission line route.
4	From State Route 58 northeast of McKittrick, looking northeast toward the proposed electric transmission line.
5	From Mirasol Avenue just south of Buerkle Road, looking west toward proposed electric transmission line Route D.
6	From Buerkle Road just west of Mirasol Avenue, looking southwest toward proposed electric transmission line Route D.
7	From Buerkle Road just west of Mirasol Avenue, looking northwest toward proposed electric transmission line Route B.

VISUAL RESOURCES Figure 3a

Electric Transmission Line Route and Key Observation Points – Section 1

VISUAL RESOURCES Figure 3b

Electric Transmission Line Route and Key Observation Points – Section 2

VISUAL RESOURCES Figure 3c

Electric Transmission Line Route and Key Observation Points – Section 3

VISUAL RESOURCES Figure 3d

Electric Transmission Line Route and Key Observation Points – Section 4

VISUAL RESOURCES Figure 3e

Electric Transmission Line Route and Key Observation Points – Section 5

VISUAL RESOURCES Figures 3a, b, c, d, and e show the locations of KOPs 2 through 6. **VISUAL RESOURCES Figures** 4a through 10a at the end of the **VISUAL RESOURCES** section show from each KOP the existing view toward the project. **VISUAL RESOURCES Figures** 4b, 5b and c, 6b and c, 7b, c, d, and e, 8b, 9b, and 10b and c at the end of the **VISUAL RESOURCES** section show the view from each KOP after construction of the project.

The visual setting from Buttonwillow was also evaluated. Existing visual quality is low in views from Buttonwillow toward the proposed transmission line route because of the substantial number of existing transmission lines in the foreground (see **VISUAL RESOURCES Figure 11** at the end of the section). The project could not substantially lower the visual quality of these views so visual impacts would be less than significant.

VISUAL RESOURCES Figure 12 (at the end of the section) shows the existing view southeast toward the proposed electric transmission line route from the southern end of McKittrick. The structures of the existing 230 kV Midway-Sunset Line #1 are barely visible from this view, and appear much smaller than the closer oilfield development. A separate visual simulation was not prepared for this view because it is at a similar distance as **VISUAL RESOURCES Figures 6b and c** from KOP 3, visual quality is slightly worse, and the proposed poles would be similarly close to the Midway-Sunset line, so visual impacts would be slightly less than for Figure 6b and c from KOP 3.

KEY OBSERVATION POINT 1: STATE ROUTE 33 EAST OF POWER PLANT SITE

Key Observation Point 1 is on State Route 33, approximately 1.3 miles east of the proposed power plant site. (**see VISUAL RESOURCES Figure 2**).

VISUAL QUALITY

From Key Observation Point 1 the view toward the power plant site is dominated by low-lying vegetation in the foreground and the Temblor Range in the background, with oil field development visible in the middleground and wood pole electric lines in the foreground and middleground (see **VISUAL RESOURCES Figure 4a**).

The natural features are of moderate visual quality, but the existing oil field development reduces visual quality to low-to-moderate.

VIEWER SENSITIVITY

Because Key Observation Point 1 represents a) travelers on State Route 33, some of whom are recreational travelers, and b) a nearby residence, viewer sensitivity is high.

VISIBILITY

The view of the proposed power plant site is largely unobstructed, but the view direction is largely to the side, so visibility from Key Observation Point 1 is moderate.

VIEWER EXPOSURE

Distance

The distance from the view area to the power plant site varies from approximately three miles to as little as approximately 1.3 miles, so the project would be in the middleground.

Number of Viewers

Annual average daily traffic on SR 33 in the area is approximately 10,600, of which approximately 2,544, or 24 percent, is truck traffic (SCPP 1999a, Table 8.10-1). Some of the travelers are recreationists. One residence, approximately 1.3 miles from the power plant site, is also represented by this KOP.

Duration of View

Because the view area primarily represents travelers on State Route 33, duration of view is moderate.

Overall Viewer Exposure

Considering the middleground distance, the moderate number of sensitive viewers, and the moderate duration of view, viewer exposure is moderate for Key Observation Point 1.

KEY OBSERVATION POINT 2: FROM STATE ROUTE 33 SOUTH OF ELECTRIC TRANSMISSION LINE ROUTE LOOKING NORTH

Key Observation Point 2 is located on State Route 33, north of Derby Acres and approximately 1 ½ miles south of McKittrick, just south of the point where the proposed electric transmission line route crosses State Route 33 (see **VISUAL RESOURCES Figure 3b**).

VISUAL QUALITY

The area is characterized by open range land, dominated by salt bush scrub and other low-lying desert vegetation (SCPP 1999m, p.3.11-2). The topography varies from relatively flat to small rolling hillocks. The area is less industrial in character than the immediate surroundings of the Sunrise power plant site. The view toward the electric transmission line route from KOP 2 includes low-growing natural vegetation in the foreground; deciduous trees surrounding two residences in the middleground; some oil development and the existing double wood pole Midway-Sunset Line #1 and other electric lines in the middleground; and low hills and the Temblor Range in the background (see **VISUAL RESOURCES Figure 5a**). The existing H-frame poles approach 80 feet in height. The natural elements are of moderate visual quality, but the oil development and electric lines reduce visual quality to low-to-moderate.

VIEWER SENSITIVITY

Because Key Observation Point 2 represents some recreationists and two residences, viewer sensitivity is high.

VISIBILITY

Because views toward the transmission line route are largely unobstructed and the route crosses State Route 33, visibility from Key Observation Point 2 is high.

VIEWER EXPOSURE

Distance

This view distance both for travelers on State Route 33 and for two residences is foreground.

Number of Viewers

Annual average daily traffic on SR 33 in the area is approximately 10,600, of which approximately 2,544, or 24 percent, is truck traffic (SCPP 1998a, Table 8.10-1). Some of the travelers are recreationists. Two residences also are in this view area. Overall, the number of sensitive viewers is moderate.

Duration of View

Because the view area primarily represents travelers on State Route 33, duration of view is moderate.

Overall Viewer Exposure

Considering the foreground distance, the moderate number of viewers, and the moderate duration of view, viewer exposure is moderate to high.

KEY OBSERVATION POINT 3: SOUTHERN END OF MCKITTRICK

Key Observation Point 3 is located in the southern end of McKittrick (see **VISUAL RESOURCES Figure 3b**).

VISUAL QUALITY

The view from Key Observation Point 3 south toward the proposed transmission line is dominated by the natural terrain, with low hills covered with low-lying desert vegetation (see **VISUAL RESOURCES Figure 6a**). A dirt road runs down the middle of the view. State Route 33 is visible on the right. Electric lines on wood poles, including the Midway-Sunset 230 kV Line #1 on H-frame structures, as well as two other small structures are visible in the middle ground. The natural elements are of moderate visual quality, but the roads and electric lines reduce visual quality to low-to-moderate.

VIEWER SENSITIVITY

Because of the residences represented by Key Observation Point 3, viewer sensitivity is high.

VISIBILITY

Because the lower portions of some of the transmission poles would be partially obscured by terrain, visibility for KOP 3 is moderate.

VIEWER EXPOSURE

Distance

The proposed transmission line would be in the middleground.

Number of Viewers

Several residences in the view area represented by KOP 3 would have views of the proposed transmission line.

Duration of View

Because residences are present, duration of view is long.

Overall Viewer Exposure

Considering the middleground distance, the moderate number of viewers, and the long duration of view, viewer exposure is moderate to high for Key Observation Point 3.

KEY OBSERVATION POINT 4: FROM STATE ROUTE 58 NORTHEAST OF MCKITTRICK

Key Observation Point 4 is located on State Route 58, approximately two miles northeast of McKittrick (see **VISUAL RESOURCES Figure 3c**).

VISUAL QUALITY

The view from Key Observation Point 4 toward the proposed transmission line route is panoramic and predominantly flat. It includes low-growing desert vegetation and several electric transmission lines, including a PG&E 500 kV line on steel lattice towers in the left foreground and middleground as well as the Midway-Sunset 230 kV Line #1 on wood H-frame structures in the middleground (see **VISUAL RESOURCES Figure 7a)**. The natural elements are of moderate visual quality, but the electric transmission lines reduce visual quality to low-to-moderate.

VIEWER SENSITIVITY

Because some of the travelers on State Route 58 are recreationists, viewer sensitivity is high.

VISIBILITY

Views of the proposed transmission line would be largely unobstructed, so visibility is high.

VIEWER EXPOSURE

Distance

The proposed transmission line route is within middleground views for travelers on State Route 58.

Number of Viewers

Annual Average Daily Traffic on State Route 58 in this area is 13,700 (Sunrise 1998a, Table 8.10-1). Some of these viewers are recreationists, with high viewer sensitivity.

Duration of View

Because of the flat terrain, duration of view for travelers on State Route 58 is moderate.

Overall Viewer Exposure

Considering the middleground distance, the moderate number of viewers, and the moderate duration of view, viewer exposure is moderate.

KEY OBSERVATION POINT 5: FROM MIRASOL AVENUE LOOKING WEST

Key Observation Point 5 is located on Mirasol Avenue just south of Buerkle Road, looking west toward the proposed transmission line route for Option D (see **VISUAL RESOURCES Figure 3d**). This KOP represents several rural residences as well as travelers on Buerkle Road.

VISUAL QUALITY

The view from Key Observation Point 5 toward the proposed transmission line Route D includes row crops and existing transmission lines, with a wooden building in the left foreground and the Midway-Sunset 230 kV Line #1 on wood pole H-frame structures in the foreground and middleground (**see VISUAL RESOURCES Figure 8a**). The irrigated crops are of moderate visual quality, but the existing transmission lines lower visual quality to low-to-moderate.

VIEWER SENSITIVITY

Viewer sensitivity is high because of the residences in the view area.

VISIBILITY

Views of the proposed transmission line would be largely unobstructed, so visibility is high.

VIEWER EXPOSURE

Distance

The proposed transmission line route is in the foreground of the view area represented by Key Observation Point 5.

Number of Viewers

Three residences are in the view area.

Duration of View

Because residences are present, duration of view is long.

Overall Viewer Exposure

Considering the foreground distance, the small number of viewers, and the long duration of view, viewer exposure is moderate for Key Observation Point 5.

KEY OBSERVATION POINT 6: FROM BUERKLE ROAD LOOKING SOUTHWEST

Key Observation Point 6 is located on Buerkle Road just west of Mirasol Avenue (see **VISUAL RESOURCES Figure 3d**). This KOP represents three residences in the area and travelers on Buerkle Road who have views looking southwest toward the proposed Route D for the electric transmission line.

VISUAL QUALITY

The view from Key Observation Point 6 toward proposed transmission line Route D includes row crops and a rural residence backdropped by trees in the foreground, as well as existing transmission lines, including the Midway-Sunset 230 kV Line #1 in the foreground and middleground (see **VISUAL RESOURCES Figure 9a**). The irrigated crops and trees are of moderate visual quality, but the existing transmission lines lower visual quality to low-to-moderate.

VIEWER SENSITIVITY

Viewer sensitivity is high because of the residences in the view area.

VISIBILITY

Views of proposed transmission line Route D are largely unobstructed, so visibility is high.

VIEWER EXPOSURE

Distance

The proposed transmission line route is within the foreground.

Number of Viewers

Three residences are in the view area.

Duration of View

Because residences are present, duration of view is long.

Overall Viewer Exposure

Considering the foreground distance, the small number of viewers, and the long duration of view, viewer exposure is moderate for Key Observation Point 6.

KEY OBSERVATION POINT 7: FROM BUERKLE ROAD LOOKING NORTHWEST

Key Observation Point 7 is located on Buerkle Road just west of Mirasol Avenue (see **VISUAL RESOURCES Figure 3d**). It represents local residences as well as travelers on Buerkle Road with views toward the northwest of proposed electric transmission line Routes B, E, and F.

VISUAL QUALITY

The view from Key Observation Point 7 toward proposed transmission line routes B, E, and F includes row crops, a rural residence with trees, and existing transmission lines in the foreground (see **VISUAL RESOURCES Figure 10a**). The irrigated crops and trees are of moderate visual quality, but the existing transmission lines lower visual quality to low-to-moderate.

VIEWER SENSITIVITY

Viewer sensitivity is high because of the residences in the view area.

VISIBILITY

Views of proposed transmission line Routes B, E, and F are largely unobstructed, so visibility is high.

VIEWER EXPOSURE

Distance

The proposed transmission line route is within foreground views for residences in this view area.

Number of Viewers

Three residences are in the view area.

Duration of View

Because residences are present, duration of view is long.

Overall Viewer Exposure

Considering the foreground distance, the small number of viewers, and the long duration of view, viewer exposure is moderate.

IMPACTS

DIRECT EFFECTS

TEMPORARY EFFECTS

POWER PLANT SITE

The temporary visual impacts at the power plant site would occur during the construction phase, lasting a total of approximately 15 months (SCPP 1998a, p.2-34). Construction would include materials and equipment storage, the use of heavy equipment, and the erection of large structures. Because the construction period would last more than a year it is considered more than short-term. However, because of the substantial distance of the power plant site from public view areas, the only construction effects that would be noticeable to the public would be the

erection of the taller project structures. However, tall stack construction would be of short duration, so impacts are not expected to be significant. Fugitive dust disturbances could be visually prominent, but due to their short-term nature they are not considered as causing significant impacts.

Electric Transmission Line

The construction period for the electric transmission line would last approximately 9 months (SCPP 1999m, Tables 3.8-2 and 3.8-3). However, construction in any one area would last substantially less time. Therefore, construction impacts would be short term and not significant.

Permanent Effects

Permanent effect are those that would remain after construction of the project. As discussed in the section on methodology (see Visual Resources Appendix B), in regard to permanent effects Commission staff considers the susceptibility to visual impact and the severity of impact together to determine the significance of impact for most factors. Both of these values are considered in regard to each of the view areas, represented by key observation points. Lighting and visible plume impacts as well as construction impacts are addressed separately.

Project Site and Transmission Line

VISUAL RESOURCES Table 2 shows the values for visual quality, viewer sensitivity, visibility, and viewer exposure (discussed previously in the setting section) considered for each of the Key Observation Points analyzed in that section and the resultant value for susceptibility to visual impact for each Key Observation Point.

VISUAL RESOURCES Table 3 shows the values for form, line, color, texture, and scale contrast; scale dominance; spatial dominance; view blockage considered for each of the Key Observation Points analyzed, and the resultant value for severity of visual change for each Key Observation Point.

VISUAL RESOURCES Table 2
Susceptibility to Visual Impact- Key Observation Points

	VISUAL QUALITY	VIEWER SENSITIVITY	VISIBILITY	VIEWER EXPOSURE	SUSCEPTIBILITY TO VISUAL IMPACT
Key Observation Point 1	Low to Moderate	High	Moderate	Moderate	Moderate
Key Observation Point 2	Low to Moderate	High	High	Moderate to High	Moderate to High
Key Observation Point 3	Low to Moderate	High	Moderate	Moderate to High	Moderate
Key Observation Point 4	Low to Moderate	High	High	Moderate	Moderate to High
Key Observation Point 5	Low to Moderate	High	High	Moderate	Moderate to High
Key Observation Point 6	Low to Moderate	High	High	Moderate	Moderate to High
Key Observation Point 7[a]	Low to Moderate	High	High	Moderate	Moderate to High

VISUAL RESOURCES Table 3
Severity of Visual Change- Key Observation Points

	CONTRAST					DOMINANCE		VIEW BLOCKAGE	SEVERITY OF VISUAL CHANGE
	FORM	LINE	COLOR	TEXTURE	SCALE	SCALE	SPATIAL		
Key Observation Point 1	Structures: L* Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: M Vegetation: L Land: L	Sub-ordinate	Subordinate	Negligible	Weak
Key Observation Point 2	Structures: L Vegetation: L Land: L	Structures: M Vegetation: L Land: L	Structures: M Vegetation:M Land: M	Structures: M Vegetation:M Land: M	Structures: M Vegetation: L Land: L	Sub-ordinate	Co-dominant	Negligible	Moderate
Key Observation Point 3	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Sub-ordinate	Co-dominant	Negligible	Moderate
Key Observation Point 4 - with La Paloma	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Sub-ordinate	Co-dominant	Negligible	Moderate
Key Observation Point 4 – without La Paloma	Structures: M Vegetation:M Land: M	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Sub-ordinate	Co-dominant	Negligible	Moderate
Key Observation Point 5	Structures: M Vegetation:M Land: M	Structures: L Vegetation: L Land: L	Structures: M Vegetation:M Land: M	Structures: M Vegetation:M Land: M	Structures: M Vegetation: L Land: L	Sub-ordinate	Co-dominant	Negligible	Moderate
Key Observation Point 6	Structures: L Vegetation:M Land: M	Structures: L Vegetation: L Land: L	Structures: M Vegetation:M Land: M	Structures: M Vegetation:M Land: M	Structures: M Vegetation: L Land: L	Sub-ordinate	Co-dominant	Negligible	Moderate
Key Observation Point 7	Structures: L Vegetation: **L** Land: **L**	Structures: L Vegetation: **L** Land: **L**	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Sub-ordinate	Co-dominant	Negligible	Moderate

L = Low; M = Moderate; H = High

Table B-1 in Appendix B shows the contribution to severity of visual change for each level of each factor.

VISUAL RESOURCES Table 4 shows the values for susceptibility to visual impact and severity of visual change for each Key Observation Point and the resultant values for visual impacts.

VISUAL RESOURCES Table 4
Visual Impacts - Key Observation Points

	SUSCEPTIBILITY TO VISUAL IMPACT	SEVERITY OF VISUAL CHANGE	VISUAL IMPACT
Key Observation Point 1	Moderate	Weak	Insignificant
Key Observation Point 2	Moderate to High	Moderate	Less than Significant
Key Observation Point 3	Moderate	Moderate	Less than Significant
Key Observation Point 4	Moderate to High	Moderate	Less than Significant
Key Observation Point 5	Moderate to High	Moderate	Less than Significant
Key Observation Point 6	Moderate to High	Moderate	Less than Significant
Key Observation Point 7	Moderate to High	Moderate	Less than Significant

Key Observation Point 1: State Route 33 East of Power Plant Site

Taken from the project site: east of McKittrick located near Reserve Road

Susceptibility to Visual Impact

For Key Observation Point 1, visual impact susceptibility is moderate (see VISUAL RESOURCES Table 2).

Severity of Visual Change

VISUAL RESOURCES Figure 4b shows the appearance of the power plant from Key Observation Point 1.

Contrast with Structures

The project structures would cause a low level of contrast in regard to form, line, color and texture with the existing oil tanks and other facilities in the view. Because the proposed exhaust stacks would appear somewhat larger than the existing structures, the project would cause moderate scale contrast.

Contrast with Vegetation

Vegetation visible in the view from Key Observation Point 1 toward the site consists of a variety of seasonal grasses and low shrubs. The project appears generally as a group of rectangles of varying proportions that would create a high level of contrast in regard to form and line with the irregular shapes of the grassy vegetation. The proposed neutral beige color of the power plant structures (Sunrise January 27, 1999, p.8.11-22) would create a low level of contrast with the seasonally green or tan tones of the vegetation in this view. This low level of color contrast depends on the use of such a color. Staff has created a condition of certification (Condition VIS-1 below) to ensure that color contrast would be minimized. The contrast between the flat surfaces of project elements and the varied texture of existing vegetation would cause a high level of contrast in regard to texture. However, because of the substantial distance of the project from the KOP, texture contrast would not be noticeable. Because the vegetation is closer to the KOP than the proposed structures would be, the vegetation would appear larger than the project structures, so scale contrast would be low. In summary, if no existing structures were visible, contrast with vegetation would be high in regard to form and line, and low in regard to color, texture, and scale. However, because existing oil production facilities are visible from Key Observation Point 1, and those structures are similar to the proposed project structures in regard to form, line, texture, and scale, the incremental increase in contrast with vegetation that the project would cause would be small, so contrast with vegetation would be low.

Contrast with Land/Water

No water is visible in this view. The landform varies from generally flat in the foreground to the moderately irregular forms of the Temblor Range on the horizon. The rectangular shapes and straight lines of the project structures would cause a high level of contrast in regard to form and line. The proposed neutral beige color of the power plant structures (Sunrise January 27, 1999, p.8.11-22) would create a low level of contrast with the tan earth tones in this area. The contrast between the flat surfaces of project elements and the varied texture of the land surface would cause a high level of contrast in regard to texture. However, because of the substantial distance of the project from the KOP, texture contrast would not be noticeable. The project would appear smaller than the existing landforms, so scale contrast would be low. In summary, if no existing structures were visible, contrast with vegetation would be high in regard to form and line, and low in regard to color, texture, and scale. However, because existing oil production facilities are visible from Key Observation Point 1, and those structures are similar to the proposed project structures in regard to form and line, the incremental increase in contrast with land in regard to form and line that the project would cause would be small, so contrast with land would be low.

Scale Dominance

Because of the project's substantial distance from the view area (1.3 miles at the closest point), it would appear of small size in comparison to the wide field of view and it would occupy a small part of the setting. Therefore, scale dominance from Key Observation Point 1 would be subordinate.

Spatial Dominance

Because the spatial composition of the view from Key Observation Point 1 is panoramic, the project would be subordinate in regard to composition. Because the view angle is somewhat to the side for most of the view area, including the closest part to the project site, spatial dominance would be subordinate in regard to position. Because the project will be backdropped by the Temblor Range, spatial dominance in regard to backdrop would be subordinate. The overall spatial dominance rating would be subordinate.

View Blockage

From Key Observation Point 1 the project would block a minor portion of a view with low to moderate visual quality, so the severity of view blockage would be negligible.

Visual Impact Severity

Because contrast would be low except for moderate scale contrast in regard to structures, scale dominance and spatial dominance would be subordinate, and view blockage would be negligible, the project's visual impact severity from Key Observation Point 1 would be weak (see **VISUAL RESOURCES Tables 3 and B-1**).

Visual Impact

Because visual impact susceptibility for Key Observation Point 1 is moderate and visual impact severity would be weak, visual impact would be insignificant (see **VISUAL RESOURCES Tables 4 and B-2**).

Key Observation Point 2: State Route 33 South of Electric Transmission Line Route

Susceptibility to Visual Impact

For Key Observation Point 2 visual impact susceptibility is moderate to high (see **VISUAL RESOURCES Table 2**).

Severity of Visual Change

VISUAL RESOURCES Figure 5b shows the appearance of the project from Key Observation Point 2 if either Route B or Route F is used. **VISUAL RESOURCES Figure 5c** shows the appearance of the project from Key Observation Point 2 if either Route D or Route E is used. Because the appearance of the project from this KOP is almost the same for all routes, they are addressed as one below.

Contrast with Structures

The most prominent structures visible from the area represented by Observation Point 2 are the existing electric lines, which consist of a combination of single pole and double pole structures. The proposed line would introduce more single pole structures. The proposed poles would cause low contrast in regard to line to the existing poles. In regard to form the proposed poles would cause low contrast to the existing single poles and moderate contrast to the existing double pole structures. The proposed galvanized steel poles would contrast moderately with the existing wood poles in regard to color and texture. The proposed poles would appear

somewhat taller than the existing double pole structures, creating moderate scale contrast. They would appear similar in height to the existing single poles.

Contrast with Vegetation

Vegetation visible in the view from Key Observation Point 2 toward the proposed transmission line route consists of grasses, shrubs, and mature trees near residences. The slender vertical poles would contrast strongly in regard to form and line with the irregular masses of grasses and shrubs and with the rounded masses of the mature trees.

The galvanized poles would contrast moderately with the tan and green colors of the vegetation. The flat surface of the poles would contrast moderately with the texture of the vegetation. The poles would appear smaller than the masses of existing vegetation so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 2, contrast with vegetation would be strong in regard to form and line, moderate in regard to color and texture , and low in regard to scale. However, because the existing electric are similar to the proposed transmission line in regard to form and line, the increment of contrast with vegetation added by the proposed transmission line would be low in regard to form and line, moderate in regard to color and texture, and low in regard to scale.

Contrast with Land/Water

No water is visible in this view. The slender vertical form and straight line of the poles would contrast strongly with the generally horizontal form and irregular line of the land The proposed galvanized poles would create moderate contrast with the earth tones of the land. The flat surfaces of project elements would contrast moderately with the texture of the land surface. The project would appear smaller than major land elements in the view, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 2, contrast with land would be strong in regard to form and line, moderate in regard to color and texture, and low in regard to scale. However, because the existing electric lines are similar to the proposed transmission line in regard to form and line, the increment of contrast with land added by the proposed transmission line would be low in regard to form and line, moderate in regard to color and texture, and low in regard to scale.

Scale Dominance

The project would appear small in comparison to the wide field of view, and would occupy a small part of the setting. Therefore, scale dominance from Key Observation Point 2 would be subordinate.

Spatial Dominance

Because the spatial composition of the view from Key Observation Point 2 is panoramic, the project would be subordinate in regard to composition. Because the transmission line would run across the middle of the view spatial dominance would be prominent in regard to position. Because the transmission poles would be partially backdropped by the sky, spatial dominance in regard to backdrop would be prominent. The overall spatial dominance rating would be co-dominant.

View Blockage

From Key Observation Point 2 the project would block a minor portion of a view with low to moderate quality, so the severity of view blockage would be negligible.

Visual Impact Severity

Because a) the highest contrast rating would be moderate (for form, color, texture, and scale), b) scale dominance would be subordinate, c) spatial dominance would be co-dominant, and d) the severity of view blockage would be negligible, the severity of the visual change due to the project for the view area represented by Key Observation Point 2 would be moderate (see **VISUAL RESOURCES Tables 3 and B-1**).

Visual Impact

Because for Key Observation Point 2 visual impact susceptibility is moderate to high and visual impact severity would be moderate, visual impact would be less than significant (see **VISUAL RESOURCES Tables 4 and B-2**).

Key Observation Point 3: Southern End of McKittrick

Susceptibility to Visual Impact

For Key Observation Point 3 visual impact susceptibility is moderate (**see VISUAL RESOURCES Table 2**).

Severity of Visual Change

VISUAL RESOURCES Figure 6b shows the appearance of the project from Key Observation Point 3 if either Route B or Route F is used. **VISUAL RESOURCES Figure 6c** shows the appearance of the project from Key Observation Point 3 if either Route D or Route E is used. Because the appearance of the project from this KOP is almost the same for all routes, they are addressed as one below.

Contrast with Structures

From Key Observation Point 3 the most prominent existing structures are the poles of the electrical lines along State Route 33 and along the horizon. From this distance the proposed poles would appear similar to the existing poles in form and line. The color and texture of the new poles would not be distinguishable from this distance. The new poles would appear approximately the same size as the existing poles, so scale contrast would be low. In summary, the proposed poles would cause low contrast with existing structures in regard to form, line, color, texture, and scale.

Contrast with Vegetation

Vegetation visible in the view from Key Observation Point 2 toward the proposed electric transmission line consists of grasses and low-growing desert shrubs. The vertical form of the poles would contrast highly to the low, irregular form of the vegetation. The straight lines of the poles would similarly contrast highly with the existing vegetation. The color and texture of the poles would not be distinguishable from this distance, so contrast in regard to these factors would be low. The poles would appear smaller than the masses of vegetation, so scale contrast would be low.

In summary, if no existing structures were visible from Key Observation Point 3, contrast with vegetation would be strong in regard to form and line, and low in regard to color, texture, and scale. However, because the existing electric lines appear similar to the proposed transmission line in regard to form and line, the increment of contrast with vegetation added by the proposed transmission line in regard to form and line would be small. Therefore, contrast would be low in regard to form, line, color, texture, and scale.

Contrast with Land/Water

No water is visible in this view. The landform consists of a slightly irregular foreground with low hills on the horizon in the middleground. The slender vertical proposed transmission poles would contrast highly with this land surface in regard to form and line. The color and texture of the poles would not be distinguishable from this distance, so contrast in regard to these factors would be low. The poles would appear smaller than the landform, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 3, contrast with land would be strong in regard to form and line, and low in regard to color, texture, and scale. However, because the existing electric lines appear similar to the proposed transmission line in regard to form and line, the increment of contrast with land added by the proposed transmission line in regard to form and line would be small. Therefore, contrast would be low in regard to form, line, color, texture, and scale.

Scale Dominance

The proposed transmission poles would appear small compared to the panoramic field of view and would occupy a small part of the setting. Therefore, scale dominance would be subordinate.

Spatial Dominance

Because the spatial composition of the view from Key Observation Point 3 is panoramic, the towers would be subordinate in regard to composition. The pole would run across the middle of the view, so spatial dominance would be prominent in regard to position. Because portions of the transmission poles would be backdropped by sky, spatial dominance in regard to backdrop would be prominent. The overall spatial dominance rating would be co-dominant, similar to the existing poles.

View Blockage

From Key Observation Point 3 the proposed poles would block a minor portion of a low to moderate quality view, so the severity of view blockage would be negligible.

Severity of Visual Change

Because contrast would be low, scale dominance would be subordinate, spatial dominance would be co-dominant, and view blockage would be negligible, the severity of visual change from Key Observation Point 3 would be moderate (see **VISUAL RESOURCES Tables 3 and B-1**).

Visual Impact

Because visual impact susceptibility for Key Observation Point 3 is moderate and severity of visual change would be moderate, visual impact would be less than significant (see **VISUAL RESOURCES Tables 4 and B-2**).

Key Observation Point 4: State Route 58 Northeast of McKittrick

Susceptibility to Visual Impact

For Key Observation Point 4 visual impact susceptibility is moderate to high (see **VISUAL RESOURCES Table 2**).

Severity of Visual Change

VISUAL RESOURCES Figure 7b shows the appearance of the proposed transmission line from Key Observation Point 4 if Route B is used without the transmission line proposed for the La Paloma project. **VISUAL RESOURCES Figure 7c** shows the appearance of the project from Key Observation Point 4 if Route D is used without the transmission line proposed for the La Paloma project. Because the appearance of the project from this KOP is almost the same for these two options, they are addressed as one below.

VISUAL RESOURCES Figure 7d shows the appearance of the proposed transmission line from Key Observation Point 4 if Route B is used with the transmission line proposed for the La Paloma project. **VISUAL RESOURCES Figure 7e** shows the appearance of the project from Key Observation Point 4 if Route D is used with the transmission line proposed for the La Paloma project. Because the appearance of the project from this KOP is almost the same for these two options, they are addressed as one below.

Contrast with Structures

<u>With La Paloma Transmission Line</u>

The form and line of the proposed poles would be similar to the La Paloma poles. The poles also would be of galvanized steel and similar in color and texture with the La Paloma poles. The proposed poles would appear approximately the same height as the poles of the La Paloma line. In summary, the proposed poles would cause low contrast with structures in regard to form, line, color, texture, and scale.

<u>Without La Paloma Transmission Line</u>

From Key Observation Point 4 the most prominent existing structures are the lattice towers of the PG&E 500 kV Diablo-Midway electrical transmission line in the left foreground. The Midway-Sunset 230 kV Line #1 on H-frame double wood poles is also visible adjacent to the proposed transmission line route in the middleground. . The single poles of the proposed line would contrast moderately in form to the H-frame structures of both the PG&E line and the Midway-Sunset line. The poles would be straight in regard to line, similar to both the PG&E and the Midway-Sunset structures. The color and texture of the proposed poles would be similar to the PG&E

structures. The color and texture of the poles would barely be discernible from this distance, so contrast with the wood Midway-Sunset poles would be low. The proposed poles would appear somewhat taller than the poles of the Midway-Sunset line, but they would appear much smaller than the structures of the 500 kV line. Therefore, scale contrast would be low. In summary, in regard to structures the proposed poles would cause moderate contrast in regard to form and low contrast in regard to line, color, texture, and scale.

Contrast with Vegetation

With La Paloma Transmission Line

Vegetation visible in the view from Key Observation Point 4 toward the proposed electric transmission line route consists of grasses and low-growing desert shrubs. The vertical form of the poles would contrast highly to the low, irregular form of the vegetation. The straight lines of the poles would similarly contrast highly with the existing vegetation. The color and texture of the poles would not be distinguishable from this distance, so contrast in regard to these factors would be low. The poles would appear smaller than the masses of vegetation, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 4, contrast with vegetation would be strong in regard to form and line, and low in regard to color, texture, and scale. However, because the proposed electric line would appear similar to the La Paloma electric line in regard to form and line, the increment of contrast with vegetation added by the proposed transmission line in regard to form and line would be small. Therefore, contrast would be low in regard to form, line, color, texture, and scale.

Without La Paloma Transmission Line

Vegetation visible in the view from Key Observation Point 4 toward the proposed electric transmission line route consists of grasses and low-growing desert shrubs. The vertical form of the poles would contrast highly to the low, irregular form of the vegetation. The straight lines of the poles would similarly contrast highly with the existing vegetation. The color and texture of the poles would not be distinguishable from this distance, so contrast in regard to these factors would be low. The poles would appear smaller than the masses of vegetation, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 4, contrast with vegetation would be strong in regard to form and line, and low in regard to color, texture, and scale. However, because the proposed electric line would appear similar to the existing PG&E and Midway-Sunset lines in regard to line and would contrast moderately with the existing lines in regard to form, the increment of contrast with vegetation added by the proposed transmission line in regard to form would be moderate and the increment added in regard to line would be small. Therefore, contrast with vegetation would be moderate in regard to form and low in regard to line, color, texture, and scale.

Contrast with Land/Water

With La Paloma Transmission Line

No water is visible in this view. The landform consists of a slightly irregular foreground with low hills on the horizon in the middleground. The slender vertical proposed transmission poles would contrast highly with this land surface in regard to form and line. The color and texture of the poles would not be distinguishable from this distance, so contrast in regard to these factors would be low. The poles would appear smaller than the landform, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 3, contrast with land would be strong in regard to form and line, and low in regard to color, texture, and scale. However, because the existing electric lines appear similar to the proposed transmission line in regard to form and line, the increment of contrast with land added by the proposed transmission line in regard to form and line would be small. Therefore, contrast would be low in regard to form, line, color, texture, and scale.

Without La Paloma Transmission Line

No water is visible in this view. The landform consists of a slightly irregular foreground with low hills on the horizon in the middleground. The slender vertical proposed transmission poles would contrast highly with this land surface in regard to form and line. The color and texture of the poles would not be distinguishable from this distance, so contrast in regard to these factors would be low. The poles would appear smaller than the landform, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 4, contrast with land would be strong in regard to form and line, and low in regard to color, texture, and scale. However, because the proposed electric line would appear similar to the existing PG&E and Midway-Sunset lines in regard to line and would contrast moderately with the existing lines in regard to form, the increment of contrast with land added by the proposed transmission line in regard to form would be moderate and the increment added in regard to line would be small. Therefore, contrast with land would be moderate in regard to form and low in regard to line, color, texture, and scale.

Scale Dominance

The group of proposed transmission poles visible from this viewpoint would be small in size compared to the panoramic field of view and would occupy a moderate part of the setting. Therefore, scale dominance from Key Observation Point 4 would be subordinate.

Spatial Dominance

Because the spatial composition of the view from Key Observation Point 4 is panoramic, the towers would be subordinate in regard to composition. The poles would cross the middle of the view, so spatial dominance would be prominent in regard to position. Because the transmission poles would be almost completely backdropped by sky, spatial dominance in regard to backdrop would be prominent. The overall spatial dominance rating would be co-dominant, similar to the Midway-Sunset line and the La Paloma line.

View Blockage

From Key Observation Point 4 the proposed poles would block a moderate portion of a low to moderate quality view, so the severity of view blockage would be negligible.

Severity of Visual Change

With La Paloma Transmission Line

Because contrast would be low, scale dominance would be subordinate, spatial dominance would be co-dominant, and view blockage would be negligible, the severity of visual change from Key Observation Point 4 would be moderate (see **VISUAL RESOURCES Tables 3 and B-1**).

Without La Paloma Transmission Line

Because contrast would be moderate in regard to form, scale dominance would be subordinate, spatial dominance would be co-dominant, and view blockage would be negligible, the severity of visual change from Key Observation Point 4 would be moderate (see **VISUAL RESOURCES Tables 3 and B-1**).

Visual Impact

Because visual impact susceptibility for Key Observation Point 4 is moderate to high and visual impact severity would be moderate either with or without the La Paloma transmission line, visual impact would be less than significant (see **VISUAL RESOURCES Tables 4 and B-2**).

Key Observation Point 5: Mirasol Avenue looking West

Susceptibility to Visual Impact

For Key Observation Point 5 visual impact susceptibility is moderate to high (**see VISUAL RESOURCES Table 2**).

Severity of Visual Change

VISUAL RESOURCES Figure 8b shows the appearance of the project from Key Observation Point 5.

Contrast with Structures

From the view area represented by Key Observation Point 5 the most prominent existing structures are the double pole H frame structures of the Midway-Sunset 230 kV Line #1 in the foreground. Other transmission line structures farther away are also visible. The proposed transmission line would include poles that would appear slightly shorter than the existing lines. The form and line of proposed single poles would contrast moderately with the existing H-frame structures. The line of the proposed poles would be similar to the existing structures. The proposed galvanized steel poles would contrast moderately in color and texture with the existing wood H-frame structures. The new poles would appear somewhat taller than the existing H-frame structures. In summary, the proposed poles would cause moderate contrast with

existing structures in regard to form, color, texture, and scale; and low contrast in regard to line.

Contrast with Vegetation

Vegetation visible in the view from Key Observation Point 5 toward the proposed electric transmission line route consists of irrigated row crops. The slender, vertical form of the poles would contrast highly with the low, broad forms of the agricultural parcels. The straight lines of the poles would be similar to the straight edges of the crop parcels. The gray poles would contrast moderately with the seasonally green or tan tones of the vegetation. The flat texture of the poles would contrast moderately with the texture of the vegetation. The poles would appear similar in height to the crop parcels, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 5, contrast with vegetation would be strong in regard to form, moderate in regard to color and texture, and low in regard to line and scale. However, because the existing electric lines appear somewhat similar to the proposed transmission line in regard to form, the increment of contrast with vegetation added by the proposed transmission line in regard to form would be moderate. Therefore, contrast with vegetation would be moderate in regard to form, color, and texture, and low in regard to line and scale.

Contrast with Land/Water

No water is visible in this view. The landform consists of flat cropland. Large areas of soil are visible when parcels are not in production.

The slender, vertical form of the poles would contrast highly with the low, broad forms of the visible land. The straight lines of the poles would be similar to the straight edges of the crop parcels. The gray poles would contrast moderately with the tan and brown tones of the fallow parcels. The flat texture of the poles would contrast moderately with the texture of the soil. The poles would appear similar in height to the fallow crop parcels, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 5, contrast with land would be strong in regard to form, moderate in regard to color and texture, and low in regard to line and scale. However, because the existing electric lines appear somewhat similar to the proposed transmission line in regard to form, the increment of contrast with land added by the proposed transmission line in regard to form would be moderate. Therefore, contrast with land would be moderate in regard to form, color, and texture, and low in regard to line and scale.

Scale Dominance

The group of proposed transmission poles visible from this viewpoint would be small in size compared to the panoramic field of view and would occupy a small part of the setting. Therefore, scale dominance from Key Observation Point 5 would be subordinate.

Spatial Dominance

Because the spatial composition of the view from Key Observation Point 5 is panoramic, the poles would be subordinate in regard to composition. Because the

poles would be in the middle of the view, spatial dominance would be prominent in regard to position. Because the transmission poles would be almost completely backdropped by sky, spatial dominance in regard to backdrop would be prominent. The overall spatial dominance rating would be co-dominant, similar to the existing Midway-Sunset transmission line structures.

View Blockage

From Key Observation Point 5 the proposed poles would block a moderate portion of a low to moderate quality view, so severity of view blockage would be negligible.

Severity of Visual Change

Because contrast would be moderate in regard to form, color, texture and scale; scale dominance would be subordinate; spatial dominance would be co-dominant; and severity of view blockage would be negligible, the severity of the visual change that the project would cause would be moderate (**see VISUAL RESOURCES Tables 3 and B-1**).

Visual Impact

Because susceptibility to visual impact for Key Observation Point 5 is moderate to high and the severity of visual change would be moderate, visual impact would be less than significant (see **VISUAL RESOURCES Tables 4 and B-2**).

Key Observation Point 6: Buerkle Road looking Southwest

Susceptibility to Visual Impact

For Key Observation Point 6 visual impact susceptibility is moderate to high (see **VISUAL RESOURCES Table 2**).

Severity of Visual Change

VISUAL RESOURCES Figure 9b shows the appearance of the project from Key Observation Point 6.

Contrast with Structures

From Key Observation Point 6 the most prominent existing structures are the structures of the Midway-Sunset 203 kV Line #1, including H-frame structures and a single steel corner pole. The form of the proposed transmission line poles would be similar to that of the existing corner pole. The proposed poles would be similar to the existing transmission structures in regard to line. The poles also would be of galvanized steel, similar in color and texture to the existing corner pole but contrasting moderately with the color and texture of the wood H-frame structures. The proposed poles would appear slightly taller than the existing structures. The proposed corner pole would appear somewhat larger than the existing corner pole. Therefore, the proposed line would cause moderate contrast with existing structures in regard to scale. In summary, the proposed poles would cause moderate contrast with existing structures in regard to color, texture, and scale, and low contrast in regard to form and line.

Contrast with Vegetation

Vegetation visible in the view from Key Observation Point 6 toward the proposed electric transmission line route consists of irrigated row crops. The slender, vertical form of the poles would contrast highly with the low, broad forms of the agricultural parcels. The straight lines of the poles would be similar to the straight edges of the crop parcels. The gray poles would contrast moderately with the seasonally green or tan tones of the vegetation. The flat texture of the poles would contrast moderately with the texture of the vegetation. The poles would appear similar in height to the crop parcels, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 6, contrast with vegetation would be strong in regard to form, moderate in regard to color and texture, and low in regard to line and scale. However, because the existing electric lines appear somewhat similar to the proposed transmission line in regard to form, the increment of contrast with vegetation added by the proposed transmission line in regard to form would be moderate. Therefore, contrast with vegetation would be moderate in regard to form, color, and texture, and low in regard to line and scale.

Contrast with Land/Water

No water is visible in this view. The landform consists of flat cropland. Large areas of soil are visible when parcels are not in production.

The slender, vertical form of the poles would contrast highly with the low, broad forms of the visible land. The straight lines of the poles would be similar to the straight edges of the crop parcels. The gray poles would contrast moderately with the tan and brown tones of the fallow parcels. The flat texture of the poles would contrast moderately with the texture of the soil. The poles would appear similar in height to the fallow crop parcels, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 6, contrast with land would be strong in regard to form, moderate in regard to color and texture, and low in regard to line and scale. However, because the existing electric lines appear somewhat similar to the proposed transmission line in regard to form, the increment of contrast with land added by the proposed transmission line in regard to form would be moderate. Therefore, contrast with land would be moderate in regard to form, color, and texture, and low in regard to line and scale.

Scale Dominance

The group of proposed transmission poles visible from this viewpoint would be small compared to the panoramic field of view and would occupy a small part of the setting. Therefore, scale dominance from Key Observation Point 3 would be subordinate.

Spatial Dominance

Because the spatial composition of the view from Key Observation Point 6 is panoramic, the poles would be subordinate in regard to composition. The poles would cross the middle of the view, so they would be prominent in regard to position. Because the poles would be almost completely backdropped by sky, spatial dominance in regard to backdrop would be prominent. The overall spatial dominance rating would be co-dominant, slightly greater than the existing poles.

View Blockage

From Key Observation Point 6 the proposed poles would block a minor portion of a low to moderate quality view, so severity of view blockage would be negligible.

Visual Impact Severity

Because contrast would be moderate in regard to form, color, texture, and scale; scale dominance would be subordinate; spatial dominance would be co-dominant; and severity of view blockage would be negligible, the project's visual impact severity from Key Observation Point 6 would be moderate (see **VISUAL RESOURCES Tables 3 and B-1**).

Visual Impact

Because visual impact susceptibility for Key Observation Point 6 is moderate to high and visual impact severity would be moderate, visual impact would be less than significant (see VISUAL RESOURCES Tables 4 and B-2).

Key Observation Point 7: Buerkle Road looking Northwest

Susceptibility to Visual Impact

For Key Observation Point 7 visual impact susceptibility is moderate to high (see **VISUAL RESOURCES Table 2**).

Severity of Visual Change

VISUAL RESOURCES Figure 10b shows the appearance of the proposed transmission line from Key Observation Point 7 if Route B is used with the transmission line proposed for the La Paloma project. **VISUAL RESOURCES Figure 10c** shows the appearance of the project from Key Observation Point 7 if Route B is used without the transmission line proposed for the La Paloma project.

Contrast with Structures

<u>With La Paloma Transmission Line</u>

The form and line of the proposed poles would be similar to the La Paloma poles. The poles also would be of galvanized steel and similar in color and texture with the La Paloma poles. The proposed poles would appear approximately the same height as the La Paloma poles. In summary, the proposed poles would cause low contrast with structures in regard to form, line, color, texture, and scale.

<u>Without La Paloma Transmission Line</u>

In the view from Key Observation Point 7 toward the proposed electric transmission line existing electric poles and lattice structures are visible. Poles along Buerkle Road appear taller than the lattice towers of the PG&E 500 kV Diablo-Midway electrical transmission line because the poles are much closer. The Midway-Sunset 230 kV Line #1 on H-frame double wood poles is also visible on the left periphery. The single poles of the proposed line would appear similar to the existing poles along Buerkle Road in form and line. The color and texture of the proposed poles would barely be

discernible from this distance, so contrast with the existing poles would be low in regard to these factors. The proposed poles would appear similar in height to the existing poles, so scale contrast would be low. In summary, in regard to structures the proposed poles would cause low contrast in regard to form, line, color, texture, and scale.

Contrast with Vegetation

With La Paloma Transmission Line

Vegetation visible in the view from Key Observation Point 7 toward the proposed electric transmission line route consists of irrigated row crops. The slender, vertical form of the poles would contrast highly with the low, broad forms of the agricultural parcels. The straight lines of the poles would be similar to the straight edges of the crop parcels. The gray color and flat texture of the galvanized poles would barely be discernible from this distance so contrast in regard to color and texture would be low. The poles would appear similar in height to the crop parcels, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 7, contrast with vegetation would be strong in regard to form and low in regard to line, color, texture, and scale. However, because the existing electric lines appear similar to the proposed transmission line in regard to form, the increment of contrast with vegetation added by the proposed transmission line in regard to form would be small. Therefore, contrast with vegetation would be low in regard to form, line, color, texture, and scale.

Without La Paloma Transmission Line

Vegetation visible in the view from Key Observation Point 7 toward the proposed electric transmission line route consists of irrigated row crops. The slender, vertical form of the poles would contrast highly with the low, broad forms of the agricultural parcels. The straight lines of the poles would be similar to the straight edges of the crop parcels. The gray color and flat texture of the galvanized poles would barely be discernible from this distance so contrast in regard to color and texture would be low. The poles would appear similar in height to the crop parcels, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 7, contrast with vegetation would be strong in regard to form and low in regard to line, color, texture, and scale. However, because the proposed transmission poles would appear similar to poles of existing electric lines in regard to form, the increment of contrast with vegetation added by the proposed transmission line in regard to form would be small. Therefore, contrast with vegetation would be low in regard to form, line, color, texture, and scale.

Contrast with Land/Water

With La Paloma Transmission Line

No water is visible in this view. The landform consists of a slightly irregular foreground with low hills on the horizon in the middleground. The slender vertical proposed transmission poles would contrast highly with this land surface in regard to form and line. The color and texture of the poles would not be distinguishable from this

distance, so contrast in regard to these factors would be low. The poles would appear smaller than the landform, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 3, contrast with land would be strong in regard to form and line, and low in regard to color, texture, and scale. However, because the existing electric lines appear similar to the proposed transmission line in regard to form and line, the increment of contrast with land added by the proposed transmission line in regard to form and line would be small. Therefore, contrast with land would be low in regard to form, line, color, texture, and scale.

Without La Paloma Transmission Line

No water is visible in this view. The landform consists of a slightly irregular foreground with low hills on the horizon in the middleground. The slender vertical proposed transmission poles would contrast highly with this land surface in regard to form and line. The color and texture of the poles would not be distinguishable from this distance, so contrast in regard to these factors would be low. The poles would appear smaller than the landform, so scale contrast would be low. In summary, if no existing structures were visible from Key Observation Point 4, contrast with land would be strong in regard to form and line, and low in regard to color, texture, and scale. However, because the proposed poles would appear similar to the existing poles in regard to form and line, the increment of contrast with land added by the proposed transmission line in regard to form and line would be small. Therefore, contrast with land would be low in regard to form, line, color, texture, and scale.

Scale Dominance

The group of proposed transmission poles visible from this viewpoint would be small in size compared to the panoramic field of view and would occupy a moderate part of the setting. Therefore, scale dominance from Key Observation Point 7 would be subordinate.

Spatial Dominance

Because the spatial composition of the view from Key Observation Point 7 is panoramic, the towers would be subordinate in regard to composition. The poles would cross the middle of the view, so spatial dominance would be prominent in regard to position. Because the transmission poles would be almost completely backdropped by sky, spatial dominance in regard to backdrop would be prominent. The overall spatial dominance rating would be co-dominant, similar to the existing lines and the La Paloma line.

View Blockage

From Key Observation Point 7 the proposed poles would block a moderate portion of a low to moderate quality view, so the severity of view blockage would be negligible.

Severity of Visual Change

Because contrast would be low, scale dominance would be subordinate, spatial dominance would be co-dominant, and view blockage would be negligible, the severity

of visual change from Key Observation Point 4 would be moderate (see **VISUAL RESOURCES Tables 3 and B-1**).

Visual Impact

Because visual impact susceptibility for Key Observation Point 7 is moderate to high and visual impact severity would be moderate either with or without the La Paloma transmission line, visual impact would be less than significant (see **VISUAL RESOURCES Tables 4 and B-2**).

Variation 1

This route proceeds south from the power plant site for approximately 1.5 miles before turning northwest and traveling approximately 2.5 miles to join the common route for alternatives B, D, E, and F (SCPP 1999k, Figure CORR-1). Because this route travels higher along the hills for a longer distance than the primary route, its use would cause greater visual impacts than use of the primary route. However, because the route is not near public areas and the poles would be backdropped by the hills (not skylined) the visual impacts would not be significant.

Variation 2

This route diverges from the common route for alternatives B, D, E, and F approximately 0.3 mile after the crossing of State Route 33 and proceeds northeast for approximately 1.3 miles to reconnect with the common route (SCPP 1999k, Figure CORR-2). Because this route is farther from McKittrick and is screened more by terrain, its use would cause less visual impact than use of the proposed route, although use of either would not cause significant visual impacts.

Variation 3

This route would diverge from the common route for alternatives B, D, E, and F northeast of McKittrick, traveling northeast for approximately 0.7 mile then turning northwest and traveling approximately 0.4 miles to rejoin the primary route (SCPP 1999k, Figure CORR-2). Although this route is farther from State Route 58 than the primary route is, both travel through hilly terrain in this area and neither would be seen from the highway, so use of either would have similar, insignificant visual impacts.

Variation 4

This route would diverge from the common route for alternatives B, D, E, and F at approximately milepost 15.7 and travel to the southeast, then east, then north, then northwest to rejoin the common route, traveling a total of approximately 1.3 miles (SCPP 1999k, Figure CORR-3). This route is slightly farther from State Route 58 but it is also longer than the approximately 0.8 mile segment that it would replace, and it would have five additional turns, so it would require more poles. Therefore, its visual impact would be approximately the same as the primary route and would not be significant because of the substantial distance from public views, the low to moderate visual quality of the area, and the existence of other electric lines.

LIGHTING AND GLARE

The proposed project has the potential to substantially increase the amount of light visible to the surrounding area. The applicant has proposed measures to reduce lighting impacts, and staff has expanded on these measures in Condition VIS-3 (see below). Fencing for the project also has the potential to create reflective daytime glare. Staff has proposed Condition VIS-2 to minimize this potential problem.

VISIBLE PLUMES

The project would not have a cooling tower, so no cooling tower plumes would be produced. The applicant has stated that no visible steam plume has been observed at the 300 MW Sycamore and Kern County Cogeneration Company cogeneration facilities, operating since 1985 (SCPP 1999e, Data Response 81a). Because these plants are in a similar environment to that of the proposed plant, visible stack plumes are not expected from the proposed project. Any stack plumes would be small and infrequent and therefore insignificant.

INDIRECT EFFECTS

TEMPORARY EFFECTS

The construction of 700 new oil wells and appurtenant facilities, such as new dirt roads, steam injecting wells, and connecting pipelines resulting from the project, as well as resizing the water treatment facility, would cause temporary indirect effects. Because these facilities would be smaller than the proposed power plant and would be similar distance from public views as the power plant, the temporary indirect effects of the project would be less than the direct effects. Because the detailed analysis of the direct effects concludes that the direct effects would not be significant, the temporary indirect visual impacts, being even less than the direct effects, would not be significant.

PERMANENT EFFECTS

The operation of 700 new oil wells and appurtenant facilities, such as new dirt roads, steam injecting wells, and connecting pipelines resulting from the project, as well as resizing the water treatment facility, would cause permanent indirect effects. Because these facilities would be smaller than the proposed power plant and would be similar distance from public views as the power plant, the permanent indirect effects of the project would be less than the direct effects. Because the detailed analysis of the direct effects concludes that the direct effects would not be significant, the permanent indirect visual impacts, being even less than the direct effects, would not be significant.

CUMULATIVE EFFECTS

TEMPORARY EFFECTS

Construction of the remaining portion of the 20-inch diameter natural gas pipeline interconnecting with KRGT/MGC pipeline will not be noticeable from public view areas, so it will not contribute to cumulative visual impacts. In regard to the potential

for cumulative visual impacts from the proposed project, the La Paloma Generating Project, the Elk Hills Power Project, and the planned Midway-Sunset Project, none of the residential viewers with a view of one of these plants would have a view of the other plants, so the three plants would not cause a cumulative visual impact for local residents. Travelers could see the various power plants on a single trip, but only by taking a circuitous route, so cumulative impacts are unlikely to be significant. In addition, all of these power plant sites are a considerable distance from residences and recreational travelers, so the relatively low profile construction activities at any or all of the sites are unlikely to be noticeable to sensitive viewers, so impacts would not be significant.

PERMANENT EFFECTS

In regard to the potential for cumulative visual impacts from the proposed project, the La Paloma Generating Project, the Elk Hills Power Project, and the planned Midway-Sunset Project, none of the residential viewers with a view of one of these plants would have a view of the other plants, so the three plants would not cause a cumulative visual impact for local residents. Travelers could see the various power plants on a single trip, but only by taking a circuitous route, so cumulative impacts are unlikely to be significant.

The proposed power plant would add a noticeable but not considerable increment to the existing industrial character in Midway Valley. Similarly, existing transmission lines cumulatively have significantly degraded visual conditions. The addition of another transmission line will cause an adverse impact, but it will not noticeably lessen the already degraded conditions along the proposed and alternative routes. Therefore, the project will not cause a substantial contribution to the already significant cumulative visual impacts. Petroleum development has already greatly changed the visual character of the region. Further similar development will not substantially further degrade the visual character of this area.

FACILITY CLOSURE

INTRODUCTION

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

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 should address removal of the power plant structures and the transmission poles to reduce visual impacts.

UNEXPECTED TEMPORARY CLOSURE

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. No special conditions regarding visual resources are expected to be required to address temporary closure.

UNEXPECTED PERMANENT CLOSURE

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 should address removal of the power plant structures and the transmission poles to reduce visual impacts.

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES REGULATIONS AND STANDARDS

LOCAL

COUNTY OF KERN

Kern County would require the applicant to obtain a building permit for the project (Stennick 1999). One condition of the building permit is to provide landscaping in accordance with County specifications. The Landscape Plan must conform to the landscape requirements in Chapter 19.86 of the Kern County Zoning Code. The applicant should prepare a landscape plan when final construction drawings of the project are completed. Once available, the applicant should send a copy of the Landscape Plan to the Energy Commission for review and approval. Staff has proposed Condition VIS-4 to ensure that the Landscape Plan and its implementation satisfy the requirements of the Kern County General Plan and Zoning Code.

MITIGATION

The CEQA Guidelines (Title 14, California Code of Regulations, section 15370) defines mitigation to include:

a. Avoiding the impact altogether by not taking a certain action or parts of an action.

b. Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

c. Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.

d. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

e. Compensating for the impact by replacing or providing substitute resources or environments.

APPLICANT'S PROPOSED MITIGATION

SPECIFIC MITIGATION MEASURES

The Applicant's position is that the project's visual impacts would be less than significant, therefore, no mitigation measures are needed (SCPP 1998a, p.8.11-29).

STAFF'S PROPOSED MITIGATION

STAFF MITIGATION 1 (CONDITION VIS-1)

The applicant has proposed to use a neutral beige color to minimize color contrast with the surroundings. Staff proposes Condition VIS-1 to ensure that this occurs. The condition requires the project owner to treat the project structures, buildings, and tanks visible to the public in non-reflective colors to blend with the natural setting. The color plan would be submitted at an early time so that any precolored buildings and structures can have colors approved prior to their color treatment.

STAFF MITIGATION 2 (CONDITION VIS-2)

As previously discussed, fencing has the potential to create substantial daytime glare. All fencing should be non-reflective to minimize glare. Staff proposes Condition VIS-2 to achieve this.

STAFF MITIGATION 3 (CONDITION VIS-3)

The applicant has proposed lighting design to minimize off-site light and glare. To ensure that this occurs, staff proposes Condition VIS-3 requiring the project owner to prepare a lighting plan designed to achieve these objectives, and to implement the plan. The plan would also be designed to minimize backscatter to the nighttime sky, and should include provisions to minimize lighting of plant areas, consistent with operational and safety needs. The plan would also include a procedure to resolve any lighting complaints.

STAFF MITIGATION 4 (CONDITION VIS-4)

Staff proposes Condition VIS-4 requiring the project owner to prepare and implement a landscaping plan that satisfies the requirements of the Kern County Planning Department. The county has stated that trees are needed to soften the appearance of the project (Rickels 1999). The plan should showing the location of such landscaping, the varieties and sizes of plants proposed to be used in such landscaping, the proposed time to maturity for such landscaping, and a method for replacing any unsuccessful plantings.

CONCLUSION AND RECOMMENDATION

CONCLUSION

With staff's proposed conditions of certification the visual impacts of the proposed project would be less than significant, and the project would comply with laws, ordinances, regulations, and standards.

RECOMMENDATION

If the Energy Commission certifies the Project, staff recommends that the Commission adopt the following proposed conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

VIS-1 Prior to first electricity generation, the project owner shall treat the project structures, buildings, and tanks visible to the public in non-reflective colors to blend with the natural setting.

Protocol: The project owner shall submit a color plan for the project to the California Energy Commission Compliance Project Manager (CPM) for review and approval. The color plan shall include:

- specification, including color samples and 11" x 17" color simulations, of the color(s) proposed for use on project structures, including structures colored during manufacture;
- a detailed schedule for completion of the treatment; and,
- documentation that switchyard structures shall be galvanized steel, switchyard buss shall be aluminum, and other switchyard structures shall be in shades of ANSI gray;
- documentation that transmission structures shall be galvanized steel; and,
- a procedure to ensure proper treatment maintenance for the life of the project.

If the CPM notifies the project owner that revisions of the color plan are needed before the CPM will approve the plan, the project owner shall submit to the CPM a revised plan.

After approval of the color plan by the CPM, the project owner shall implement the plan according to the schedule and shall ensure that the treatment is properly maintained for the life of the project.

For any structures that are treated during manufacture, the project owner shall not specify the treatment of such structures to the vendors until the project owner receives notification of approval of the color plan by the CPM.

The project owner shall not perform the final treatment on any structures until the project owner receives notification of approval of the color plan from the CPM.

The project owner shall notify the CPM within one week after all precolored structures have been erected and all structures to be treated in the field have been treated and the structures are ready for inspection.

Verification: Not later than 60 days prior to treating any structures that are to be color treated during manufacture, or a lesser period of time mutually agreed to by the project owner and the CPM, the project owner shall submit its proposed color plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the color 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.

Not less than thirty days prior to first electricity generation, the project owner shall notify the CPM that all structures treated during manufacture and all structures treated in the field are ready for inspection.

The project owner shall provide a status report regarding treatment maintenance in the Annual Compliance Report.

VIS-2 Any fencing for the project shall be galvanized with a non-reflective finish.

Protocol: At least 60 days prior to ordering the fencing the project owner shall submit to the CPM for review and approval the specifications for the fencing documenting that such fencing finish will be galvanized and non-reflective.

If the CPM notifies the project owner that revisions of the finish specifications are needed before the CPM will approve the submittal, the project owner shall submit to the CPM revised specifications.

The project owner shall not order the fencing until the project owner receives approval of the fencing submittal from the CPM.

The project owner shall notify the CPM within one week after the fencing has been installed and is ready for inspection.

Verification: At least 60 days prior to ordering the galvanized non-reflective fencing, or a lesser period of time as mutually agreed to by the project owner and the CPM, the project owner shall submit the specifications to the CPM for review and approval.

If the CPM notifies the project owner that revisions of the submittal 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.

The project owner shall notify the CPM within seven days after completing installation of the fencing that the fencing is ready for inspection.

VIS-3 Prior to first electricity generation, the project owner shall design and install all lighting such that light bulbs and reflectors are not visible from public viewing areas and illumination of the vicinity and the nighttime sky is minimized. To meet these requirements:

Protocol: The project owner shall develop and submit a lighting plan for the project to the CPM for review and approval. The lighting plan shall require that:

- Lighting is designed so that exterior light fixtures are hooded, with lights directed downward or toward the area to be illuminated and so that backscatter to the nighttime sky is minimized. The design of this outdoor lighting shall be such that the luminescence or light source is shielded to prevent light trespass into public view areas, the closest of which are State Route 33 and the residence along that highway;

- High illumination areas not occupied on a continuous basis such as maintenance platforms or the main entrance are provided with switches or motion detectors to light the area only when occupied;

- A lighting complaint resolution form (following the general format of that in attachment 1) will be used by plant operations, to record all lighting complaints received and document the resolution of those complaints. All records of lighting complaints shall be kept in the on-site compliance file.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

Lighting shall not be installed before the plan is approved. The project owner shall notify the CPM when the lighting has been installed and is ready for inspection.

Verification: At least 60 days before ordering the exterior lighting, or a lesser period of time as mutually agreed to by the project owner and the CPM, the project owner shall provide the lighting plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification the project owner shall submit to the CPM a revised plan.

The project owner shall notify the CPM within seven days of completing exterior lighting installation that the lighting is ready for inspection.

VIS-4 **T**he project owner shall comply with landscaping requirements of the Kern County Zoning Code. The project owner shall submit a proposal that is consistent with the Land Use site plan (see Condition LAND-1) that includes a cost estimate for landscaping the cogeneration facility site. The submittal shall also include a copy of the letter of comment from the Kern County Planning Director.

If the letter from the Kern County Planning Director states that the project owner shall provide landscaping at the cogeneration facility site, the submittal shall comply with the following protocol.

Protocol: The project owner shall submit to the CPM for review and approval a plan describing its landscaping proposal, stating that it conforms to Kern County's Zoning Code and has been approved by the County. The plan shall include, but not be limited to:

- a detailed landscape plan, at a reasonable scale, which includes a list of proposed tree and shrub species and sizes and a discussion of the suitability of the plants for the site conditions and mitigation objectives. One objective shall be to use trees of sufficient height to soften the appearance of the project. Another objective shall be to include species that grow rapidly. The plan shall propose species and spacing to achieve these objectives. Trees to be planted shall be the optimal size to reach full height as rapidly as possible.

- maintenance procedures, including any needed irrigation; and

- a procedure for replacing unsuccessful plantings.

If the letter from the Kern County Planning Director states that it would be more appropriate to make these funds available to Kern County to be applied to landscaping at a site that will provide more beneficial landscaping (e.g., school grounds, parks) than at the project site, then the submittal shall comply with the following protocol.

Protocol: The project owner shall submit to the CPM for review and approval a specific plan describing its landscaping proposal, stating that it conforms to Kern County's Zoning Code and has been approved by the County. The plan shall include, but not be limited to:

- documentation that the project owner has held discussions with Kern County and that an alternative off-site location for landscaping based on funds identified for landscaping the SCPP has been mutually agreed to. The goal of the off-site landscaping shall be to enhance the visual quality of a location more exposed to the public than the project site is.

- Identification (in text and on a map) of the mitigation site where the landscaping shall be installed.

- a detailed landscape plan, at a reasonable scale, which includes a list of proposed tree and shrub species and sizes and a discussion of the suitability of the plants for the site conditions and mitigation objectives. The plan shall propose species and spacing to achieve these objectives.

- maintenance procedures, including any needed irrigation; and

- a procedure for replacing unsuccessful plantings.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

The landscaping shall not be planted before the plan is approved. The project owner shall notify the CPM when the landscaping has been planted and is ready for inspection.

Verification: At least 60 days prior to the start of any ground disturbance related to construction, the project owner shall submit the proposed landscape plan and a copy of the letter of comment from the Kern County Planning Director to the CPM for review and approval. The project owner shall submit any required revisions within 30 days of notification by the CPM.

If landscaping is installed at the project site, the project owner shall complete installation of the landscaping by the end of the first planting season following first electricity generation.

If landscaping is installed at an off-site location, the project owner shall complete installation of the landscaping by the end of the first planting season following the start of project construction.

The project owner shall notify the CPM within seven days after completing implementation of the landscaping plan that the landscaping is ready for inspection.

REFERENCES

Rickels, David B. 1999. Senior Planner, County of Kern Planning Department. Telephone conversation with Gary D. Walker, California Energy Commission staff, July 21, 1999.

SCPP(Sunrise Cogeneration and Power Project) 1998a. Application for Certification, Sunrise Cogeneration and Power Company (98-AFC-4). Submitted to the California Energy Commission, December 21, 1998.

SCPP (Sunrise Cogeneration and Power Project/Soares/King) 1999b. Supplementary AFC Material in Response to Data Adequacy Worksheets. Submitted to the California Energy Commission on January 28, 1999.

SCPP (Sunrise Cogeneration & Power Project/King) 1999e. Data Responses – SET ONE. Submitted to the California Energy Commission on March 31, 1999.

SCPP (Sunrise Cogeneration and Power Project/King) 1999g. Data Responses, Set 1A. Submitted to the California Energy Commission on April 15, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999h. Data Responses, Set 1B (Attachment: Proof of Service). Submitted to the California Energy Commission on April 30, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999j. Transmission Alternatives, Supplement One. Submitted to California Energy Commission on May 5, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999k. Transmission Alternatives, Supplement Two. Submitted to the California Energy Commission on May 21, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999m. Transmission Supplemental 2 – Sections 3.0, 4.0, remaining Appendices and Errata. Submitted to the California Energy Commission on June 4, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999n. Data Responses – Set 2. Submitted to the California Energy Commission on June 15, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999r. Comments on the California Energy Commission Preliminary Staff Assessment. Submitted to the California Energy Commission on September 2, 1999.

ATTACHMENT 1

LIGHTING COMPLAINT RESOLUTION FORM

LIGHTING COMPLAINT RESOLUTION FORM

SUNRISE COGENERATION POWER PROJECT Kern County
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.)

VISUAL RESOURCES Figure 4a
Existing View from Key Observation Point1

VISUAL RESOURCES Figure 4b
Proposed Project from Key Observation Point 1

VISUAL RESOURCES Figure 5a
Existing View from Key Observation Point 2

VISUAL RESOURCES Figure 5b
Proposed Project from Key Observation Point 2

VISUAL RESOURCES Figure 5c
Proposed Project from Key Observation Point 2

VISUAL RESOURCES Figure 6a
Existing View from Key Observation Point 3

VISUAL RESOURCES Figure 6b
Proposed Project from Key Observation Point 3

VISUAL RESOURCES Figure 6c
Proposed Project from Key Observation Point 3

VISUAL RESOURCES Figure 7a
Existing View from Key Observation Point 4

VISUAL RESOURCES Figure 7b
Proposed Project from Key Observation Point 4

VISUAL RESOURCES Figure 7c
Proposed Project from Key Observation Point 4

VISUAL RESOURCES Figure 7d
Proposed Project from Key Observation Point 4

VISUAL RESOURCES Figure 7e
Proposed Project from Key Observation Point 4

VISUAL RESOURCES Figure 8a
Existing View from Key Observation Point 5

VISUAL RESOURCES Figure 8b
Proposed Project from Key Observation Point 5

VISUAL RESOURCES Figure 9a
Existing View from Key Observation Point 6

VISUAL RESOURCES Figure 9b
Proposed Project from Key Observation Point 6

VISUAL RESOURCES Figure 10a
Existing View from Key Observation Point 7

VISUAL RESOURCES Figure 10b
Proposed Project from Key Observation Point 7

VISUAL RESOURCES Figure 10c
Proposed Project from Key Observation Point 7

VISUAL RESOURCES APPENDIX B - COMMISSION STAFF'S VISUAL ASSESSMENT METHODOLOGY

METHODOLOGY FOR ASSESSING VISUAL SETTING

Visual Factors

Commission staff evaluated a number of factors in assessing the visual setting of the proposed project. These factors include visual quality, viewer sensitivity, visibility, and viewer exposure.

Visual Quality

The visual quality of a setting is the value of visual resources in that setting, determined by the visible environment's intrinsic physical properties and by associated cultural or public values (Andrews 1979; Smardon et al. 1986). Where publicly adopted goals, policies, designations or guidelines exist, they are given great weight in assessing visual quality. Where they do not exist, the analyst relies on experience and judgment to assess visual quality. The relevant physical properties of the environment include landform, vegetation, water, color, scarcity, and cultural modifications.

A basic premise in the evaluation of visual quality is whether a project will be compatible with the character of the landscape. In the case of predominantly natural settings, projects should be compatible with this character. It is possible for new structures to be compatible with predominantly natural settings if such settings already contain some structures that are considered compatible and the new structures are similar to the existing structures and do not appreciably change the balance of natural and cultural elements. However, in areas that appear to be totally natural, any modification that appears to be human-made will change the character of the area.

Viewer Sensitivity

One of the principal factors evaluated in assessing the potential for visual impacts is the sensitivity level of potential viewers. Viewer sensitivity is a measurement of the level of interest or concern of viewers regarding the visual resources of an area. It is generally expressed as high, moderate, or low. Local values and goals affect a viewer's expectations regarding a visual setting (Blair 1980). Concern regarding a change to a visual setting is often due at least in part to the symbolic effect of the change. A basic document for visual impact assessment states that

> "more often it is symbolic meaning, not preference, which motivates our value judgments and reactions" (Schauman 1986, p.105).

A visual change can be perceived as a symbol of a threat to the cultural stability and identity of a group or community (Costonis 1982). Viewer sensitivity can be determined in two ways, directly through evaluation of viewer attitudes or indirectly using viewer activities.

Viewer Attitudes (direct)

The direct determination of viewer attitudes is normally done by surveying potential viewers. As mentioned above in the discussion on Visual Quality, the accurate determination of such information is very complex, involves well-designed, implemented and interpreted surveys, is usually labor intensive, and is usually expensive. Given these constraints and the mandated time schedule for power plant siting cases, it is generally not possible for Commission staff to conduct such a direct determination of viewer attitudes and be assured of accurate and valid results.

Viewer Activities (indirect)

In situations where direct information on viewer sensitivity cannot be obtained, indirect methods are typically used in the visual profession to gain an insight as to viewers' sensitivity regarding visual resources. Land use is considered a "useful indirect indicator of likely viewer response" (Blair 1986), and activities associated with some uses can result in an increased awareness of visual or scenic resources (Headley 1992). Use activities associated with 1) designated parks, monuments, and wilderness areas, 2) scenic highways and corridors, 3) recreational areas, and 4) residential areas are usually highly sensitive. Commercial uses are generally less sensitive as activities, and views are often focused on those commercial activities. Large scale industrial or agricultural processing facility uses are usually the least sensitive because workers are focused on their work, and often are working in surroundings with relatively low visual value.

Visibility

Another important factor in assessing the existing visual setting, and thus potential impact is the visibility of the project. Visibility can differ substantially between view locations, depending on screening and the effect of the location of the visual change in the view. The smaller the degree of screening, the higher the visibility usually is and the greater the potential impact is likely to be. One factor potentially affecting screening is the season. Deciduous trees that provide substantial screening in summer may provide little screening in winter. Angle of view is also important. The closer the feature is to the center of the view area, the greater the impact is likely to be. Meteorological conditions can also affect visibility. For example, fog can make a cooling tower plume or stack plume unnoticeable, given particular fog density and distance from the viewer to the plume. Another factor affecting visibility is time of day. Although projects are generally more noticeable during daylight hours, lighting can make project structures and plumes more noticeable at night than during the day.

Viewer Exposure

The degree to which viewers are exposed to a view by (a) their distance from the feature or view in question, (b) the number of viewers, and (c) the duration of view is called viewer exposure (Grinde and Kopf 1986). Viewer exposure is important in determining the potential for a change in the visual setting to be significant.

Distance

As the distance between the viewer and the feature viewed increases, the perceived size of the feature and the ability to see details decreases. Distance zones may be usefully categorized as follows: foreground, or close-range; middleground, or mid-range; and background, or long-range. Within close-range distances, details such as surface textures and the fullest range of surface colors are clearly perceptible. Mid-range distances are characterized by visualization of complete surface features such as tree stands, building clusters, and small landforms. Long-range distances are dominated by the horizon and major landforms (Felleman 1986).

Numbers of Viewers

Two measures of the number of viewers are important to consider in assessing the potential visual impact of a project. One is the absolute number of viewers. The other is the proportion of viewers in a viewshed who can see the project.

Duration of View

The length of time that a view is visible to a viewer is another important factor to be considered in determining the importance of a view and the potential impact of a project. For a given activity, the longer the view duration, the greater the potential importance or impact. View durations range from a few seconds, as in the case of some travelers in motor vehicles, to a number of hours per day, in regard to some residential situations.

Key Observation Points

The evaluation factors discussed above are considered in relation to Key Observation Point. Key Observation Points are chosen to provide the basis for evaluation of project impacts by comparing the appearance before and after project construction. Key Observation Points include locations which are chosen to be representative of the most critical locations from which the project will be seen. Additional Key Observation Points should be selected that represent typical views encountered in different classes of views within the viewshed, if they are not covered by critical viewpoints. Variables that should be considered in selecting Key Observation Points include relative project size, season, and light conditions.

METHODOLOGY FOR ASSESSING VISUAL IMPACTS

Use of Objective vs. Subjective Methods

The determination of visual resource impacts has traditionally been done using a completely subjective method relying exclusively on the knowledge and experience of the visual resources professional. The drawback to this approach is that it is difficult to relate the steps and process used in the analysis which lead to the conclusions which are drawn regarding visual impacts.

In the 1970s and 1980s, there was an attempt in the profession to develop more objective methods for determining potential impacts. While this led to a more understandable set of steps and processes, analyses often did not account for unusual situations not addressed by the standard procedure or gave the false impression that they were totally objective.

In recent years visual resource analysts have been developing a synthesis, in which an objective methodology has been used to develop the categories and the analysis process to be used in analyzing visual impacts, at the same time explicitly recognizing that subjective values are involved in selecting factors and assigning weights to factors. It is important that subjective judgements be identified and defined to the extent possible.

Key Observation Points

As previously discussed, Key Observation Points include locations which are chosen to be representative of the most critical locations from which the project will be seen. For linear projects such as power lines, additional Key Observation Points are selected that represent any special project or landscape features such as skyline crossings, river crossings, or substations.

Because each Key Observation Point represents a critical location, a typical view encountered in a class of view, and/or a special project or landscape feature, it also represents an important specific aspect of the viewshed that is susceptible to visual impacts. Therefore, the visual impact of a project is determined for each Key Observation Point, not from an “overall” perspective that masks the specific impacts.

Major Impact Evaluation Factors

For each Key Observation Point Commission staff considers the susceptibility to visual impact and the severity of impact are considered together to determine the significance of impact. The following sections explain how these two major factors are assessed and considered. Other potential causes of significant visual impacts, such as night lighting, visible emission plumes, and noncompliance with laws, ordinances, regulations, and standards, are addressed separately in this analysis.

Susceptibility to Impact

The first step in evaluating the visual impact of a project from a particular Key Observation Point is to consider the elements of the existing visual setting (discussed previously), including visual quality, viewer sensitivity, visibility, and viewer exposure. Each of these factors is assessed as either high, moderate to high, moderate, low to moderate, or low. Staff combines these factors into a measure of the susceptibility of the view from a particular Key Observation Point to visual impact. A low value for any of the four factors generally results in low susceptibility to impact.

Impact Severity

As previously discussed, the degree of visual impact that a project will cause depends on the degree of change resulting from the project upon visual character or visual quality, here called the impact severity. Commission staff considers both the relationship of the project to the other components visible in the landscape, and blockage from view or elimination by the project of any previously visible components.

Relationship of the Project to Other Visible Components

Landscape Components

The three basic landscape components are land and water, vegetation, and structures.

Visual Elements

The basic elements of each physical component of a view include color, form, line, texture, scale, and spatial character. The impact of a project is assessed in terms of contrast in color, form, line, texture, and scale, as well as scale dominance and spatial dominance. Scale is the proportionate size relationship between an object and its surroundings. Absolute scale is the size of an object obtained by relating its size to a definitely defined standard (i.e., measurement). Relative scale is the relative size of objects; the apparent size relationship between landscape components. Sub-elements of scale include *scale dominance* (the scale of an object relative to the visible expanse of the landscape and to the total field of view of the human eye or camera) and *scale contrast* (the scale of an object relative to other distinct objects or areas in the landscape). *Spatial dominance* is the measure of the dominance of an object due to its location in the landscape. Regarding these three factors, a change has the greatest potential to cause impacts in regard to scale dominance, and the least potential in regard to scale contrast.

Assessment of Contrast

Staff assesses contrast with existing structures, vegetation, and land/water in regard to color, form, line, texture, and scale. Regarding these factors, contrast in

color, form, or line has greater potential to cause impacts than contrast in texture or scale.

The magnitude of the visual impact of a project is measured by the degree of change that it causes. In regard to contrast, the degree of change depends partly on the existing levels and types of contrast. For instance, if existing structures already contrast strongly with natural features, the addition of a similar structure tends to cause a smaller change than if no structures already existed. In addition, the degree of contrast depends on the proximity of the project to the landscape component to which it is compared. If a project is superimposed on a component (such as body of water), the potential for contrast is greater than if the project is near such a landscape component, and even greater than if the project is far from the landscape component.

Factors Affecting Contrast

Among the basic characteristics of the visual setting previously discussed, distance is a factor in determining the visual contrast that a project will create. Increasing distance can decrease perceived contrast both by reducing the apparent size of project structures and by reducing clarity of view due to atmospheric conditions.

Several additional factors can also influence the degree of contrast that a project may cause. These include atmospheric conditions, light conditions, motion, seasonal changes, and recovery time (BLM 1986).

Blockage or Elimination of Existing Elements

In regard to obstruction or elimination of previously visible components, the analysis evaluates any change between the visual quality of those components compared to the visual quality of the project. Blockage of higher quality visual elements by lower quality elements can cause impacts, potentially as great as those regarding scale dominance.

Assessment of Visual Impact Severity

VISUAL RESOURCES Table B-1 shows how staff calculates impact severity from each Key Observation Point.

Determination of Significance

Commission staff considers the following factors in determining whether a visual impact will be significant. These factors are not a complete listing of all the considerations that staff uses in its analyses, because many such considerations are site-specific.

State

The California Environmental Quality Act Guidelines make it clear that aesthetic impacts can be significant adverse impacts by defining Asignificant effect≅ on the environment to mean a Asubstantial, 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, э 15382.) Appendix G, subdivision (b), of the Guidelines state that a project Awill normally have a significant effect on the environment if will have a substantial, demonstrable negative aesthetic effect.

VISUAL RESOURCES Table B-1
Staff's Assessment Process for Severity of Visual Change

	SEVERITY SCORE				
	Very Strong	**Strong**	**Moderate**	**Weak**	**Negligible**
SEVERITY FACTOR					
CONTRAST					
Color Contrast		High	Medium		Low
		Or	Or		Or
Form Contrast		High	Medium		Low
		Or	Or		Or
Line Contrast		High	Medium		Low
		Or	Or		Or
Texture Contrast			High	Medium	Low
			Or	or	Or
Scale Contrast			High	Medium	Low
			or	or	Or
DOMINANCE					
Scale	Dominant	Co-Dominant	Subordinate		Insignificant
		Or	Or		Or
Spatial		Dominant	Co-Dominant	Subordinate	Insignificant
VIEW BLOCKAGE	Substantial blockage of high quality view	Moderate blockage of high quality view or substantial blockage of moderate to high quality view	Minor blockage of high quality view, moderate blockage of moderate to high quality view, or substantial blockage of moderate quality view	Minor blockage of moderate to high quality view, moderate blockage of moderate quality view, or substantial blockage of low to moderate quality view	Minor blockage of moderate, low to moderate, or low quality view; moderate blockage of low or low to moderate quality view; or substantial blockage of low quality view
COMBINED FACTORS	Two or more of the above factors with a severity score of strong				

Local

As discussed above, Commission staff considers any local goals, policies or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts.

Professional Standards

Professionals in visual impact analysis have developed a number of questions as a means of evaluating the potential significance of visual impacts (see, e.g., Smardon 1986). The questions listed below address issues commonly raised in visual analyses for energy facilities:

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 substantially degrade the existing visual quality of the viewshed or eliminate or block views of valuable visual resources?

Will the project significantly increase light and glare in the project vicinity, particularly night-time glare?

Will the project result in significant amounts of backscatter light into the night-time sky?

Will the project be in conflict with directly-identified public preferences regarding visual resources?

Will the project comply with local goals, policies, designations or guidelines related to visual quality?

Will the project result in a significant reduction of sunlight, or the introduction of shadows, in areas used extensively by the community?

Will the project result in a substantial visible exhaust plume?

Commission staff considers these questions, where applicable, in its impact assessment.

Consideration of Impact Susceptibility and Impact Severity

For most operations impacts staff considers the assessment of the impact susceptibility in relation to the impact severity from each Key Observation Point to determine visual impact (see **VISUAL RESOURCES Figure B-4**). Staff considers construction impacts, lighting impacts, and visible plume impacts separately.

Cumulative Visual Impacts

Staff reviews the proposed project and its related facilities as well as other past, present, and future projects in the vicinity to determine whether potential cumulative visual impacts will occur and whether those impacts will be significant. In addition, in the case of cogeneration facilities where the proposed power plant is to be part of an already existing industrial facility, this review examines whether the addition of the proposed project and its related facilities will result in cumulative visual impacts and whether they will be significant. If past activities have resulted in significant impacts, and the project will appreciably increase the total impact, the project will contribute substantially to a significant cumulative impact. When cumulative visual impacts are found to be significant, whether in relation to other proposed projects or to the host industry, feasible mitigation measures will be recommended to reduce those impacts.

VISUAL RESOURCES Table B4
Staff's Process for Assessing Significance of Visual Impact

	SUSCEPTIBILITY TO VISUAL IMPACT				
	High	**Moderate to High**	**Moderate**	**Low to Moderate**	**Low**
SEVERITY OF VISUAL CHANGE					
Very Strong	Significant	Significant	Significant	Less than significant	Less than significant
Strong	Significant	Significant	Less than significant	Less than significant	Insignificant
Moderate	Significant	Less than significant	Less than significant	Insignificant	Insignificant
Weak	Less than significant	Less than significant	Insignificant	Insignificant	Insignificant
Negligible	Less than significant	Insignificant	Insignificant	Insignificant	Insignificant

REFERENCES TO APPENDIX B

Andrews, Richard N.L. 1980. "Landscape Values in Public Decisions." In *Proceedings of Our National Landscape: A Conference on Applied Techniques for Analysis and Management of the Visual Resourc*e, pp. 686-692, April 23-25, 1979, Incline Village, Nevada. General Technical Report PSW-35. U.S. Dept. of Interior, Forest Service, Pacific Southwest Forest and Range Experiment Station. Berkeley, CA. NTIS PB81-157620.

Blair, William G. 1980. "Visual Resource Management." In *Environmental Comment*.

Blair, William G. 1986. "Visual Impact Assessment in Urban Environments." In *Foundations for Visual Project Analysis*, Richard C. Smardon, James F. Palmer, and John P. Felleman, eds. PP.223-244. John Wiley & Sons. New York.

Felleman, John P. 1986. "Landscape Visibility." In *Foundations for Visual Project Analysis*, Richard C. Smardon, James F. Palmer, and John P. Felleman, eds. Pp.47-62. John Wiley & Sons. New York.

Grinde, Kate and Al Kopf. 1986. "Illustrated Glossary." In *Foundations for Visual Project Analysis*, Richard C. Smardon, James F. Palmer, and John P. Felleman, eds. Pp.307-333. John Wiley & Sons. New York.

Smardon, Richard C., Tony Costello, and Harry Eggink. 1986. "Urban Visual Description and Analysis." In *Foundations for Visual Project Analysis*, Richard C. Smardon, James F. Palmer, and John P. Felleman, eds. Pp.21-35. John Wiley & Sons. New York.

CULTURAL RESOURCES

Testimony of Kathryn M. Matthews

INTRODUCTION

This analysis discusses cultural resources which are defined as the structural and cultural evidence of the history of human development and life on earth. Evidence of California's early occupation is becoming increasingly vulnerable due to the ongoing development and urbanization of the state.

Cultural resource materials may be found nearly anywhere in California: along the ocean coastline and on coastal islands; along rivers and streams; in coastal and inland valleys and lowlands; throughout the coastal and inland mountain ranges; and throughout the interior deserts. Cultural resources may be found on the ground or may be found at varying depths beneath the surface. In some areas of the state, a sequence of settlements on the same site may cover multiple layers of cultural resources. In other areas, the distribution of cultural materials may be much more dispersed and seemingly unrelated.

Cultural resources are significant to our understanding of our culture, our history and heritage. Critical to the analysis of cultural resources are the spatial relationships between an undisturbed cultural resource site and the surface environmental resources and features, and the analysis of the locational context of the resource materials within the site and beneath the surface. These relationships provide information that can be used to piece together the sequence of human occupation and use of an area, and they begin to create a picture of the former inhabitants and their environment.

Staff's primary concerns in its cultural resource analysis are to ensure that all potential impacts are identified and that conditions are set forth which ensure no significant adverse impacts will occur. The determination of potential impacts to cultural resources from the proposed Sunrise Cogeneration and Power Project (Sunrise) is required by the Siting Regulations of the California Energy Commission (Energy Commission) and by the California Environmental Quality Act (CEQA). Impacts to cultural resources may result either directly or indirectly during pre-construction, construction, or operation of the project. Cumulative impacts may be associated with the proposed project, and other projects in the same area or of similar size and requirements.

In California, many cultural resource sites are already known and the maps and records for these sites are on file at cultural resource information centers located throughout the state. Some of the known resource sites have also been designated as state historic landmarks and others have been listed on the National Register of Historic Places. However, many areas of the state have not been fully explored or mapped and there are cultural resources and sites that still remain undiscovered. The potential for the project to affect both known and unknown resources is addressed in this analysis. For this analysis, three aspects of cultural resources are

addressed: prehistoric archaeologic resources, historic archaeologic resources, and ethnographic resources.

PREHISTORIC RESOURCES

Prehistoric archaeologic resources are those materials relating to prehistoric human occupation and use of an area; these resources may include sites and deposits, structures, artifacts, rock art, trails and other traces of Native American human behavior. In California, the prehistoric period began over 10,000 years ago and extended through the 18th century when the first Euro-American explorers settled in California.

HISTORIC RESOURCES

Historic archaeologic resources are those materials usually associated with Euro-American exploration and settlement of an area and the beginning of a written historical record; they may include archaeological deposits, sites, structures, travelled ways, artifacts, documents, or other evidence of human activity. Under federal and state requirements, cultural resources must be greater than fifty (50) years old to be considered of potential historical importance.

ETHNOGRAPHIC RESOURCES

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

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Cultural resources are indirectly protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, § 431 et seq.) and subsequent related legislation, policies and enacting responsibilities, e.g. federal agency regulations and guidelines for implementation of the Antiquities Act. The following laws, ordinances, regulations, standards and policies apply to the protection of cultural resources in California. Projects licensed by the Energy Commission are reviewed to ensure compliance with these laws.

FEDERAL

Portions of the routes proposed for the electric transmission lines go across land managed by the US Bureau of Land Management (BLM). Therefore the project may become an “undertaking” according to federal definition and the BLM would be involved as the lead federal agency for cultural and paleontologic resources. If cultural resource sites are identified on non-federal lands and they meet federal criteria for eligibility for listing in the National Register of Historic Places, then federal laws also would apply to these resources.

- National Environmental Policy Act (NEPA): Title 42, United States Code, section 4321-et seq., requires federal agencies to consider potential environmental impacts

of projects with federal involvement and to consider appropriate mitigation measures.

- Federal Land Policy and Management Act (FLPMA): Title 43, United States Code, Section 1701 et seq., requires the Secretary of Interior to retain and maintain public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric water resource, and archeological values [Section 1701(a)(8)]; the Secretary, with respect to the public lands, shall promulgate rules and regulations to carry out the purposes of this Act and of other laws applicable to public lands [Section 1740].

- Federal Register 48 44739-44738 190 September 30, 1983: Federal Guidelines for Historic Preservation Projects: 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 Secretary's standards and guidelines are used by federal agencies, such as the Forest Service, the Bureau of Land Management, and the National Park Service. 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 16 United States Code sec.106) Sets forth procedures to be followed for determining eligibility for nomination, the nomination, and the listing of cultural resources in the National Register of Historic Places (NHRP). The eligibility criteria and the process are used by federal, state, and local agencies in the evaluation of the significance of cultural resources. Very similar criteria and procedures are used by the state in identifying cultural resources eligible for listing in the State Register of Historic Resources.

- Executive Order 11593, "Protection of the Cultural Environment," May 13, 1971, (36 Federal Register, 8921) orders the protection and enhancement of the cultural environment through providing leadership, establishing state offices of historic preservation, and developing criteria for assessing resource values.

- American Indian Religious Freedom Act; Title 42, United States Code, Section 1996 protects Native American religious practices, ethnic heritage sites, and land uses.

- Native American Graves Protection and Repatriation Act (1990); Title 25, United States Code Section 3001, et seq. defines "cultural items", "sacred objects", and "objects of cultural patrimony"; establishes an ownership hierarchy; provides for review; allows excavation of human remains, but stipulates return of the remains according to ownership; sets penalties; calls for inventories; and provides for the return of specified cultural items.

STATE

- Public Resources Code, Section 5020.1 defines several terms, including the following:

(j) “Historical resource” includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.

(q) “Substantial adverse change” means demolition, destruction, relocation, or alteration such that the significance of an historical resource would be impaired.

- Public Resources Code, Section 5024.1 establishes a California Register of Historic Places; sets forth criteria to determine significance; defines eligible properties; and lists nomination procedures.

- Public Resources Code, Section 5097.5 states that any unauthorized removal or destruction of archaeologic or paleontologic resources on sites located on public land is a misdemeanor. As used in this section, “public lands” means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority or public corporation, or any agency thereof.

- Public Resources Code, Section 5097.98 defines procedures for notification of discovery of Native American artifacts or remains and for the disposition of such materials.

- Public Resources Code, section 5097.99 prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and sets penalties for these actions.

- Public Resources Code, section 5097.991 states that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated.

- Public Resources Code, section 21000, et seq, California Environmental Quality Act (CEQA). This act requires the analysis of potential environmental impacts of proposed projects and requires application of feasible mitigation measures.

- Public Resources Code, section 21083.2 states that, if a project may affect a resource that has not met the definition of an historical resource set forth in section 21084, then the lead agency may determine 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, such resources must be avoided; if they can’t be avoided, mitigation measures shall be required. The law also discusses excavation as mitigation; discusses the costs of mitigation for several types of projects; sets time frames for excavation; defines “unique and non-unique archaeological resources”; provides for mitigation of unexpected resources; and sets financial limitations for this section.

- Public Resources Code, section 21084.1 indicates 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 a “historic resource” and describes what constitutes a “significant” historic resource.

- CEQA Guidelines, Title 14, California Code of Regulations, section 15126.4 “Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects”, sub-section (b) “Mitigation Measures Related to Impacts on Historical Resources”. Subsection (b) discusses impacts of maintenance, repair, stabilization, restoration, conservation, or reconstruction of a historical resource. Subsection (b) discusses documentation as a mitigation measure. Subsection (b) discusses mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.

- CEQA Guidelines, Title 14, California Code of Regulations, section 15064.5 “Determining the Significance of Impacts to Archaeological and Historical Resources”. Subsection (a) defines the term “historical resources”. Subsection (b) explains when a project may be deemed to have a significant effect on historic resources and defines terms used in describing those situations. Subsection (c) describes CEQA’s applicability to archaeological sites and provides a bridge between the application of the terms “historic resources” and a “unique archaeological resources”.

- CEQA Guidelines, Title 14, California Code of Regulations, section 15064.7 “Thresholds of Significance”. This section encourages agencies to develop thresholds of significance to be used in determining potential impacts and defines the term “cumulatively significant”.

- CEQA Guidelines, Appendix G: “Issue V: Cultural Resources”. Lists four questions to be answered in determining the potential for a project to impact archaeological, historic, and paleontologic resources.

- California Penal Code, section 622.5. Anyone who willfully damages an object or thing of archaeological or historic interest can be found guilty of a misdemeanor.

- California Health and Safety Code, section 7050.5. If human remains are discovered during construction, the project owner is required to contact the county coroner.

- Public Resources Code, section 5097.98. If the county coroner determines that the remains are Native American, the coroner is required to contact the Native American Heritage Commission, which is then required to determine the “Most Likely Descendant” to inspect the burial and to make recommendations for treatment or disposition of the remains and any associated burial items.

LOCAL

Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies. The project site and associated linear facilities are all located within unincorporated portions of western Kern County.

KERN COUNTY

According to the Application for Certification (AFC), there are no applicable local LORS (SCPP 1998a). Kern County staff indicated that they do not have a specific county policy that addresses cultural resources but they do ensure compliance with CEQA for most projects (Forrest 1999). However, areas of the county where petroleum resources are located receive a special zoning designation and allowable uses are relatively unrestricted. Where the resource has already been developed, the county typically considers that the construction of new wells or oil field facilities or the modification of the surface for oil-related infrastructure, is a ministerial action and oil field activities are allowed to proceed with no additional environmental documentation (James 1999).

ENVIRONMENTAL SETTING

REGIONAL DESCRIPTION

The project area is located in the Great Valley Physiographic Province of California, which is bounded on the south by the Transverse Range; on the east by the Sierra Nevada Range; on the north by the deltas of the San Joaquin and Sacramento rivers; and on the west by the Temblor Range (an interior portion of the Coast Ranges). The Kern River flows west across the valley floor from the Sierra foothills, and southward into Lake Buena Vista.

Today the southern part of the Great Valley Province is called the San Joaquin Valley. At one time this entire valley area was covered by an ancient salt-water sea that gradually became a fresh-water sea. During the late Pleistocene, the sea began to shrink and vast areas of wetland and tules formed in the shallows around the shores of ancient lakes Buena Vista and Tulare. These lakes formed in the low spots of the Kern River flood plain. The shorelines of ancient Lake Buena Vista are located less than twenty miles east and southeast of the Sunrise project area. At its highest watermark, the Buena Vista Lake covered an area of 760 square miles. As late as the 1840s, prior to the control of water resources for irrigation, when the Kern River flooded, Buena Vista Lake would again take shape in the southern-most portion of the San Joaquin Valley. Today the project region is generally arid and existing vegetation is dominated by desert saltbush and there are no longer any year-round streams (SCPP 1998a; Pacific 1998a; SCPP1999m).

Ancient geologic activity in the coastal range and in the Temblors caused tremendous folding and squeezing of the underlying rock layers, transforming them into new types of rock. Among the transformed rocks is “chert” which is known from the archaeological record to have been quarried by prehistoric people to make

stone tools. Other geologic conditions caused underlying petroleum deposits to work their way to the surface along fault lines, forming tar seeps that were also used by the native peoples, as well as modern-day residents (SCPP 1998a).

PROJECT VICINITY DESCRIPTION

The proposed Sunrise project is located in the Midway-Sunset Oilfield at the southwestern margin of the San Joaquin Valley. The power plant site sits on the low foothills on the eastern side of the Temblor Range, three miles northwest of the town of Fellows, west of the Elk Hills and about seven miles south of the McKittrick Valley (SCPP 1998a).

The AFC initially included three alternative routes for the electrical transmission facilities, with the preferred route, designated as “A”, running south from the project site and then turning eastward toward a proposed new switching station called Valley Acres. Route A crosses through lands long in use for oil extraction and runs along the southern side of the Elk Hills toward the western edge of the San Joaquin Valley and the shoreline of Lake Buena Vista. Proposed Route B would run northward from the project site towards the McKittrick Valley, where it then turns eastward, skirting along the northwestern portion of the West Elk Hills and heads across the valley floor toward the town of Buttonwillow. Route B also contained alternatives “D”, “E”, and “F” which provided variations on the approach and crossing through the Elk Hills. The alternative route designated as “C” was proposed to run south and then eastward toward the Pastoria Substation near the Grapevine. However Route C was not pursued beyond the AFC because it was considerably longer than other alternatives and this increased the potential for impacts, as well as the cost of construction (SCPP 1998a).

In the early spring of 1999, Sunrise added another alternative route designated as “G”, which would run eastward through developed oil fields, toward the proposed Elk Hills project site and then would turn northward to follow an existing transmission line to the Midway Substation at Buttonwillow. Both routes B and G could be developed in conjunction with other proposed power plant projects currently seeking permits from the Energy Commission. In subsequent filings, Sunrise indicated it was changing its preferred route from A to B and it was withdrawing routes A and G from further consideration (SCPP 1998a, 1999*).

Route B is now designated as the preferred route. Initial portions of this twenty-five mile long transmission route cross through varied terrain with many active oil wells and associated oil field development. Flatter portions of the route east of the Elk Hills, travel through extensive agricultural fields that lie within the flood zone of the Kern River, also crossing numerous local irrigation and drainage canals (SCPP 1998a; Pacific 1999a). Refer to the **Project Description** section of this document for 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. Evidence from archaeological sites found along the

shorelines of ancient lakes Buena Vista and Tulare, indicates that native peoples may have occupied the project area as early as 8,000 years ago. These ancient lakes were surrounded by great marshy sloughs and wetlands that were populated by animals and waterfowl that offered a wide variety of food and material resources for prehistoric peoples. The potential cultural resource sensitivity of the region is greatest near such water resources (SCPP 1998a; Pacific 1998a).

Archaeologists have proposed several different developmental chronologies for the project region. Evidence from archaeological sites excavated in the 1930's led archaeologists to tentatively conclude that there were similarities between the type of archaeological assemblages found in the project area and those found outside the region. Some of the points discovered at archaeological sites along the shorelines of ancient Lake Tulare suggest that these sites could possibly have been populated by hunters of big game as early as 11,000 years ago (SCPP 1998a; Pacific 1998a).

Later excavations in 1964 revealed artifacts in close proximity to fresh-water shell, which could be dated at about 10,000 years before the present (BP). However, archaeological experience has shown that dates obtained from freshwater shell can be misleading and artifacts found in close proximity to such shells might not share the same dates (SCPP 1998a; Pacific 1998a).

As described in the AFC, known Native American prehistoric cultural resources in the project vicinity include archaeological sites representing residential bases, field camps, and structures. Known resources recorded in the project area range from large, complex sites indicating residential use and including burials, to sites with a great abundance and diversity of cultural materials, to widely separated and isolated artifacts (SCPP 1998a; Pacific 1998a).

ETHNOGRAPHIC BACKGROUND

The prehistoric marshland environment along the lakeshores was rich in fish, waterfowl and other animals. It was an abundant source of many necessities of life and it is likely that, with such resources, many tribal groups were able to maintain residences at the same location throughout most of the year. The project area is located within the ethnographic boundaries of the Southern Valley Yokuts and the town of Buttonwillow was originally a Yokuts meeting place and dance ground. A number of individual tribal groups were known to exist at the time of contact with Euro-American explorers (Wallace 1978). Yokuts tribal groups living in the project area included the Tulamni who occupied the area near the southwestern perimeter of Lake Buena Vista and the Chuxoxi who inhabited the channels and sloughs of the Kern River delta area on the northeasterly edge of Lake Buena Vista. The lake and marshlands provided shelter to a great variety and abundance of wildlife and the rich food sources allowed the Yokuts peoples to live there most of the year. Archaeological artifacts associated with the Yokuts people include triangular projectile points, preserved textiles, pottery, glass beads, and steatite artifacts (SCPP 1998a; Pacific 1998a).

The literature also indicates that the project area may have been somewhat influenced culturally by Chumash people. The Chumash traditionally occupied the Pacific coastal areas in the Santa Barbara County region and it is likely that their presence in the southern portion of the central valley would have been peripheral or transitory. The archaeological evidence does indicate there was trade between the valley peoples and the coastal peoples. Artifacts associated with the Chumash include beads; fine baskets; certain types of projectile points; sandstone, oak and steatite bowls. The Chumash are also well known for extraordinary rock art and numerous sites have been recorded within their traditional lands in the coastal range (SCPP 1998a; Pacific 1998a; and Grant 1978).

Thus, portions of the project area may have been influenced culturally by both the Yokuts people and the Chumash people, and artifacts from either group could be present in areas affected by the project (SCPP 1998a; Pacific 1998a).

HISTORIC SETTING

Spanish missionaries began their exploration and development of the missions in California in 1769, starting in San Diego and ending with the missions in San Rafael and Sonoma, in 1823. For ease of access to Spanish ships, development of the missions was focused on areas along the coast and they were spaced within a reasonable travel distance apart. Native peoples were recruited to serve as laborers and often the missions relied upon soldiers to ensure that the workers remained to work the mission lands. Exploratory parties traveled inland to inventory its resources and in 1772 an expedition led by Pedro Fages visited a Yokuts village on the shores of Lake Buena Vista. Visits by European explorers increased during the early 1800s but the southern San Joaquin Valley remained relatively sparsely settled for some time (SCPP 1998a; Pacific 1998a; LPGP1998e).

Beginning in the 1830s, toward the end of the Spanish period and into the Mexican period, large tracts of land were granted to Mexican and other European settlers and used primarily for cattle grazing. Two of these land grants in the project area, the “Rancho El Tejon” and the “Rancho Emigdio,” remain today. They are located in the southern part of the San Joaquin Valley, to the south of the proposed project area. Rancho El Tejon is one of the San Joaquin Valley’s most important historic sites. Rancho San Emigdio is now owned by the Wildlands Conservancy and managed as the Wind Wolves Preserves. The current headquarters of the San Emigdio Rancho are located between the pueblo and the old headquarters, near San Emigdio Creek (SCPP 1998a; Pacific 1998a; LPGP1998e).

Much of the proposed project area has been considerably disturbed by on-going oil production. Petroleum extraction began in Kern County began in the 1860s with the establishment of the Buena Vista Petroleum Company’s refinery north of McKittrick but this gradually slowed due to transportation costs. In the early 1900s the discovery of substantial deposits in the McKittrick, Midway, Sunset, Kern River, and Elk Hills oil fields set off a boom in petroleum development that continues today. The McKittrick oil field, adjacent to the Sunrise project area on the north, was one of several oil fields that served to make Kern County into a major oil-producing region (SCPP 1998a; Pacific 1999c).

The opening of rail lines into the McKittrick and Midway valleys in 1893 and 1900 provided more economical access to transportation for the booming petroleum industry. The Asphalto (McKittrick) Branch of the Southern Pacific Railroad remains in operation today and still runs between town of Buttonwillow and the city of Bakersfield (SCPP 1998a; Pacific 1998a).

Within the last century there has also been significant agricultural development along the western edges of the southern San Joaquin Valley. In the last fifty years, the statewide development of major irrigation facilities and the increased availability of water for irrigation has allowed the development of large tracts of land in Kern County for major agricultural production. The presence of the railroads built to facilitate transportation of petroleum products also facilitated the transport of agricultural products to worldwide markets (SCPP 1998a, LPGP 1998a).

As described in the AFC, known historical era cultural resources of potential interest or concern would include transportation facilities; oil and gas production facilities; homesteads; commercial and residential communities, as represented by buildings and other structural elements; sites; districts; landscapes; and objects (SCPP 1998a).

PRE-AFC LITERATURE AND RECORDS SEARCH

Prior to preparation of the AFC, consultants to the applicant conducted a literature search and reviewed site records and maps at the Southern San Joaquin Valley Information Center of the California Historical Resources Information System (CHRIS). Although the records indicated numerous previous surveys had been done in the project area, not all of the area potentially affected by the project had been surveyed. The project's archaeological consultants attempted to relocate previously recorded sites during their pre-AFC surveys and provided maps and information to update the records at the regional information center (SCPP 1998a; Pacific 1998a).

To evaluate the project's potential to affect cultural resources during construction and operation, the applicant's literature and record search focused on the Areas of Potential Effect (APE). The APE for the Sunrise project site was defined in the AFC as the area within a five hundred-foot (500 ft) buffer zone around the power plant site and associated areas to be used for parking and for laydown or storage. The project site APE also included the routes for most linear facilities and access roads (SCPP 1998a; Pacific 1998a).

The AFC refers to three alternative routes for the electric transmission facilities, plus three variations on one of the routes. The routes evaluated were designated as "A", "B", and "C", with three alternatives to a portion of route B, designated as "D", "E", and "F". The AFC indicated that Route A was the preferred route for the transmission lines and it included the construction of a new electrical switching station called, "Valley Acres" (SCPP 1998a).

The APE for the transmission facilities extended up to five hundred (500) feet on either side of the proposed centerlines, for a total corridor survey width of 1,000 to

2,000 feet. The width of the area surveyed varied, depending upon the route alternative, the terrain, and the location of known sensitive resources. The record search indicated that nine (9) sites had previously been recorded within the APE for the project site and the preferred transmission route A (SCPP 1998a; Pacific 1999c).

Results of the literature review and a brief description of the known resources are summarized in the AFC, in section 8.3.2.6. Site-specific information was filed with the Energy Commission under separate cover to maintain confidentiality of sensitive resource locations (SCPP 1998a; Pacific 1998a, 1998b, 1999c; SCPP 1999e). For a summary of the results of the literature review and a brief description of the types of resources found at the recorded sites, refer to Table 8.3-1 on page 8.3-13 of the AFC.

PRE-AFC FIELD SURVEYS

The record search indicated not only that portions of the project site and linear facility routes had undergone previous surveys for archaeological resources but that some of those surveys had been completed more than five years ago. Current state and federal guidelines recommend that survey records and maps more than five years old should be updated to determine whether any changes have occurred. The consultants to the applicant conducted a cultural resource survey of the entire project APE to determine the current status and condition of the previously recorded resources, and to identify any additional resources that might be present in areas not surveyed before (SCPP 1998a; Pacific 1998a).

The pre-AFC, pedestrian survey (equivalent to a BLM Class 3 survey) of the project APE was completed by archaeological resource specialists between October 26th and November 8th, 1998. All but one of the nine previously recorded sites were found and re-recorded as part of the surveys for the Sunrise project and an additional thirty-three (33) sites were newly recorded during the field surveys (SCPP 1998a; Pacific 1998a). In early 1999, follow-up surveys were conducted in the vicinity of the proposed Valley Acres switching station and in some of the areas that were not accessible during the fall surveys (SCPP 1998e; Pacific 1998a, 1999c).

POWER PLANT SITE AND IMMEDIATE LINEAR FACILITY ROUTES

The Sunrise project site is located in the Midway-Sunset Oil Field, approximately three miles northeast of the town of Fellows, California. The consultant's record search indicated that no previous surveys had been conducted for the project sites. Surveys of the project site, including an area up to 1,000 feet around the project site, were conducted in the fall of 1998. Surveyors walked in a series of transects spaced about 15 meters apart where visibility was good and as much as 25 meters apart in heavily disturbed areas (SCPP 1998a).

The project site and the associated routes for most of the linear facilities are all located within the 16-acre site proposed for the Sunrise project. The six hundred (600) foot connecting pipelines for the project make-up water supply, the potable water supply, and the wastewater discharge lines, and the sixty (60) foot connecting pipeline to the natural gas supply all connect to utility service facilities that are

already in place or are under construction by Texaco California Incorporated (TCI), as part of its Main Utility Corridor project that is being constructed independent of the Sunrise project (SCPP 1998a).

TCI MAIN UTILITY CORRIDOR

The oil fields in the project area are currently served by a multi-utility corridor that includes a 12-inch natural gas pipeline that connects to an alternative natural gas supply. Beginning in 1998, the 12-inch line in approximately 4-miles of the utility corridor was being upgraded to a 20-inch pipeline. The final upgrade to the 20-inch pipeline is expected to be completed in the year 2000. This utility corridor project, although it will eventually be used by the proposed Sunrise project, was permitted by other agencies and is being constructed separately to also serve the oil fields surrounding and adjoining the Sunrise project area. Sunrise provided staff with copies of other agency documents related to the oil field development and construction of portions of this utility corridor. Cultural resource surveys were conducted on lands managed by federal agencies and these agencies did require notification if any cultural resource materials were found (BLM 1998a, 1998b, 1998c).

Staff compared maps of the TCI main utility corridor provided by Texaco and maps of the proposed Sunrise project APE to determine whether project-related surveys covered any of the areas associated with the TCI utility corridor. It appears that nearly all of the corridor has been surveyed during previous surveys for the project and its associated linear facilities. Staff has included this utility corridor in its discussion of indirect and cumulative impacts on cultural resources.

ELECTRIC TRANSMISSION LINES

As described in the AFC, the project site area and the preferred route for the transmission lines have been intensively used for petroleum extraction. These activities have resulted in a nearly continuous distribution of industrial remains across the landscape. Numerous traces of oil field development and remnants of oil production equipment were found during surveys of the project site and some of it may be more than 45 years old. Of the thirty-three (33) new sites that were recorded during pre-AFC surveys, all but one consisted of historic era deposits. Most of the sites consisted of remnants from oil and gas extraction activities and some of the sites also included modern household refuse. Most of these materials and sites appeared to lack integrity and thus, would not likely be eligible for listing on the National Register (SCPP 1998a; Pacific 1998a).

NEW STEAM LINES, STEAM INJECTION WELLS, NEW OIL PRODUCTION WELLS, AND NEW WELL FIELD ACCESS ROADS

The proposed SCPP power plant will produce approximately 120,000 barrels of steam each day for enhanced oil recovery in the adjacent Midway-Sunset Oil Field. In a supplemental filing, the applicant indicated that, for greatest thermal efficiency, the steam would be used within a three-quarters of a mile radius of the project site. The amount of steam produced could serve approximately 2,000 oil production wells and corresponding injection wells, of which about 1,300 already exist. An additional 700 new wells would be constructed to fully use the steam produced by

the Sunrise project. New access roads or renovation of existing roads would also be necessary to achieve the level of well field development planned by the operator (SCPP 1999k).

Permits for previous development of the wells in TCI's field have been granted by federal, state, and local agencies. These same agencies would also be involved in granting permits for the new wells (SCPP 1999k). In response to staff data requests, Texaco provided copies of well permits issued by the California Department of Conservation, Division of Oil and Gas, for the drilling and operation of well # 3541 and well # 3645 in section 21, T31S, R22E, of the Midway-Sunset Oil Field. While these permits do contain conditions, none of them apply to cultural resources (DOG 1998, 1999). Staff discussed well development permits with DOG staff in the Bakersfield office and they indicated that their permits are strictly limited to physical and mechanical aspects of the drilling, operation, and abandonment of oil and steam wells. They do not become involved in the identification of cultural resources or in any requirements for mitigation. They indicated the surface land planning or management agency is responsible for any concerns related to cultural resources (Mitchell 1999). Staff was unable to determine whether or not a literature search and cultural resource surveys were conducted prior to oil field development on lands subject to DOG requirements.

In response to data requests, Texaco also provided copies of reports for pedestrian surveys conducted by BLM archaeologists in 1981. Following a literature search, the surveys were done for four separate Texaco leaseholds located within sections 22 and 27, Township 31S, Range 22E, on the "Fellows" 7.5-minute USGS map sheet. The records state that the complete survey of these leaseholds would negate the need for future follow-up surveys prior to well field development unless cultural resources had been recorded. The areas covered by these four surveys include about 75 percent of the western half of the area expected to be served by the steam produced by the Sunrise project. Staff does not have similar information for the eastern half of the Texaco well field that could be served by the Sunrise project. The permits for well development on the BLM leaseholds do include a set of Conditions of Authorization for historic, cultural, and paleontologic resources. The BLM conditions require the developer to halt construction and implement any necessary mitigation if any cultural resources were encountered (BLM 1981a, 1981b, 1981c, 1981d). The well field is also located within BLM's "Caliente Area Resource Management Plan" and measures for protection of cultural resources are included in this plan (BLM 1996a, 1996b).

POST-AFC FIELD SURVEYS

In data requests subsequent to the AFC, staff had requested that Sunrise provide record and survey information for alternative transmission Route B so the relative sensitivity of alternative routes A and B could be evaluated. With the previous filing of the La Paloma project, and the anticipated filing of two additional power plant projects in the same general area as the Sunrise project, staff also suggested that these applicants consider the possibility of shared facilities or joint use of shared rights-of-way. In early March 1999, Sunrise indicated its archaeological consultants would be evaluating alternative Route B, plus variations D, E, and F, and they would

also be evaluating a new alternative Route G that would run eastward toward the Elk Hills project and then northward to the Midway Substation at Buttonwillow. Field surveys of these routes began in April and continued through May 1999 (SCPP 1999e).

In May and in June filings with the Commission, Sunrise withdrew the AFC-preferred Route A from further consideration. Alternative Route B was now identified as the preferred route. Intensive surveys of alternative Route B were conducted in April and May 1999 and surveyors covered a corridor of 500 feet on either side of the transmission center line, plus a 200-foot radius circle around the site of each transmission pole (SCPP 1999e; Pacific 1999c).

ROUTE B, PLUS VARIATIONS D, E, AND F

The Route B corridor runs along the eastern margin of the Temblor Range (or Telephone Hills, as they are known locally) and then crosses the McKittrick Valley near the town of McKittrick. From McKittrick, the route travels across the northwestern end of the West Elk Hills, and then crosses the western edge of the southern San Joaquin Valley to terminate near the town of Buttonwillow. Route B extends for a total distance of about twenty-five (25) miles (SCPP 1998a).

The pre-survey record search indicated that as many as 25 sites and 22 isolates were known to exist within or adjacent to the APE for proposed Route B. Of these known resources, 16 were re-located during the surveys and two were determined not to be cultural resources. Eight additional sites were discovered during the post-AFC surveys and some of these new sites incorporated previously known sites and/or isolates (SCPP 1998a).

Approximately eight (8) miles of Route B - between MP 0 to 1, MP 2.7 to 3.4, MP 4, MP 5.4 to 5.8, MP 7.3 to 10.2, MP 11 to 12.3, MP 13.5 to 14.7, and MP 15.5 to 16.5,- cross lands that are under the jurisdiction of the US Bureau of Land Management (BLM). While the BLM serves as the federal permitting agency with respect to cultural and paleontologic resources, they have chosen to take the role of a responding agency for this project (SCPP 1998a; Christian, 1998, 1999a)

Pedestrian surveys of this corridor were conducted between April 15 and May 5, 1999. The survey crew included four to seven archaeologists and they covered the area in transects about ten meters wide. Where the ground was heavily disturbed by petroleum activities, transects were about 25 meters wide. Visibility of the ground surface along much of the route was limited by heavy vegetation growth and about two miles of the route were inaccessible due to crop coverage. Additional surveys and/or testing may be needed after the vegetation has died back or crops have been harvested. Information on the results of the record search and the post-AFC surveys of Route B is summarized on page 4 of the confidential Appendix D-S to the AFC (Pacific 1999c)

Portions of Route B between MP 5 and MP 6 and between MP 19 and MP 25 were identified as being particularly sensitive and further evaluation and testing may be needed to clarify the potential for the project to affect known resources. As a result

of the surveys the archaeological consultant has also recommended that several of the previously recorded isolates and sites, plus several of the newly found resources all be combined into new sites with boundaries revised to reflect the new findings. While many of the known resources present in Route B are not likely to be eligible for the National Register, no determination of potential eligibility has yet been made for several of these sites (Pacific 1999c)

At several locations within the Area of Potential Effect (APE) and elsewhere, within the 1000 foot corridor of the APE for Route B, are remnants of berms that formed the raised bed of the Asphalto (McKittrick) branch of the Southern Pacific Railroad. These berms were previously recorded and were relocated during pre-AFC surveys. While the berms and the railroad alignment are of potential historical interest, they have been considerably altered and may no longer meet the eligibility criteria for the National Register (SCPP 1998a; Pacific 1998a).

ROUTE G

In the late spring of 1999, additional surveys were conducted for a revised project study area, based on changes to the preferred transmission route and modifications to the project APE. The new study area included alternative transmission Route G which would run eastward from the project site to the proposed Elk Hills project site and then run northward alongside an existing transmission line, to the Midway Substation at Buttonwillow. Route G has been formally withdrawn from consideration as an alternative (SPCC 1999k).

ARCHITECTURAL RECONNAISSANCE

Due to a long history of oil production that continues today, land in the project area and along the proposed linear facility routes is in a very disturbed state. Although much of the oil and gas production equipment in the project vicinity could be older than 45 years, the archaeological consultant to the applicant indicated that most of this material is no longer likely to have integrity due to considerable disturbance by oil field development. Surveys of the various corridors for the transmission lines and pipelines revealed an additional section of railroad berm and a trash heap, neither of which appeared to meet criteria for historic significance. No other structures older than 45 years are located within the project or linear facility APEs (SCPP 1998a).

NATIVE AMERICAN CONTACTS

In November 1998, prior to beginning the fieldwork and surveys, the consultant to the applicant contacted the state's Native American Heritage Commission (NAHC) to request information on sacred lands within the project area (SCPP 1998a). The NAHC maintains a list and maps of traditional sacred sites located on public and private lands throughout the state. The Heritage Commission also can refer staff, applicants, consultants, and members of the public to Native Americans who have indicated they wish to be notified about projects in their area of interest. If Native American burials are encountered during project construction, the Heritage Commission will provide the name of a representative who will serve as the "most likely descendant".

In response to the project consultant's request, no sacred properties were identified within the project area (including the one-mile radius study area). The absence of sacred properties, however, does not mean that they may not exist since this information is often protected until a project actually appears to be approaching such a resource area. In its response, the NAHC provided a list of Native American contacts. Confidential Appendix D to the AFC contains a sample of the letter sent to the Native American representatives for the project area and a summary of the contacts undertaken. As of September 1999, there were no responses to the applicant's letters or inquiries (Pacific 1998a, 1999c).

SUMMARY OF KNOWN CULTURAL RESOURCES WITH THE AREA OF PROJECT EFFECT

The record search and field surveys of the APE for alternative Route B for the transmission facilities, indicate the presence of twenty-two previously recorded isolates, fifteen previously recorded sites, and eight newly recorded sites. Many of the known resource sites have been disturbed or damaged to the extent that they are not likely to be eligible for listing on the Register. The isolates, by definition, are typically not eligible for listing on the National Register of Historic Places. However, regardless of the potential for a known site or resource to be eligible for the Register, these resources should be avoided during project construction and operation.

At least two of the recorded sites appear to meet the criteria for eligibility for the Register and if *in situ* cultural deposits exist, seven additional sites may be eligible. Many of these sites have both prehistoric and historic components. Additional testing prior to construction was recommended to assist in making a determination of eligibility Follow-up testing by manual excavation of at least one standard unit (one meter by one meter by one meter) or by carefully planned mechanical excavation was recommended to help determine the presence or absence of resources or deposits outside the boundary of these sites, but in the vicinity of proposed electric transmission facilities.

Although the BLM has jurisdictional interest in cultural resources on lands crossed by portions of the routes for the electric transmission line, they have indicated they would act as a reviewing and responsible agency for this project. BLM staff recently received copies of the confidential cultural resource filings related to the Sunrise project and has just begun its review. The BLM archaeologist indicated he would review the staff analysis and provide comments during later workshops or hearings on the final staff document (Christian 1999b).

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 resources and the mitigation that may be required to ameliorate any such impacts.

Under federal law, only historical or prehistoric sites, objects or features, or architectural resources that are assessed by a qualified researcher as “important” or “significant’ in accordance with federal guidelines typically need to be considered during the planning process. The significance of historical and prehistoric cultural resources is judged in accordance with the criteria for eligibility for nomination to the National Register of Historic Places as defined in 36 CFR 60.4. If such resources are determined to be significant, and therefore eligible for listing in the National Register, as well as the California Register, they are afforded certain protection under the National Historic Preservation Act and/or CEQA. The Advisory Council on Historic Preservation, for example, must be given an opportunity to comment on any federally-funded or permitted undertaking that could adversely affect such resources.

The National Register criteria state that “eligible historic properties” are: districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that (a) are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or (d) that have yielded or may be likely to yield, information important to history or prehistory. Isolated finds, by definition do not meet these criteria. California has adopted a very similar set of criteria, for assessing resources of statewide importance.

Under federal law, resources determined not to be significant, that is, not eligible for National Register listing, are subject to recording and documentation only, and are afforded no further protection. However, occasionally certain resources, although they may not be assessed as “significant”, may nonetheless be of local or regional importance such that mitigation may be warranted regardless of their assessed significance. Staff evaluates the survey reports and site records for any known resources located within or adjacent to the project APE to determine whether they meet the eligibility criteria.

The record and literature search and the walking surveys of the proposed project APE were conducted to identify the presence of any cultural resource sites or materials. Where resources were identified, additional evaluation was conducted to determine whether the resources are already listed on, or are potentially eligible for listing on either the National Register of Historic Places (National Register) [36 CFR 800] or the California Register of Historic Resources. The determination of eligibility is made in compliance with the applicable provisions of the National Historic Preservation Act.

In the time that has elapsed since the AFC was prepared, the state Resources Agency has adopted considerable revisions to the regulations implementing California Environmental Quality Act (CEQA). These changes affected the language applicable to staff’s analysis of cultural resources. Previously, the bulk of the information on how to assess resource and impact significance and on the types of mitigation measures available was contained in Appendix K of the CEQA

Guidelines. Much of the language of that appendix has now been incorporated into Title 14, Code of California Regulations, sections 15126.4 and 15064.5.

The CEQA guidelines now explicitly require the lead agency (in this case, the Energy Commission), to make a determination of whether a proposed project will affect "historic resources". The guidelines provide a definition for historic resources and set forth a listing of criteria for making this determination. As used in CEQA, the term "historic resources" includes any resource, regardless of age, as long as it meets these criteria. If the criteria are met, the Energy Commission must evaluate whether the project will cause a "substantial adverse change in the significance of that historic resource", which the regulations define as a significant effect on the environment. The recent CEQA changes also indicate that the mitigation for impacts to historic resources that meet these criteria shall not be subject to the limitations provided in PRC section 21083.2.

Using the above criteria, staff has determined that the cultural resource sites described in the AFC and in subsequent filings for the Sunrise project meet one or more of the criteria for being an historical resource. Isolated finds, by definition do not meet these criteria.

CEQA also contains a section addressing "unique" archeological resources and provides a definition of such resources (Public Resources Code, section 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 prohibition in this section does not apply when an archeological resource has already met the definition of a historical resource (California Code of Regulations, section 15064.5). Since staff has determined that the sites for which it is recommending mitigation do meet the definition of historical resources, the prohibition does not apply to the mitigation discussed in this staff assessment.

IMPACTS

Since project development and construction usually entail surface and sub-surface disturbance of the ground, the proposed Sunrise project has the potential to adversely affect both known and previously unknown cultural resources. For many other types of resources, the effects of ground disturbance during construction are often deemed "temporary" since they generally occur only during construction-related activities. However, for cultural resources the potential for temporary effects really does not exist. Once cultural resource materials have been encountered or disturbed during project site preparation or during project construction, the effect upon cultural resources is permanent and extends for the lifetime of the project. The only examples of a "temporary effect" on cultural resources that come to mind would be if access to a known site or resource were blocked for a period of time. Or if there were a short-term intrusion of modern-day construction noises or dust in a historic district, or scaffolding surrounding a historic building. Typically, once these activities are completed, the temporary effects would be alleviated.

The potential for permanent effects to occur to cultural resources would be associated with direct damage to, or destruction of, known resources that are not protected during construction activities or damage to, or destruction of, previously unknown resources that are unexpectedly encountered during construction ground disturbance. Permanent effects to cultural resources may occur if sensitive resource areas are used for parking or storage because any resources present could be compressed, or dislocated, or damaged. Permanent effects may also occur with the development and use of new access roads to an area previously inaccessible, thereby providing an opportunity for project personnel or members of the public to collect or vandalize a site. Ongoing maintenance of pipelines and other linear facilities also have the potential to have permanent effects on cultural resources over an extended period of time.

PROJECT SPECIFIC EFFECTS

Project-related effects may occur either directly or indirectly, as a result of activities associated with the pre-construction site preparation, construction, operation, and/or closure of the project. A project may also have effects that can be part of an overall, cumulative perspective.

During various workshops and site visits there have been several discussions between staff, SPCC, other agencies, and intervenors about the scope of project analysis. Staff and SPCC reached an agreement on scope in a document identified as a joint blueprint (CEC/SCPP 1999a). The blueprint identifies what staff and SPCC believe are the project facilities that may result in direct, indirect, and cumulative effects. The Committee for the Sunrise project, in an order dated June 4, 1999, adopted the joint blueprint as the guiding document for the environmental analysis of the project.

DIRECT IMPACTS

According to CEQA Guidelines, direct impacts are defined as those impacts that are directly attributable to the project and they are occurring at the same time and place. For cultural resources, direct impacts are those which may result from the disturbance of resources, whether from vegetation removal; heavy equipment or other vehicle parking on, or travel over, the ground surface; earth-moving activities; or trenching and excavation.

INDIRECT IMPACTS

According to CEQA Guidelines, indirect impacts are caused by the project, but they can occur later in time or farther removed in distance, but are reasonably foreseeable and related to a proposed project. For cultural resources, indirect impacts may result from increased erosion due to site clearance and preparation. Project-related improvement in access to sensitive resource areas may lead to inadvertent damage or outright vandalism to exposed resource materials. Under the blueprint adopted by the Sunrise project Committee the indirect effects that are attributable to the proposed SCPP project include the following: completion of 20-inch gas pipeline in the the TCI Main Utility Corridor; the construction and operation of 700 new oil production and steam injection wells; the construction of the new

steam pipelines; the construction and/or modification of well field service facilities; and the construction and/or modification of access roads (CEC 1999*).

POTENTIAL FOR PROJECT EFFECTS

Often the potential for project construction activities to impact previously unknown cultural resources cannot be fully evaluated until the sub-surface soils have been exposed by grading, excavation, trenching, and/or augering. An assessment of the potential for discovery of cultural resources can be made, based on the results of the literature review and the field surveys. The presence of numerous known sites of historical interest near the project site or portions of the linear facility routes, the recorded occurrence of numerous isolates, and the evidence of human habitation over a period of thousands of years -- all in proximity to the proposed project APE – indicate that construction of the proposed project has the potential to encounter previously unknown cultural resources.

Thus, the potential for the Sunrise project to impact previously unknown cultural resources is directly related to the likelihood that such resources are present and whether they are actually encountered during project development and construction activities. The potential for discovery of cultural resources is not a measure the full significance of individual artifacts or other cultural resources present since it is impossible to accurately predict what individual artifacts or sites have not yet been discovered.

THE POTENTIAL FOR “ADVERSE CHANGES” TO HISTORIC RESOURCES

Based upon NEPA, the Warren-Alquist Act and the Energy Commission siting regulations, the Commission staff must evaluate the potential for significant impacts to cultural resources. Based upon CEQA, the Commission staff must evaluate the “potential for adverse changes in the significance of historic resources”. Not all-cultural resources are the same, nor do they offer the same degree of information or insight into past human activities and adaptations to their environment.

Professional experience, the literature, and the records of previously discovered cultural resources all provide a means of assessing the relative value of a newly discovered site or a recently unearthed resource. Significant cultural resources are those that meet established and generally accepted scientific criteria. The significance of any cultural resource sites or materials recovered during project construction is assessed by a qualified cultural resource specialist and often can only be evaluated after they have been mapped and recorded, collected, prepared and analyzed by professional archaeologists and historians and cultural resource specialists.

The AFC and supplementary filings indicate that a total of 46 cultural resource sites and isolates have been recorded within the 100-foot corridor surrounding the proposed power plant site area or within and adjacent to the 1,000-foot wide corridors of project-related electric transmission routes. There is a potential for construction of the transmission facilities to impact thirteen known cultural sites unless final design avoids construction in the vicinity of these resources. Many of

the known resources appear to lack the integrity to meet the eligibility criteria for listing in the Register but several potentially eligible sites are known to exist. Additional testing and analysis must be conducted in the vicinity of these sites to fully evaluate the potential for impacts (SCPP 1998a; Pacific 1999c).

For this project, the majority of potential impacts to cultural resources would be associated with the construction phase of the project, during disturbance of the ground surface and subsurface. Given the presence of known cultural resources throughout the project area, the sensitivity of the project area is very high. It is likely that additional, previously unknown cultural resources may be discovered during project construction. At this time the number of sites, both known and unknown, that cannot be avoided is uncertain. Likewise, the potential significance of an unknown resource cannot be determined until it has been discovered and evaluated by qualified professionals.

POWER PLANT SITE AND IMMEDIATE LINEAR FACILITY ROUTES

As described in the AFC, the elevation of the proposed 16-acre plant site slopes gently from an elevation of 1430, to 1450 feet mean sea level (msl). In preparing for project construction, the site will be leveled to an average elevation of 1430 feet above msl. Soil in this area has been previously disturbed by oil and gas production. After the site is leveled and holes for foundations have been excavated, concrete mat foundation pads will built at grade level to support the power generation equipment (SCPP 1998a).

The 600-foot long pipelines for the potable water supply, the make-up water supply, and the wastewater disposal line will all be carried on a system of above ground racks that will connect with the TCI utility service facility now under construction. The project's natural gas supply pipeline will run approximately 60 feet to connect with the new 20-inch TCI facility. Construction of the foundation footings for the above-ground utility racks to carry these pipelines is not expected to exceed about six feet in depth and about ten inches in diameter. The potential for impacts to sub-surface cultural resources is expected to be minimal.

ELECTRIC TRANSMISSION LINE ROUTE(S)

The proposed route for the electric transmission line is about 25 miles long and about 20 miles would parallel existing transmission lines. The route crosses land that has been modified by oilfield activity and some of the route crosses irrigated agricultural land. Most of the route is accessible from existing roads although four new access spurs would be constructed. Nearly thirty known cultural resource sites and nearly twenty-five isolates have been found within the 1000 to 2000 feet survey corridor of preferred Route B. In some portions of the proposed transmission route and the variations, unknown cultural resources could be present below the surface and could be unexpectedly impacted by construction (SCPP 1998a).

The transmission lines will be strung on tubular steel poles and the spans between poles would average about 700 feet and could extend up to a maximum of 850 feet. Construction of foundations for the transmission structures will require drilling into the soil to variable depths for each power pole. The depth of soil disturbance will

depend on the height and diameter of the individual transmission poles designed for each portion of the route. Typically, the diameter of the holes being augered for the power poles would be about six feet. For poles placed at angle points or where extra strength is needed, the diameter of the holes needed for the poles may be as much as ten feet (Pacific 1999c). The width and extent of surface soil disturbance would depend upon the size of equipment needed to set and erect the poles and the amount of construction work that can be accomplished from existing, disturbed areas or roads.

NEW STEAM LINES, NEW STEAM INJECTION WELLS, NEW OIL PRODUCTION WELLS, AND NEW WELL FIELD ACCESS ROADS

Texaco expects to develop an additional 700 oil production and steam injection wells, plus associated access roads and steam supply pipelines, within the area that lies within an approximate three-quarters of a mile radius of the SCPP site. While the oil field has already experienced considerable disturbance from previous and on-going development, there is always a potential for previously unknown cultural resources to be encountered during grading of the ground surface or during excavation or augering for well field structures and facilities. Site preparation and construction activities at a nearby power generation project encountered two large, isolated artifacts at relatively shallow depth in an area already disturbed by considerable oil field development.

CUMULATIVE IMPACTS

According to CEQA Guidelines cumulative impacts are associated with the construction and operation of other, similar projects occurring in the same area or region or occurring in the same general time frame. For cultural resources, cumulative impacts 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 cumulative impacts may be associated with at least two different aspects of the Sunrise project. First is the continuing development of oil wells and steam injection wells within an approximate radius of three-quarters of a mile around the power plant site. The second aspect is the proposed construction and operation of four additional power plants in the southwestern portion of Kern County.

The Energy Commission is currently reviewing, or anticipates receiving for review, at least five large power generation projects, all proposed for construction in this part of southwestern Kern County. Discussions are underway to consider joint use of rights-of-way for linear facilities. The consolidation and/or the reduction in the number of rights-of-way and facilities would reduce the cumulative impact potential associated with the development of multiple projects in the same general area.

Proposed developments such as these large power generation projects and associated linear facilities, and ongoing oil field and agricultural production are extending farther out into the southern San Joaquin Valley. The combined effects of this development can accelerate the potential for continued disturbance of cultural resource sites and the loss of significant information. The level of cumulative impact will grow as increasing development opens more undisturbed

areas and eventually exposes highly sensitive cultural resource sites. There is increasing potential that important resources will be inadvertently lost or destroyed. Implementation of appropriate mitigation measures is essential to the protection of valuable cultural resources and for the recovery of information on earlier climate patterns and human adaptations to these environmental conditions. Staff encourages cooperation among project owners to facilitate the protection and mitigation of sensitive and/or significant cultural resources sites.

The incremental effect of this project is likely to contribute to a significant cumulative impact on Route B of the preferred transmission route. At this time, the process of determining site boundaries and significance is still underway. The process of determining the presence of significant cultural resources will continue into the construction phase of this project. The applicant can mitigate impacts to both undetermined and identified sites to less than significant by following the suggestions for mitigation and the conditions of certification

IMPACTS OF FACILITY CLOSURE

PLANNED CLOSURE

The anticipated lifetime of the Sunrise project is expected to be at least thirty-five years. It is anticipated that upgrades or modifications made prior to the facility's closure 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.

At the time of closure, all then-applicable LORS will be identified and the Energy Commission-required closure plan will address compliance with these LORS. 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 more likely to depend upon the final location of project structures in relation to existing resources, and then upon the procedures used for the removal of project structures. Since the spatial relationship between the closure and removal of project structures and sensitive resources cannot be determined at this time, no conclusion can be drawn at this time with respect to the impact of facility closure on cultural resources.

UNEXPECTED TEMPORARY CLOSURE

According to the AFC, an emergency unplanned closure, would probably be temporary. The applicant's plan, if this type of closure occurs, would be to keep everything ready to start-up as soon as the emergency is over. In this sort of situation, there is unlikely to be any impact to cultural resources (SCPP 1998a).

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 of known and/or previously unknown, cultural resources might result. Project-related facilities on federal lands may be required to be returned, as nearly as possible, to pre-project conditions.

MITIGATION

The AFC indicates that numerous historic and prehistoric sites and numerous isolates have previously been found on the surface within the 1000 feet corridor of the project area. Since project development and construction usually entail disturbance of the ground surface, as well as disturbance below the surface, the proposed project has the potential for sub-surface excavation to encounter sub-surface cultural resources. The presence of cultural resource materials beneath the surface of the project area is difficult to determine until the ground is opened by excavation, trenching, or augering, so the extent of potential impacts often cannot easily be evaluated prior to construction. The applicant intends to use archaeological methods to determine the presence of sites and avoid them, if possible.

The preferred mitigation for impacts to cultural resources is avoidance of the resource. If previously unknown cultural resources are encountered during site clearance and preparation, or during project construction, and they cannot be avoided, then contingency measures must be in place to protect these resources. Staff's objective is to ensure that there will be no adverse impacts to significant cultural resources during project development and construction. Critical to the success of any mitigation effort is the selection of a qualified professional cultural resources specialist. This designated specialist must have the authority to halt or redirect work if cultural resources are encountered. Commission staff must review the qualifications and approve of the professional archaeologist designated by the project owner to lead and participate in project monitoring and mitigation efforts.

Mitigation measures are developed to reduce the potential for adverse project impacts on the project region's cultural resources to a less than significant level. Staff has recommended a series of conditions of certification that would help ensure the mitigation of project impacts. The proposed conditions are presented in the approximate sequence in which they would be implemented and include specific time requirements to reflect a phased or staged sequence implementation prior to, during, and following project construction.

The proposed mitigation measures would apply to any potential for impacts to sensitive cultural resources, in all areas affected by the project. Mitigation measures are derived from good professional practice and they are based on the US Secretary of Interior guidelines, and Commission staff recommendations. All of these mitigation measures have previously proven successful in protecting sensitive cultural resources from construction-related impacts, while allowing the timely completion of many projects throughout California.

MITIGATION OF DIRECT IMPACTS

Direct impacts are those clearly associated with the construction and operation of the proposed SCPP project.

APPLICANT'S PROPOSED MITIGATION

As indicated in the AFC and in the confidential filings, any known cultural resource sites will be avoided wherever possible. The AFC recommends that sites for which significance has not been formally assessed, will be presumed to be important or significant until a determination of significance can be made. The applicant has assumed that all the recorded sites that have not yet been formally evaluated for significance/importance, and that may still retain integrity, are at minimum an "important" resource under CEQA, or are potentially eligible for listing on the National Register under 36 CFR 60.4(d).

MITIGATION MEASURES IN THE AFC

In the AFC, the applicant recommended a program of mitigation measures that would apply to any known or newly discovered cultural resources within the project APE. These proposed mitigation measures were presented in section 8.3.5 of the AFC and are to be incorporated into the Cultural Resource Monitoring and Mitigation Plan to be prepared, as described in the proposed Conditions of Certification. The mitigation measures set forth in the AFC include:

- It is the intent of the Sunrise project to avoid or minimize impacts to any known or newly discovered cultural resources. To the extent possible, the Sunrise project will be designed to avoid or minimize impacts to cultural resources.

- The Sunrise project will implement mitigation measures to ensure that cultural resources will be protected from damage during construction or during maintenance of the built project, or render any unavoidable direct impacts to be less than significant.

- A qualified monitor will be available during construction activities to address, with reference to the significance criteria of the California Register of Historical Resources and the National Register of Historic Places, the significance of cultural resources that could potentially be impacted by the project.

- During construction, measures will be taken to avoid impacts to cultural resources by training appropriate construction personnel to recognize and avoid cultural resources, and be instructed to halt construction upon the discovery of such materials.

- A qualified "monitor" will be available during construction activities in the vicinity of known cultural resources or in areas considered sensitive for potentially buried archaeological deposits.

- As appropriate, cultural resources in the vicinity of construction activities may be fenced or otherwise posted as exclusion zones and made off-limits to construction personnel and equipment.

- The Sunrise project will document and report to the CEC the discovery during construction of any previously unknown cultural resources and consult with CEC staff regarding the management of any such resource(s), including the design and implementation of appropriate mitigation measures if the resource cannot be avoided. Any violation of a cultural resource exclusion zone or other damage to cultural resources not in accordance with stipulated avoidance and mitigation measures will be reported to the CEC and appropriate action taken, in consultation with CEC staff, to remedy any adverse impacts.

- If an archaeological site cannot be avoided by construction or maintenance activities, the Sunrise Cogeneration and Power Project will, prior to initiating construction, develop a specific mitigation plan to address the impacts on the resource(s) and submit the plan to the CEC for review. In consultation with CEC staff, the plan will be completed and implemented so as to render any adverse impacts to the resource(s) to less than significant in accordance with CEQA, CEC standards, and other legal requirements.

- If human remains are encountered on private lands either during construction or mitigation activities, work will stop immediately within 50 feet of the discovery and the provisions of the California Health and Safety Code section 70500.5, Public Resources Code section 5097.98, and other applicable provisions of ARPA, NAGPRA, and other law shall apply.

The AFC concludes that implementation of the foregoing mitigation measures would be effective by either ensuring the avoidance of cultural resources, or by mitigating unavoidable impacts to less than significant (Pacific 1998a)

POST-AFC MITIGATION MEASURES

After the AFC was filed, the applicant continued its study and evaluation of the alternative routes for the electrical transmission facilities. For the AFC, Route A was presented as the preferred route for project-related electrical transmission facilities. Following a series of staff workshops and the discussion of potential impacts to known significant cultural resources associated with Route A, the applicant's consultant completed additional record searches and conducted additional field surveys within a wide corridor along alternate Route B, including several small variations. They also did a record search and conducted field surveys along a new route, Route G, that would parallel to an existing transmission line that runs northward from the Elk Hills Petroleum Reserve into the Midway Substation at Buttonwillow. In a June 1999 filing, the applicant indicated that Route G had been dropped from further consideration, as was Route A. The applicant is now seeking a regulatory permit to construct the transmission lines in Route B, which includes three variations represented by Route segments D, E, and F (SPCC 1999k; Pacific 1999*).

In a supplement to Appendix D of the AFC (confidential), the applicant discussed several additional mitigation measures for the now preferred Transmission route B (Pacific 1999c). These supplemental mitigation measures are summarized here, with site location information minimized to protect the resources:

- The project will be designed with the intent to avoid cultural resources. If avoidance of any potentially significant cultural resource through project design will not be possible, the significance of that resource must be formally evaluated with respect to CEQA Appendix J, CRHR guidelines and NRHP criteria. Appropriate mitigation measures and Section 106 consultation procedures will be followed to consider projects effects on potentially affected cultural resources.

- Installation of the poles for the electric transmission lines will be monitored by a qualified archaeologist for two designated portions of preferred Route B. The monitor is to be present during construction between mile-posts (MP) 5 and 6 and between MP 19 through MP 25. Monitoring is recommended because portions of these areas were not accessible during field surveys and because they potentially may also contain sensitive, undisturbed sub-surface cultural resources.

- For the area between MP 5 and MP 6, the applicant suggests the Sunrise project could be designed to span this archaeologically sensitive area with the new transmission line. Or the new line could enter the new switching station at the existing Midway-Sunset power plant project facility without the need to install new transmission poles in the sensitive area.

The area between MP 19 and MP 25 contains several areas of particular sensitivity. The area was once part of the complex slough system and the extensive wetlands associated with the Kern River flood plain as it flowed into Tulare and Buena Vista lakes. Natural resources in this area supported a large prehistoric population and several occupation sites have been recorded around the lakeshores. As these areas were drained and developed for agriculture, the land was leveled, low spots were filled in with soils removed from higher points and surface waters were redirected into a system of ditches and canals. Today the agricultural areas are very flat and there is relatively little elevation change but old maps indicate there once was more varied terrain and there are Indian mounds in the vicinity of the proposed transmission route. The record search indicates that numerous cultural resource materials have been found widely scattered across the surface in this area. Although the surface has been disturbed by agricultural use, it is quite likely that additional materials may remain in place, in layered deposits (stratigraphy) that lie beneath the modern-day plow zone. Scientific recovery of data and materials from these undisturbed layers would provide invaluable information about the prehistoric residents, their adaptation to prehistoric environmental conditions, and their culture (Pacific 1999c).

As mitigation, the applicant's consultant has recommended that the project be designed, whenever possible, to avoid placement of any transmission poles within

areas where dispersed or potentially "*in situ*" archaeological materials have been found. If it is not possible to span the entire area where archaeological materials have previously been found scattered on the surface, then the proposed location of each transmission pole must be examined by a qualified archaeologist prior to final siting of that pole. The archaeologist will examine an area extending one hundred feet in diameter around the center point of the proposed pole location. If artifacts or other indications of archaeological materials are found, the archaeologist will make a test excavation to determine whether the materials are part of a dispersed scatter or part of an *in situ* deposit, and to determine the relative integrity of the material. At a minimum, the test excavation would include one (or more), 1-meter by 1-meter square units, dug by hand and using appropriate archaeological methods and techniques. In some instances, testing could also be done by mechanical excavation using an auger or a backhoe (Pacific 1999c).

- If in situ resources are encountered, the site for the pole will be moved in order to avoid them. If the deposit cannot be avoided, then the mitigation measures outlined in the AFC will be implemented, in consultation with Commission staff.

- Procedures for addressing unanticipated archaeological discoveries were defined in the AFC. Consultation with Commission staff will be carried out to ensure that all appropriate and necessary measures are taken to minimize impacts to cultural resources encountered during construction.

BLM's PROPOSED MITIGATION MEASURES

Portions of the route proposed for the electrical transmission line facilities for the Sunrise project cross lands managed by the US Bureau of Land Management. The staff archaeologist for the BLM at the Caliente Resource Area office in Bakersfield, received and reviewed a copy of the AFC (Christian 1998). In August 1999, BLM staff received copies of the project-related confidential cultural resource reports prepared by the applicant's consultants. The BLM staff expects to review the final staff analysis document prior to Commission hearings on the project and will provide staff with comments and recommendations for cultural resource mitigation and data recovery. The BLM archaeologist also indicated that he would draw from the Commission's adopted conditions of certification in placing conditions on the BLM permit for project-related activities on BLM lands (Christian 1999a, 1999b).

STAFF'S PROPOSED MITIGATION MEASURES

Commission staff concurs with the mitigation measures proposed by the applicant in the AFC and in supplemental filings. Staff has adapted the applicant's proposed mitigation measures into a series of conditions of certification, sometimes rewording for clarification and adding time frames and other requirements. A draft of staff 's proposed conditions were discussed by the applicant and intervenors during a public workshop and staff made further revisions to the draft conditions in response to comments. Adoption of staff's proposed conditions of certification are expected to reduce the potential for adverse project impacts on the region's cultural resources to a less than significant level.

The proposed mitigation measures would apply to any potential for impacts to sensitive cultural resources in all areas affected by the project. Mitigation measures are derived from good professional practice and they are based on the US Secretary of Interior's guidelines, and staff's recommendations. The mitigation measures set forth in the conditions have been applied to previous projects before the Commission and they have proven successful in protecting sensitive cultural resources from construction-related impacts, while allowing the timely completion of many projects throughout California.

MITIGATION OF INDIRECT IMPACTS

Potential indirect impacts would be associated with the completion of the 20-inch natural gas pipeline and the TCI Main Utility Corridor; the construction and operation of the 700 new oil extraction and steam injection wells; the construction and maintenance of new and existing access roads; the modification of existing well field services and facilities; and the construction of new steam supply pipelines.

US BUREAU OF LAND MANAGEMENT MITIGATION MEASURES

On federally-managed lands, the development and operation of the 700 new oil extraction and steam injection wells within three quarters of a mile from the proposed SCPP site will be subject to permits from the US Bureau of Land Management. Under prior permits for certain leaseholds, as well as under the Caliente Area Resource Management Plan, mitigation measures are required to identify and protect cultural resources. Existing BLM conditions require that, if cultural resources are encountered during construction or operation activities within the leasehold, all activities in the vicinity of the find will immediately be halted and an archaeologist must be consulted to evaluate the find. Activities must remain halted until the archaeologist has made the evaluation and any necessary mitigation measures have been completed (BLM 1996a; 1998a, 1998b, 1998c).

DIVISION OF OIL AND GAS MITIGATION MEASURES

On non-federal lands, the development and operation of the 700 new oil extraction and steam injection wells within the three quarters of a mile from the proposed SCPP site will be permitted by the California Department of Conservation, Division of Oil and Gas. These permits do not address the identification or mitigation of potential impacts on cultural resources.

KERN COUNTY MITIGATION MEASURES

Kern County is the local agency responsible for permitting various types of surface activities in the oil fields. In those areas of the county where petroleum resources have already been developed, any future oil field development or new facilities are considered to be ministerial actions and no additional environmental documentation is required and no additional conditions would be required.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

As discussed in the AFC, there are a total of 20 recorded cultural resource sites and 25 isolates within one mile of the power plant project area. Since numerous prehistoric sites and isolates have been recorded within the project area, there is a strong possibility that project construction could encounter potentially significant cultural resources. The presence of isolates on the surface can sometimes indicate the presence of additional resources below the surface or in proximity to the surface finds.

Of the twenty known, recorded sites within the Sunrise project APE, two have been already been determined to be eligible for listing on the National Register of Historic Places. While many of these previously recorded resources may not be eligible for the register, an eligibility determination has not been completed for all known, recorded resources. Nor has an eligibility determination been initiated for new, as-yet-undiscovered, cultural resource sites.

However, two areas, located between MP 19 and MP 25 on transmission line Route B, contain sites that previous cultural resource specialists have suggested as potentially eligible for the National Register. Additional testing by mechanical excavation was conducted to provide further information for the eligibility determination. The AFC also notes that these sites are located in frequently plowed agricultural fields and concludes that construction-related activity on the surface is unlikely to result in new physical impacts to surface resources at the sites. However, the absence of surface resources does not preclude the presence of subsurface deposits and the applicant has recommended that any project-related excavation in the vicinity of these sites should be closely monitored (SCPP 1998e; Pacific 1999b).

Under recently adopted changes to CEQA, the Energy Commission is now required to make findings as to the presence of historic resources in the area potentially affected by a project and to draw conclusions as to the potential significance of the resources and/or the impacts. Staff has determined that the known resource sites described in the AFC and in the confidential technical reports meet one or more of the criteria needed to identify them as “historical resources”. Staff has reviewed the discussions of the materials recorded at the various known sites found within one-quarter mile of the project APE. Staff has reviewed the recommendations of the applicant’s archaeological specialist and has incorporated them into the proposed conditions of certification. Staff also expects to receive comments from the BLM archaeologist, prior to Commission certification and anticipates that the Commission’s conditions can be adapted into any permit requirements that BLM may have for those portions of the project that would be on lands managed by federal agencies.

Staff has incorporated the various cultural resource mitigation measures into a proposed set of conditions of certification for the Sunrise project. The cultural

resource conditions of certification are presented as a means of anticipating potential impacts directly associated with the SCPP and they are expected to reduce any potential for adverse impacts to historic resources to a less than significant level.

The proposed Conditions of Certification are set forth below as a series of steps or activities that are intended to be completed in a phased sequence, during project-related pre-construction, construction, post-construction, and operation activities. For instance, the preparation of a monitoring and mitigation plan by the designated cultural resource specialist cannot take place until final project design and site maps have been completed, the designated specialist has been approved by the CPM, and any necessary final surveys have been completed.

Now that the construction of new power plants is responding to market forces, an applicant or a project owner frequently anticipates starting project construction as soon as they receive the Commission's decision on certification. It is crucial to recognize that such construction cannot begin until the adopted Conditions of Certification have been complied with. If the start of project construction begins immediately after certification, conditions with extended lead times must be initiated prior to certification.

Staff believes that construction of the Sunrise project can be accomplished in a manner that can avoid potential adverse changes to the significance of the known historic resources. The potential for adverse changes to as yet undiscovered additional historic resources will remain unknown until, and unless, such resource are encountered. Staff concludes that, if the proposed conditions of certification are implemented by qualified professionals in a timely and proper manner, the project will be in compliance with the applicable LORS.

RECOMMENDATIONS

Staff recommends the designation of a qualified professional cultural resource specialist to implement all cultural resource conditions of certification. Staff also recommends monitoring by the designated specialist throughout the pre-construction and construction periods, as needed, and the implementation of appropriate mitigation measures wherever cultural resources are encountered. Monitoring and mitigation by a qualified cultural resource specialist are essential to reduce the potential for project impacts to cultural resources to a less than significant level.

Staff recommends that the Energy Commission adopt the following proposed conditions of certification, to ensure mitigation of potential impacts to sensitive cultural resources during the construction of the Sunrise Cogeneration and Power Project. For the indirect impacts associated with the development of the 700 new wells in the TCI oil field, staff recommends that the permit conditions in effect for those portions of the field located on lands managed by the US Bureau of Land Management, be extended to all of the lands within three quarter of a mile from the SPCC site.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of project-related construction activities (defined as any construction-related vegetation clearance; ground disturbance and preparation; site excavation activities; or the movement or parking of heavy equipment or other vehicles onto or over the project surface), the project owner shall provide the California Energy Commission (Commission) Compliance Project Manager (CPM) with the name and statement of qualifications for its designated cultural resource specialist who will be responsible for implementation of all cultural resources Conditions of Certification.

Protocol:

The statement of qualifications for the designated cultural resource specialist shall include all information needed to demonstrate that the specialist meets the minimum qualifications set forth below, including the following:

a. a graduate degree in anthropology, archaeology, California history, cultural resource management, or a comparable field;
b. at least three years of archaeological resource mitigation and field experience in California; and
c. at least one year's experience in each of the following areas:
d. leading archaeological resource field surveys;
e. leading site and artifact mapping, recording, and recovery operations;
f. marshalling and use of equipment necessary for cultural resource recovery and testing;
g. preparing recovered materials for analysis and identification;
h. determining the need for appropriate sampling and/or testing in the field and in the lab;
i. directing the analyses of mapped and recovered artifacts;
j. completing the identification and inventory of recovered cultural resource materials; and
k. preparing appropriate reports to be filed with the receiving curation repository, the SHPO, all appropriate regional archaeological information center(s).

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

a. a list of specific projects the specialist has previously worked on;
b. the role and responsibilities of the specialist for each project listed; and
c. The names and phone numbers of contacts familiar with the specialist's work on these referenced projects.

Verification: At least ninety (90) days prior to the start of project construction, the project owner shall submit the name and statement of qualifications of its designated cultural resource specialist to the CPM for review and written approval.

At least ten (10) days but no more than thirty (30) days prior to the start of construction, the project owner shall confirm in writing to the CPM that the approved designated cultural resource specialist will be available at the start of construction and is prepared to implement the cultural resource Conditions of Certification.

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

CUL-2 Prior to the start of project construction, the project owner shall provide the designated cultural resource specialist and the CPM with maps and drawings issued for the construction site plan and site layout, and for the final alignment of all linear facilities. The routes for the linear facilities shall be provided on 7.5-minute quad maps, showing:

a. post mile markers (including "tic marks" for tenths of a mile);
b. Final center lines and right-of-way boundaries; and
c. The location of all the various areas where surface disturbance may be associated with project-related access roads, storage yards, laydown sites, pull sites, pump or pressure stations, switchyards, electrical tower or pole footings, and any other project components.

The designated cultural resource specialist may request, and the project owner shall provide, enlargements of portions of the 7.5 minute maps presented as a sequence of strip maps (or other acceptable format approved by the designated specialist) for the linear facility routes. The strip maps would include post mile and tenth of a mile markers and show the detailed locations of proposed access roads, storage or laydown sites, tower or pole footings, and any other areas of disturbance associated with the construction and maintenance of project-related linear facilities. The project owner shall also provide copies of any such enlargements to the CPM at the same time as they are provided to the specialist.

Verification: At least seventy-five (75) days prior to the start of construction on the project, the project owner shall provide the designated cultural resource specialist and the CPM with final drawings and site layouts for all project facilities and maps at appropriate scale(s) for all areas potentially affected by project construction. If the designated cultural resource specialist requests enlargements or strip maps for linear facility routes, the project owner shall also provide a set of these maps to the CPM at the same time that they are provided to the specialist.

CUL-3 Prior to the start of project construction, the designated cultural resources specialist shall prepare, and the project owner shall submit to the CPM for review and written approval, a Cultural Resources Monitoring and Mitigation Plan (CRMMP), identifying general and specific measures to minimize potential impacts to sensitive cultural resources.

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

a. A proposed research design that includes a discussion of questions that may be answered by the mapping, data and artifact recovery conducted during monitoring and mitigation activities, and by the post-construction analysis of recovered data and materials.
b. A discussion of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the pre-construction, construction, and post-construction analysis phases of the project.
c. Identification of the person(s) expected to perform each of the tasks; a description of each team member's qualifications and their responsibilities; and the reporting relationships between project construction management and the mitigation and monitoring team.
d. A discussion of the need for Native American observers or monitors, the procedures to be used to select them, the areas or post-mile sections where they will be needed, and their role and responsibilities.
e. A discussion of measures such as flagging or fencing, to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during construction and/or operation, and identification of areas where these measures are to be implemented. The discussion shall address how these measures will be implemented prior to the start of construction and how long they will be needed to protect the resources from project-related effects.
f. A discussion of where monitoring of project construction activities is deemed necessary by the designated cultural resource specialist. The specialist will determine the size or extent of the areas where monitoring is to occur and will establish the percentage of the time that the monitor(s) will be present.
g. A discussion of the requirement that all cultural resources encountered will be recorded and mapped (may include photos) and all significant or diagnostic resources will be collected for analysis and eventual curation into a retrievable storage collection in a public repository or museum that meets the standards and requirements for the curation of cultural resources set forth at Title 36 of the Federal Code of Regulations, Part 79.
h. 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.
i. Identification of the public institution that has agreed to receive any data and cultural resources recovered during project-related monitoring and mitigation work. Discussion of any requirements, specifications, or funding needed for the materials to be delivered for curation and how they will be met. Also include the name and phone number of the contact person at the institution.

Verification: At least sixty (60) days prior to the start of construction on the project, the project owner shall provide the Cultural Resources Monitoring and Mitigation Plan, prepared by the designated cultural resource specialist, to the CPM for review and written approval.

CUL-4 Prior to the start of project construction, the designated cultural resources specialist shall prepare an employee training program. The project owner shall submit the cultural resources training program to the CPM for review and written approval.

Protocol: The training program shall discuss the potential to encounter cultural resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

The training program shall also include the set of resource reporting procedures and work curtailment procedures that workers are to follow if previously unknown cultural resources are encountered during project activities. The training program shall be presented by the designated cultural resource specialist or qualified individual(s) approved by the CPM and may be combined with other training programs prepared for biological resources, paleontologic resources, hazardous materials, or any other areas of interest or concern.

Verification: At least sixty (60) days prior to the start of construction on the project, the project owner shall submit to the CPM for review and written approval, the proposed employee training program, the set of reporting procedures, and the work curtailment procedures that the workers are to follow if previously unknown cultural resources are encountered during construction. The project owner shall provide the name and resume of the individual(s) performing the training.

CUL-5 Prior to the start of construction and throughout the project construction period as needed for all new employees, the project owner shall ensure that the designated cultural resource trainer(s) provide(s) the CPM-approved cultural resources training to all project managers, construction supervisors, and workers. The project owner shall ensure that the designated trainer provides the workers with the CPM-approved set of procedures for reporting any sensitive resources that may be discovered during project-related ground disturbance and the work curtailment procedures that the workers are to follow if previously unknown cultural resources are encountered during construction.

Verification: Within seven (7) days after the start of construction the project owner shall provide the CPM with documentation that the designated cultural resources trainer(s) has/have provided to all project managers, construction supervisors, and workers hired before the start of construction the CPM-approved cultural resources training and the set of reporting and work curtailment procedures.

In each Monthly Compliance Report after the start of construction the project owner shall provide the CPM with documentation that the designated cultural resource trainer(s) has/have provided to all project managers hired in the month to which the

report applies, the CPM-approved cultural resources training and the set of resource reporting and work curtailment procedures.

CUL-6 The designated cultural resource specialist or the specialist's delegated monitor(s), shall have the authority to halt or redirect construction if previously unknown cultural resource sites or materials are encountered during project-related grading, augering, excavation and/or trenching.

If such resources are found and the specialist determines that they are not significant, the specialist may allow construction to resume. The project owner shall notify the CPM of the find as set forth in the Verification.

If such resources are found and the specialist determines that they are or may be significant, the halting or redirection of construction shall remain in effect until:

- the designated cultural resources specialist has notified the CPM of the find and the work stoppage;
- the specialist, the project owner, and the CPM have conferred and determined what, if any, data recovery or other mitigation is needed; and
- Any necessary data recovery and mitigation has been completed.

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

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

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

Verification: Thirty (30) days prior to the start of construction, the project owner shall provide the CPM with a letter confirming that the designated cultural resources specialist and delegated monitor(s) have the authority to halt construction activities in the vicinity of a cultural resource find.

For any cultural resource encountered that the specialist determines is or may be significant, the project owner shall notify the CPM as soon as possible.

For any cultural resource encountered that the specialist determines is not significant, the project owner shall notify the CPM within 72 hours after the find.

CUL-7 Prior to the start of construction and each week throughout project construction (the period involving any ground disturbing activities, including landscaping), the project owner shall provide the designated cultural resource specialist with a current schedule of anticipated project activity in the following month and a map indicating the area(s) where the construction activities will occur. The designated cultural resources specialist shall

consult daily with the project superintendent or construction field manager to confirm the area(s) to be worked on the next day(s).

Verification: Ten (10) days prior to the start of construction and in each Monthly Compliance Report thereafter, the project owner shall provide the CPM with a copies of the weekly schedule of the construction activities, as well as maps, showing where construction activity was to take place. The project owner shall notify the CPM when all ground disturbing activities, including landscaping, are completed.

CUL-8 Throughout the pre-construction reconnaissance surveys and the construction monitoring and mitigation phases of the project, the designated cultural resources specialist and delegated monitor(s) shall keep a daily log of any resource finds and the progress or status of the resource monitoring, mitigation, preparation, identification, and analytical work being conducted for the project. The daily logs shall indicate by tenths of a post mile, where and when monitoring has taken place, where monitoring has been deemed unnecessary, and where cultural resources were found.

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

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

Verification: Throughout the project construction period, the project owner shall ensure that the daily log(s) and the weekly summary reports prepared by the designated cultural resource specialist and delegated monitor(s) are available for periodic audit by the CPM. Upon request by the CPM, the project owner shall provide specified weekly summary reports to the CPM.

CUL-9 The designated cultural resource specialist or delegated monitor(s) shall be present at times the specialist deems appropriate to monitor construction-related grading, excavation, trenching, and/or augering in the vicinity of previously recorded archaeological sites and in areas where cultural resources have been identified.

Protocol: If the designated cultural resource specialist determines that full-time monitoring is not necessary in certain portions of the project area or along portions of the linear facility routes, the designated specialist shall notify the project owner of the changes. The designated cultural resource specialist shall use milepost markers and boundary stakes placed by the project owner to identify areas where monitoring is being reduced or is no longer deemed necessary.

Verification: Throughout the project construction period the project owner shall include in the Monthly Compliance Reports to the CPM copies of the weekly summary reports prepared by the designated cultural resource specialist regarding project-related cultural resource monitoring.

CUL-10 The project owner shall ensure that the designated cultural resource specialist obtains and maintains a current BLM Archaeological Resource Use Permit to gain access to lands managed by the US BLM or other federal agencies, to conduct any surveys, monitoring, data and/or artifact recovery activities on these lands. This use permit is to be obtained from the area office of the BLM in Bakersfield, California, no less than ten (10) days prior to the start of cultural resource activities governed by the permit.

Verification: The project owner shall provide the CPM and the designated BLM representative(s) with a copy of the BLM archaeological resource use permit received by the designated cultural resource specialist, in the next Monthly Compliance Report following its receipt or renewal.

CUL-11 The project owner shall ensure that the designated cultural resource specialist meets the professional qualifications specified by the BLM; that the Cultural Resources Monitoring and Mitigation Plan prepared per Energy Commission Condition CUL-5, also reflects BLM requirements for a Archaeological Resource Treatment Plan; and that all surveys, monitoring, and data and/or artifact recovery activities implemented during the construction and operation of the HDPP project, meet the requirements of the BLM and the Energy Commission.

Verification: The project owner shall concurrently provide the designated BLM representative(s) with copies of all information submitted to the CPM in response to Energy Commission conditions of certification. The project owner shall provide the CPM with current copies of BLM permit conditions and requirements; the criteria and requirements for the designation of a cultural resource specialist; the contents of its Archaeological Resource Treatment Plan; and any other requirements pertinent to the protection of cultural resources potentially affected by the HDPP project. In each Monthly Compliance Report, the project owner shall provide the CPM with a summary outlining the measures it has taken to ensure that it has met both BLM and Energy Commission requirements.

CUL-12 The project owner shall ensure that the designated cultural resource specialist performs the recovery, preparation for analysis, analysis, preparation for curation, and delivery for curation of all cultural resource materials encountered and collected during pre-construction surveys and during the monitoring, data recovery, mapping, and mitigation activities related to the project.

Verification: The project owner shall maintain in its compliance files, copies of signed contracts or agreements with the museum(s), university(ies), or other appropriate research specialists which will ensure the necessary recovery, preparation for analysis, and analysis of cultural resource materials collected during data recovery and mitigation for the project. The project owner shall maintain these files for the life of the project and the files shall be kept available for periodic audit by the CPM. Information as to the specific location of sensitive cultural resource site shall be kept confidential and accessible only to qualified cultural resource specialists.

CUL-13 Following completion of data recovery and site mitigation work the project owner shall ensure that the designated cultural resources specialist prepares a proposed scope of work for the Cultural Resources Report. The project owner shall submit the proposed scope of work to the CPM for review and written approval.

Protocol: The proposed scope of work shall include (but not be limited to):

a. A discussion of any analysis to be conducted on recovered cultural resource materials;
b. discussion of possible results and findings;
c. proposed research questions which may be answered or raised by analysis of the data recovered from the project; and
d. An estimate of the time needed to complete the analysis of recovered cultural resource materials and prepare the Cultural Resources Report.

Verification: The project owner shall ensure that the designated cultural resources specialist prepares the proposed scope of work within ninety (90) days following completion of the data recovery and site mitigation work. Within seven (7) days after completion of the proposed scope of work, the project owner shall submit it to the CPM for review and written approval.

CUL-14 The project owner shall ensure that the designated cultural resources specialist prepares a Cultural Resources Report. The project owner shall submit the report to the CPM for review and written approval.

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

a. For all projects:

- A description of pre-project literature search, surveys, and any testing activities;
- maps of showing areas surveyed or tested;
- a description of any monitoring activities;
- maps of any areas monitored; and
- conclusions and recommendations.

b. For projects in which cultural resources were encountered, include the items specified under “a” and also provide:

- site and isolate records and maps;
- a description of testing for, and determinations of, significance and potential eligibility; and
- a discussion of the research questions answered or raised by the data from the project.

c. For projects regarding which cultural resources were recovered, include the items specified under “a” and “b” and also provide:

- A descriptions (including drawings and/or photos) of recovered cultural materials;
- results and findings of any special analyses conducted on recovered cultural resource materials;
- an inventory list of recovered cultural resource materials; and
- The name and location of the public repository receiving the recovered cultural resources for curation.

Verification: The project owner shall ensure that the designated cultural resources specialists completes the Cultural Resources Report within ninety (90) days following completion of the analysis of the recovered cultural materials. Within seven (7) days after completion of the report, the project owner shall submit the Cultural Resources Report to the CPM for review and written approval.

CUL-15 The project owner shall submit an original, an original-quality copy, or a computer disc copy of the CPM-approved Cultural Resource Report to the public repository to receive the recovered data and materials for curation, to the SHPO, and to the appropriate regional archaeological information center(s). If the report is submitted to any of these entities on a computer disc, the disc files must meet SHPO requirements for format and content.

Protocol: The copies of the Cultural Resource Report to be sent to the curating repository, the SHPO, and the regional information center(s) shall include the following (based on the applicable scenario (a, b, or c) set forth in the previous condition):

a. originals or original-quality copies of all text;
b. originals of any topographic maps showing site and resource locations;
c. originals or original-quality copies of drawings of significant or diagnostic cultural resource materials found during pre-construction surveys or during project-related monitoring, data recovery, or mitigation; and
d. Photographs of the site(s) and the various cultural resource materials recovered during project monitoring and mitigation and subjected to post-recovery analysis and evaluation. The project owner shall provide the curating repository with a set of negatives for all of the photographs.

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

For the life of the project the project owner shall maintain in its compliance files copies of all documentation related to the filing of the CPM-approved Cultural Resources Report with the public repository receiving the recovered data and

materials for curation, the SHPO, and the appropriate archaeological information center(s).

CUL-16 Following the filing of the CPM-approved Cultural Resource Report with the appropriate entities, the project owner shall ensure that all cultural resource materials, maps and data collected during data recovery and mitigation for the project are delivered to a public repository that meets the US Secretary of Interior requirements for the curation of cultural resources. The project owner shall pay any fees for curation required by the repository.

Verification: The project owner shall ensure that all recovered cultural resource materials are delivered for curation within thirty (30) days after providing the CPM-approved Cultural Resource Report to the public repository receiving the recovered data and materials, to the SHPO, and to the appropriate archaeological information center(s).

For the life of the project the project owner shall maintain in its project history or compliance files, copies of signed contracts or agreements with the public repository to which the project owner has delivered for curation all cultural resource materials collected during data recovery and mitigation for the project.

CUL-17 Prior to final design, during the "spotting" of potential locations for the electric transmission poles along Route B, between MP 5 and MP 6, and from MP19 to MP 25, the project owner shall do the following:

1. Spot the pole locations and design the transmission line, in the area between MP 5 and MP 6, to span sensitive cultural resource site areas or design the system to enter the existing Midway-Sunset facility without the installation of transmission line poles.

2. In the areas between MP 5 to MP 6 and MP 19 to MP 25: if it is not possible to span potential cultural resource sites, the cultural resource specialist will survey each area where the ground may be disturbed by transmission pole construction. The survey will determine whether the site represents potentially significant cultural resources, with intact stratigraphy, or dispersed scatters not regarded as scientifically significant.

3. To determine the presence or absence of cultural resources, the cultural resources specialist will conduct a detailed surface examination of an area 100 feet in diameter around the pole site. If cultural materials are determined to be present, the designated cultural resource specialist will conduct an excavation at the center of the pole site. The preferred means of excavation will include a hand excavation 1-meter by 1- meter using archaeological methods and techniques. However, if deemed appropriate by the cultural resource specialist, the excavation may be conducted using auger or backhoe.

4. If sensitive cultural resources are located in situ, the pole site shall be moved to a new location where there are no sensitive cultural resources present. If it is not possible to move the pole site, the designated cultural resources specialist will apply the mitigation measures outlined previously in these conditions.

5. At the discretion of the designated cultural resource specialist, in areas where human remains may be unearthed, a representative of the Native American Community shall be requested to be on site during excavations and earth disturbing activities.

Verification: The project owners shall include information about the activities related to this condition in the summary of the designated cultural resource specialist's daily log submitted to the CPM.

REFERENCES

CEC (California Energy Commission) 1999z. Summary of the March 10, 1999 Data Request Meeting (Attachment Proof of Service). Submitted to the Meeting Attendees and the California Energy Commission on April 6, 1999.

CEC (California Energy Commission). 1999ee. Summary of May 11, 1999 Data Response Workshop. Submitted to the Meeting Attendees on May 18, 1999.

CEC (California Energy Commission). 1999ff. Summary of the April 22, 1999, Data response Workshop. Submitted to the Meeting Attendees on May 18, 1999.

CEC (Califonia Energy Commission). 1999**. Preliminary Staff Assessment, published on July **, 1999.

Christian, Duane. 1998a. Telephone conversation between Duane Christian, archaeologist for US Bureau of Land Management, Caliente Area office in Bakersfield, and Kathryn Matthews, Energy Commission cultural resources staff. August 27, 1998.

Christian, Duane. 1999a. Telephone conversation between Duane Christian, archaeologist for US Bureau of Land Management, Caliente Area office in Bakersfield, and Kathryn Matthews, Energy Commission cultural resources staff. September 10, 1999.

Christian, Duane. 1999b. Telephone conversation between Duane Christian, archaeologist for US Bureau of Land Management, Caliente Area office in Bakersfield, and Kathryn Matthews, Energy Commission cultural resources staff. September 15, 1999.

DOG (California Resources Agency, Division of Oil and Gas). 1998. Permit to Conduct Well Operations, well # 3541, located in the Midway-Sunset Oil Field, Section 21, T31S, R22E, Fellows 7.5-minute USGS map sheet. April 15, 1998.

DOG (California Resources Agency, Division of Oil and Gas). 1999. Permit to Conduct Well Operations, well # 3645, located in the Midway-Sunset Oil Field, Ssection 21, T31S, R22E, Fellows 7.5-minute USGS map sheet. February 10, 1998.

Forrest, Suzanne (Forrest). 1999. Report of Conversation (ROC) between Suzanne Forrest, Associate Planner, Kern County and Dorothy Torres, Energy Commission staff; March 31, 1999.

Grant, Campbell (Grant). 1978. “Chumash: Introduction” and “Interior Chumash”, in Handbook of North American Indians, Volume 8, California, edited by

Robert F. Heizer; published by the Smithsonian Institution, Washington, DC, 1978.

James, Ted (James). 1999. Telephone conversation between Ted James, Planner, Kern County and Kathryn Matthews, Energy Commission cultural resources staff. September 28, 1999.

LPGP (La Paloma Generating Project) 1998a. Application for Certification, for the La Paloma Generating Project (98-AFC-2). Submitted to the California Energy Commission, August 12, 1998.

LPGP (La Paloma Generating Project) 1998e. Cultural Resources Technical Report for the La Paloma Generating Project, Appendix L (Confidential) Submitted to the California Energy Commission, dated July 10, 1998.

Mitchell, David (Mitchell). 1999. Telephone conversation between David Mitchell, Supervisor of Environmental Review, Kern County Planning Dept and Kathryn Matthews, Energy Commission cultural resources staff. September 28, 1999.

Pacific (Pacific Legacy, Inc/King, J., Jackson, T.) 1998a. Cultural Resources Inventory for the Proposed Texaco Sunrise Cogeneration and Power Project. Study for Radian International. Submitted to the California Energy Commission, December 21, 1998.

Pacific (Pacific Legacy, Inc. Jackson, Thomas). 1998b. Archaeological reconnaissance for proposed Texaco Sunrise-Valley Acres substation sites in Section 35 (preferred) and Section 34 (alternate). Memorandum to David Stein, Radian International. Submitted to the California Energy Commission, December 21, 1998.

Pacific (Pacific Legacy/Jackson, Thomas L., Ph.D. and Shapiro, William A., MA) 1999c Cultural Resources Inventory for the Proposed Texaco Sunrise Cogeneration and Power Project: Addendum for Route B and Valley Acres Substation Surveys. Submitted to Radian International, Attn: David Stein. Submitted to the California Energy Commission, June 4, 1999.

SCPP(Sunrise Cogeneration and Power Project) 1998a. Application for Certification, Sunrise Cogeneration and Power Company (98-AFC-4). Submitted to the California Energy Commission, December 21, 1998.

SCPP (Sunrise Cogeneration and Power Project)/Soares/King) 1999b. Supplementary AFC Material in Response to Data Adequacy Worksheets. Submitted to the California Energy Commission on January 28, 1999.

SCPP (Sunrise Cogeneration and Power Project/King) 1999e Data Responses SET ONE Submitted to California Energy Commission on March 31, 1999.

SCPP (Sunrise Cogeneration and Power Project/King) 1999g Data Responses, Set 1A. Submitted to the California Energy Commission on April 15, 1999.

SCPP (Sunrise Cogeneration and Power Project) 1999h. Data Responses, Set 1B (Attachment Proof of Service). Submitted to the California Energy Commission on April 30, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999k. Transmission Alternatives, Supplement Two. Submitted to the California Energy Commission on May 21, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999m. Transmission Supplemental 2; Sections 3.0 and 4.0; remaining Appendices and Errata. Submitted to the California Energy Commission on June 4, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999n. Data Responses-Set 2. Submitted to the California Energy Commission on June 15, 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999q. Responses to California Energy Staff questions during June 14, 1999 Workshop. Submitted to the California Energy Commission on June 30, 1999.

BLM (United States Dept of the Interior, Bureau of Land Management). 1981a. Archaeological Reconnaissance Report Form for Oil and Gas lease # SAC 019382; Midway-Sunset Oil Field, Section 22 (all but southwesterly quarter), Township 31S, Range 22E, Fellows 7.5-minute USGS map sheet. July 1981.

BLM (United States Dept of the Interior, Bureau of Land Management). 1981b. Archaeological Reconnaissance Report Form for Oil and Gas lease # SAC 019392; Midway-Sunset Oil Field, Section 27 (80ac), Township 31S, Range 22E, Fellows 7.5-minute USGS map sheet. July 1981.

BLM (United States Dept of the Interior, Bureau of Land Management). 1981c. Archaeological Reconnaissance Report Form for Oil and Gas lease # SAC 020997; Midway-Sunset Oil Field, Section 27 (south half and northeast quarter), Township 31S, Range 22E, Fellows 7.5-minute USGS map sheet. July 1981.

BLM (United States Dept of the Interior, Bureau of Land Management). 1981d. Archaeological Reconnaissance Report Form for Oil and Gas lease # SAC 019381A; Midway-Sunset Oil Field, Section 27 (westerly half), Township 31S, Range 22E, Fellows 7.5-minute USGS map sheet. August 10, 1981.

BLM (United States Dept of the Interior, Bureau of Land Management). 1996a. Caliente Resource Area, Proposed Resource Management Plan; signed by California State Director of BLM, Ed Hastey, on December 3, 1996.

BLM (United States Dept of the Interior, Bureau of Land Management). 1996b. Caliente Resource Area, Final Environmental Impact Statement for the Proposed Resource Management Plan; signed by California State Director of BLM, Ed Hastey, on December 3, 1996.

BLM (United States Dept of the Interior, Bureau of Land Management). 1998a. Well Drilling Permit for Oil and Gas lease # SAC 019382; Midway-Sunset Oil Field, Section 22, Township 31S, Range 22E, Fellows 7.5-minute USGS map sheet. August 1998.

BLM (United States Dept of the Interior, Bureau of Land Management). 1998b. Permit for Construction of a 600-foot Steam Pipeline, on Oil and Gas lease # SAC 019382; Midway-Sunset Oil Field, Section 22, Township 31S, Range 22E, Fellows 7.5-minute USGS map sheet. October 1999.

BLM (United States Dept of the Interior, Bureau of Land Management). 1998c Permit for Construction of a 5,280-foot Steam Pipeline, on Oil and Gas lease # SAC 019382; Midway-Sunset Oil Field, Section 22, Township 31S, Range 22E, Fellows 7.5-minute USGS map sheet. October 1999.

WASTE MANAGEMENT

Testimony of Michael Ringer

INTRODUCTION

This section analyzes potential issues associated with managing wastes generated from constructing and operating the Sunrise Cogeneration and Power Project (SCPP). It evaluates 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, except wastewaters. Such wastewaters are discussed in the Soil and Water Resources section of this document.

Energy Commission staff's primary concerns 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 constructing and operating the proposed project will be managed in an environmentally safe manner; and

- 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. SECTION 6921 ET SEQ.)

The Resource Conservation and Recovery Act (RCRA) establishes requirements for the management of hazardous wastes from the time of generation to the point of ultimate treatment or disposal. Section 6922 requires generators of hazardous waste to comply with requirements regarding:

- record keeping practices which identify quantities of hazardous wastes generated and their disposition,

- labeling practices and use of appropriate containers,

- use of a manifest system for transportation to permitted treatment, storage, or disposal facilities, and

- submission of periodic reports to the U.S. Environmental Protection Agency (EPA) or authorized state agency.

TITLE 40, CODE OF FEDERAL REGULATIONS, PART 260

These sections contain regulations promulgated by the EPA to implement the requirements of RCRA as described above. Characteristics of hazardous waste are described in terms of ignitability, corrosivity, reactivity, and toxicity. Specific types of wastes are also listed.

STATE

CALIFORNIA HEALTH AND SAFETY CODE, SECTION 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 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, SECTION 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, SECTION 66262.10 ET SEQ. (GENERATOR STANDARDS)

These sections establish requirements for generators of hazardous waste. Waste generators must determine if their wastes are hazardous according to specified characteristics or lists of hazardous 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, generators must use registered hazardous waste transporters for any offsite shipments. Requirements are also established for record keeping, reporting, packaging, and labeling of hazardous wastes, use of containers and tanks for hazardous waste storage, and limiting the amount of time that hazardous waste can be stored onsite.

LOCAL

KERN COUNTY GENERAL PLAN PUBLIC FACILITIES ELEMENT

All generators and processors of hazardous waste are encouraged to develop long-term waste management programs. Large generators of hazardous waste should

be encouraged to recycle, treat and detoxify their wastes on site. Many such processes could be implemented in existing industrial map designations, if zoned appropriately (Policy No. 17).

SETTING

PROJECT AND SITE DESCRIPTION

The project would be located on approximately 16 acres of land within the Midway-Sunset oil field, a heavily developed area used by Texaco California, Inc. and other petroleum companies for natural gas and oil production. Numerous petroleum recovery and storage facilities, electric and petroleum transmission facilities, and access roads exist in the area. Please see the Project Description section for a more detailed description of the project and site.

To determine the potential for soil or groundwater contamination at the site, Dames & Moore consultants performed a Phase I Environmental Site Assessment (ESA) for an 80-acre parcel containing the site in accordance with the American Society for Testing and Materials practice E 1527-97 (Dames & Moore 1998). About 90 percent of the property is open, unoccupied rangeland covered with dry grass and scrub vegetation. Two inactive above-ground storage tanks lie just north of the project site. Outside the northeast corner of the site is a storage and recycling area containing debris, such as piping, wire, filters, concrete rubble, empty storage tanks, and recyclable materials, such as scrap metal, wood, paper, plastic, and tires. Approximately 15 active and inactive oil wells are located on the site. In the southwest corner of the property are three newly drilled oil wells and associated sumps. The north central portion of the site has an equipment storage and staging area which contains concrete rubble and soil piles, some of which exhibit oil staining. In addition to the soil piles, stained soil was observed at a number of locations, including several of the oil production wells and in the bottom of the main drainage channel that transects the site.

The ESA concluded that certain features of the site are indicative of a potential to adversely affect soil, but are typical of petroleum production properties. These include sumps used for containment of drilling fluid and wastes used during drilling operations and occasional leakage commonly associated with petroleum pipelines. While three sumps associated with new wells in the southwest corner of the site were identified, sumps related to other wells were no longer evident and residual drilling wastes may still be present. The ESA further concluded that oil impacted soil will likely be encountered during earthwork activities relating to facility construction and that buried pipelines in the area (whose locations are currently unknown) could be sources of further contamination. The ESA recommended establishing a contingency plan to provide for (1) testing subsurface soils prior to construction to locate and quantify contaminated soil and (2) properly managing such soils encountered during construction. Staff recommends that such a contingency plan be included as part of the waste management plan referred to in proposed condition of certification **WASTE-3**. Sunrise has recently commissioned a Phase II ESA for the site. However, since the nature and extent of contaminated

soil which may be encountered will remain somewhat uncertain, even after soil testing, staff further recommends that a certified environmental professional be available to provide guidance in the event that contaminated soil is encountered during project construction (see proposed condition of certification **WASTE-4**).

IMPACTS

DIRECT EFFECTS

TEMPORARY EFFECTS

Construction of the powerplant and appurtenant facilities will generate both hazardous and nonhazardous wastes. Nonhazardous wastes include debris from site grading and excavation, and miscellaneous materials such as paper, wood, glass, plastics, excess concrete, scrap metal, insulation, empty containers, and electrical wiring waste. The Sunrise Cogeneration and Power Company (SCPC) estimates that approximately 40 cubic yards of these materials will be generated on a weekly basis during construction (SCPP 1998a, AFC p. 8.13-3). Recycling of scrap metal, copper wire, empty containers, and absorbent materials will total about 20 cubic yards every two to three weeks. Wastes that cannot be recycled will be disposed of at a Class II or III (nonhazardous) landfill.

Hazardous wastes from construction include waste oil and grease, paint, spent solvent, welding materials, contaminated soil, and cleanup materials from spills of hazardous substances. These wastes will be temporarily stored onsite in containers prior to transportation via a licensed hauler to a recycling or disposal facility (SCPP 1998a, AFC p. 8.13-4). Table 8.13-1 of the Application for Certification lists construction-related hazardous wastes and the quantity that SCPC expects will be generated.

Additional wastes will also be generated when contaminated soils are encountered during site preparation or linear facility construction. As noted above, some areas of soil have been observed to be stained with oil during the Phase I ESA, and there is a potential for underground pipelines to have leaked, or to leak if disturbed. Quantities of soil that will have to be removed will depend on the amount of contaminated soils encountered.

Staff concludes that there will be no significant waste management related impacts because all wastes will be handled in an environmentally safe manner.

PERMANENT EFFECTS

Permanent direct effects result from operation of the proposed power plant. Under normal operating conditions, the Sunrise project will generate both nonhazardous and hazardous wastes.

Nonhazardous wastes generated during plant operation include trash, office wastes, empty containers, broken or used parts, used packing material, and used filters. On

a daily basis, the quantities of other nonhazardous wastes generated from gas-fired facilities such as the Sunrise project are typically minor, on the order of a few cubic yards or less, with some of the material being recyclable. Nonhazardous waste will be recycled where practical and the remainder disposed of to a Class III (nonhazardous) landfill (SCPP 1998a, AFC p. 8.13-6).

Hazardous wastes generated during routine project operation include cleaning solutions, spent air pollution control catalyst, used lubricating oil, sandblast media, used cleaning solvents, waste paint and thinner, natural gas filters, lead-acid batteries, contaminated cleanup materials, and empty chemical containers. AFC Table 8.13-3 describes the hazardous wastes expected to be generated during facility operation and their quantities.

Some of the hazardous wastes can be recycled, such as used oil or waste paint. Spent air pollution control catalyst is typically returned to the manufacturer for refurbishment or disposal. Wastes will be temporarily stored on site in appropriate containers prior to transportation by a licensed hauler to a recycling or Class I treatment, storage, or disposal facility (SCPP 1998a, AFC p. 8.13-6).

Used containers of hazardous substances, such as chemical containers or oil filters may be classified as hazardous wastes. However, if managed according to certain regulatory guidelines, such containers may be managed as nonhazardous (Cal. Code Regs., tit. 22, sec. 66261.7, 66266.130).

Staff concludes that there will be no significant waste management related impacts because all wastes will be handled in an environmentally safe manner.

Impact on Existing Waste Disposal Facilities

Nonhazardous waste, which cannot be recycled, will be disposed of at one of four Class III landfills owned and operated by the Kern County Waste Management Department (SCPP 1998a, AFC p. 8.13-10). Cumulatively, the landfills have remaining disposal capacities totaling over 18 million cubic yards and estimated closure dates up to 2076. Even discounting the effects of recycling on the total amount of nonhazardous wastes destined for landfilling, staff concludes that the amount of such wastes generated during project construction and operation are insignificant relative to existing disposal capacity, and would not meaningfully impact landfill operations.

Three Class I landfills in California are permitted to accept hazardous waste: Chemical Waste Management's Kettleman Hills facility and Safety-Kleen Environmental Service's landfills in Buttonwillow in Kern County and Westmoreland in Imperial County. In total, there is in excess of twenty million cubic yards of remaining hazardous waste disposal capacity in California with remaining lifetimes as long as 90 years.

Much of the hazardous waste generated during facility construction and operation will be recycled, such as used oil and spent catalyst. Even without recycling, the

generation of hazardous waste from this facility would be minor and would not significantly impact the capacity of any of the above Class I landfills.

INDIRECT EFFECTS

TEMPORARY EFFECTS

Indirect temporary effects are associated with the construction of new injection and production wells that may be served by the SCPP. TCI expects to drill approximately 700 new wells through the year 2004 (SCPP 1999n, p. 9). About the same number of new wells were also drilled in 1998 (SCPP 1998a, AFC p. 2-44). Staff expects that the estimated quantities and types of wastes associated with the construction of new wells will be similar to those generated from the new wells which were drilled in 1998. In response to Energy Commission staff data requests, SCPC has provided a listing of hazardous and nonhazardous wastes, by type, which were shipped offsite in 1998 (SCPP 1999n, p. 14). The quantities of wastes generated and shipped offsite in 1998 were a minor fraction of existing permitted disposal capacity for both hazardous and nonhazardous wastes, and were managed in an environmentally safe manner. Staff, therefore, does not consider the potential impacts on waste management facilities from new wells to be significant.

PERMANENT EFFECTS

Indirect permanent effects are associated with the operation of new injection and production wells that may be served by the SCPP. As noted above, SCPP estimates that about 700 new wells will be drilled by 2004. The summary of wastes shipped offsite from the Midway-Sunset in 1997-98 referred to above also includes wastes generated from existing wells. Since the amounts of waste generated in each year were significantly less than existing permitted disposal capacity, permanent waste management effects from operation of new wells will also be less than significant.

CUMULATIVE IMPACTS

Cumulative waste management impacts include those both temporary and permanent in nature. Temporary impacts include those associated with construction and operation of projects of similar size, nature, and impacts, including La Paloma, Elk Hills, and Midway-Sunset, and construction of the natural gas pipeline and transmission lines. Permanent effects include those from operation of the facilities listed above as well as overall expansion of the Midway-Sunset oilfield and operation of the TCI Main Utility Corridor and interconnecting natural gas pipeline. Due to the very minor amounts of wastes which will be generated during construction and operation of each of these projects, the insignificant impacts on individual disposal facilities, and the availability of additional regional landfills, both temporary and permanent cumulative impacts will be insignificant for both hazardous and nonhazardous wastes.

FACILITY CLOSURE

During any type of facility closure (see staff's General Conditions section which discusses planned, unexpected temporary, and unexpected permanent closure), the primary waste management related concern is that project wastes not pose any potentially significant problem to the public, workers, or the environment. Staff believes that conditions of certification in the General Conditions section will adequately address waste management issues related to closure.

In the case of unexpected temporary closure, waste management practices normally required by LORS and already in-place (such as limiting hazardous waste accumulation time to 90 days and requiring proper containment) would likely 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 stated 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, SCPP is required to develop a facility closure plan at least twelve months prior to commencement of closure and is committed to complying with LORS which are applicable at the time of closure (SCPP 1998a, AFC p. 4-3).

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Applicable LORS require the applicant to dispose of hazardous and non-hazardous wastes at facilities approved by the Central Valley Regional Water Quality Control Board or the Cal EPA - Department of Toxic Substances Control. Because hazardous wastes will be produced during project construction and operation, SCPC must acquire and maintain an EPA identification number as a hazardous waste generator. State and federal law also require SCPC to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, and keep detailed records. Pursuant to California Code of Regulations, Title 22, section 67100.1 et seq., a hazardous waste source reduction and management review may be required, depending on the amounts of hazardous waste ultimately generated.

Energy Commission staff concludes that SCPC will be able to comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during project construction and operation.

MITIGATION

The Applicant intends to implement the following mitigation measures during construction and operation of the proposed cogeneration project:

- Hazardous and nonhazardous wastes will be recycled where possible (SCPP 1998a, AFC p. 8.13-14).

- Waste management and handling will follow the hierarchy of waste reduction set forth in Public Resources Code section 40000 et seq.: source reduction, waste recycling, and waste disposal (SCPP 1998a, AFC p. 8.13-14).

Energy Commission staff has examined the mitigation measures proposed by the applicant and concluded that these measures, together with applicable LORS, will adequately assure that no significant environmental impacts will result from the management and disposal of project-related waste.

In the project application phase, certain details concerning plant construction and operation remain to be finalized, including specific methods of waste management. SCPC has proposed general methods of managing project related wastes, which staff concludes are adequate to prevent significant environmental impacts. However, staff will propose that SCPC prepare a waste management plan which will specify how project wastes will be managed once all details of plant operation are determined (see proposed condition of certification **WASTE-3**).

CONCLUSIONS AND RECOMMENDATIONS

Energy Commission staff concludes that management of the wastes generated during construction and operation of the Sunrise project will not result in any significant adverse impacts if SCPC implements the mitigation measures proposed in the Application for Certification (98-AFC-4), the additional measure proposed by staff, and the proposed conditions of certification.

Staff recommends that if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, or other signs, SCPC have an environmental professional (as defined by American Society for Testing and Materials practice E 1527-97 Standard Practice for Phase I Environmental Site Assessments) determine the need for sampling to confirm the nature and extent of contamination. If significant remediation may be required, SCPC should also contact representatives of the Kern County Environmental Health Services Department and the Sacramento regional office of the Cal EPA Department of Toxic Substances Control for possible oversight.

CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall obtain a hazardous waste generator identification number from the Cal EPA 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-2 The project owner, upon becoming aware of any waste management-related enforcement action taken or proposed to be taken against it, or against any waste hauler or disposal facility or treatment operator with which it contracts, shall notify the CPM.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action.

WASTE-3 Prior to the start of both construction and operation, the project owner shall prepare and submit to the CPM a waste management plan, including revisions based on the CPM's comments, for all wastes generated during construction and operation of the facility, respectively. The plans shall contain, at a minimum, the following:

- A description of all waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Methods of managing each waste, including treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

Verification: No less than 60 days prior to the start of construction, or a lesser time as mutually agreed upon by the project owner and the CPM, the project owner shall submit the construction waste management plan to the CPM for review. The operation waste management plan shall be submitted no less than 60 days prior to the start of project operation, or a lesser time as mutually agreed upon by the project owner and CPM. The project owner shall submit any required revisions within 30 days of notification by the CPM (or mutually agreed upon date). In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year compared to planned management methods.

WASTE-4 The project owner shall have an environmental professional (as defined by American Society for Testing and Materials practice E 1527-97 Standard Practice for Phase I environmental Site Assessments) available during soil excavation activities. The environmental professional shall advise the Construction Manager on identifying potentially contaminated soils. The Construction Manager will contact the environmental professional if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, or other signs. Prior to any further construction activity at that location, the environmental professional 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 stating the recommended course of action. If, in the opinion of the environmental professional, significant remediation may be required, the project owner shall contact representatives of the Kern County Environmental Health Services Department and the Sacramento regional office of the Cal EPA Department of Toxic Substances Control for guidance and possible oversight.

Verification: The project owner shall notify the CPM in writing within 5 days of any reports filed by the environmental professional, and indicate if any substantive issues have been raised.

REFERENCES

Dames & Moore. 1998. Phase I Environmental Site Assessment 80-Acre Oil Field Property, Western Kern County, California. December 7. (AFC Appendix G).

SCPP (Sunrise Cogeneration and Power Project) 1998a. Application for Certification, Sunrise Cogeneration and Power Company (98-AFC-4). Submitted to the California Energy Commission, December 21, 1998.

SCPP (Sunrise Cogeneration & Power Project) 1999n. Data Responses – Set 2. Submitted to the California Energy Commission on June 15, 1999.

BIOLOGICAL RESOURCES

Testimony of Rick York

INTRODUCTION

This section provides the Energy Commission staff's analysis of potential impacts to biological resources from the construction and operation of the Sunrise Cogeneration and Power Company's (SCPC) Sunrise Cogeneration and Power Project (SCPP). This analysis addresses potential impacts to state and federally listed species, species of special concern, wetlands, and other areas of critical biological concern. This analysis also describes the biological resources of the project site and at the locations of appurtenant facilities. It also determines the need for mitigation, the adequacy of mitigation proposed by the applicant, and where necessary, specifies additional mitigation measures to reduce identified impacts to less than significant levels. It also determines compliance with applicable laws, ordinances, regulations and standards (LORS), and recommends conditions of certification.

This analysis is based, in part, upon information provided in the Sunrise Application for Certification (AFC) (SCPP 1998a), workshops, staff data requests and applicant responses (SCPP 1999d and SCPP 1999n) site visits, and discussions with various agency representatives. It also includes information provided as recently as September, 1999.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL

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, prohibits the take of migratory birds.

STATE

CALIFORNIA ENDANGERED SPECIES ACT OF 1984

Fish and Game Code sections 2050 et seq. protects California's rare, threatened, 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 or 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 nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird.

Fully Protected Species

Fish and Game Code sections 3511, 4700, 5050, and 5515 prohibits 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.

Streambed Alteration Agreement

Fish and Game Code section 1600 et seq. requires CDFG to review project impacts to waterways, including impacts to vegetation and wildlife from sediment, diversions and other disturbances.

Native Plant Protection Act of 1977

Fish and Game Code section 1900 et seq. designates state rare, threatened, and endangered plants.

California Code of Regulations

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

LOCAL

Kern County General Plan Land Use, Open Space, and Conservation Elements of 1994

Section 8, Resources

Policy 14: Habitats of threatened and endangered species should be protected to the greatest extent possible.

Policy 12: The County should work closely with local, state, and federal agencies to assure that all projects, both discretionary and ministerial, avoid or minimize direct impacts to fish, wildlife and botanical resources, whenever practical.

Policy 13: The County should develop and implement measures which result in long-term compensation for wildlife habitat which is unavoidably damaged by energy exploration and development activities.

SETTING

REGIONAL DESCRIPTION

The proposed SCPP site is to be located on approximately 20 acres within the Midway-Sunset Oil Field, approximately 3 miles northwest of Fellows, California, in western Kern County.

The predominant vegetation type found in the project vicinity is valley saltbush scrub which is dominated by common saltbush (*Atriplex polycarpa*), spiny saltbush (*A. spinifera*), pale-leaf goldenbush (*Isocoma acradenia* var. *bracteata*), and a variety of non-native, annual grasses such as brome (*Bromus* spp.), foxtail (*Hordeum* spp.), and vulpia (*Vulpia* spp.). Other species found in the project area include native annual spring-flowering annuals such as white layia (*Layia glandulosa*) and bird's eye gilia (*Gilia tricolor*). Other native shrub species found in the project area include matchweed (*Gutierrezia californica*) and bladderpod (*Isomeris arborea*).

Also distributed throughout the entire project area are non-native grasslands. This vegetation type is dominated by non-native annual grasses such as brome, foxtail, and vulpia, with several species of spring-flowering, annual forbs such as gilia, lupine (*Lupinus* spp.), fiddleneck (*Amsinckia* spp.), filaree (*Erodium cicutarium*), and owl's-clover (*Castilleja* spp.).

The valley saltbush scrub and annual grasslands of western Kern County are home to a wide variety of birds, mammals, and reptiles. Common bird species include red-tailed hawks (*Buteo jamaicensis*) and western meadowlarks (*Sturnella neglecta*). Mammals often present include black-tailed hare (*Lepus californicus*), kangaroo rats (*Dipodomys* spp.), deer mouse (*Peromyscus maniculatus*), coyote (*Canis latrans*), bobcat (*Felis rufus*), and American badger (*Taxidae taxus*). Common amphibians and reptiles found in the region include western toad (*Bufo boreus*), side-blotched lizard *(Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), western rattlesnake (*Crotalus viridis*), and gopher snake (*Pituiphis melanoleucus*).

A wide variety of sensitive species are also known to occur in the project vicinity. Sensitive species are species that are either state or federally listed as rare, threatened, or endangered, or are state listed as Fully Protected, or state or federally

identified as a Species of Special Concern, or a plant species identified in the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California (CNPS 1994) or the California Natural Diversity Special Plants List (California Department of Fish and Game 1999). Sensitive species including the San Joaquin kit fox (*Vulpes macrotis mutica)*, giant kangaroo rat (*Dipodomys ingens*), San Joaquin antelope squirrel (*Ammospermophilus nelsoni*), blunt-nosed leopard lizard (*Gambelia sila*), Swainson's hawk (*Buteo swainsoni*), golden eagle (*Aquila chrysaetos*), California condor (*Gymnogyps californianus*), burrowing owl (*Athene cunicularia*), California jewelflower (*Caulanthus californicus*), Kern mallow (*Eremalche kernensis*), and Hoover's eriastrum (*Eriastrum hooveri*) are found in western Kern County.

For complete lists of vascular plants and wildlife seen while completing field surveys for the SCPP biological assessment, refer to Tables 8.2-9 and 8.2-10 respectively found in the Biological Resources section of the AFC (SCPP 1998a).

Refer to BIOLOGICAL RESOURCES Table 1 for a complete list of the sensitive biological resources associated with the region of the proposed project. Please see the Project Description section of this document for a more detailed description of the project site and setting.

SITE VICINITY DESCRIPTION

The SCPP will be located on a 16-acre site within a 20-acre parcel within the Midway-Sunset Oil Field. A complete list of plants and animal species seen during 1998 and 1999 field surveys completed for all proposed Sunrise project appurtenant facility can be found in AFC Appendix C - Biological Resources Assessment, Table 8.2-9, 10, & 11 (SCPP 1998a). The project is proposed for a region of California that contains many sensitive species, and Biological Resources Table 1 identifies those sensitive species:

BIOLOGICAL RESOURCES Table 1
- Sensitive Species -

Sensitive Plants	Status*
Forked fiddleneck (*Amsinckia vernicosa* var. *furcata*)	CNPS List 1B
California jewelflower (*Caulanthus californicus*)	CNPS List 1B/FE/SE
Slough thistle (*Cirsium crassicaule*)	CNPS List 1B
Gypsum-loving larkspur (*Delphinium gypsophilum* ssp. *gypsophilum*)	CNPS List 4
Recurved larkspur (*Delphinium recurvatum*)	CNPS List 1B
Hoover's eriastrum (*Eriastrum hooveri*)	CNPS List 1B/FT
Cottony buckwheat (*Eriogonum gossypinum*)	CNPS List 1B
Tejon poppy (*Eschscholzia lemmonii* ssp. *kernensis*)	CNPS List 1B
Kern mallow (*Eremalche parryi* ssp. *kernensis*)	CNPS List 1B/FE
Hollisteria (*Hollisteria lanata*)	CNPS List 1B
San Joaquin wooly threads (*Lembertia congdonii*)	CNPS List 1B/FE
Oil neststraw (*Stylocline citroleum*)	CNPS List 1B

Sensitive Wildlife	Status*
Tricolored blackbird (*Agelaius tricolor*)	SSC
LeConte's thrasher (*Toxostoma lecontei macmillanorum*)	SSC
California condor (*Gymnogyps californianus*)	SE/FE
Golden eagle (*Aquila chrysaetos*)	SC
Swainson's hawk (*Buteo swainsoni*)	ST
Long-eared owl (*Asio otus*)	SSC
Burrowing owl (*Athene cunicularia*)	SSC
Northern harrier (*Circus cyaneus*)	SSC
Yellow warbler (*Dendroica petechia*)	SSC
White-tailed kite (*Elanus caeruleus*)	FP
California horned lark (*Eremophila alpestris actia*)	SSC
Prairie falcon (*Falco mexicanus*)	SSC
Loggerhead shrike (*Lanius ludovicianus*)	SSC
Blunt-nosed leopard lizard (*Gambelia sila*)	SE/FE/FP
San Joaquin coachwhip (*Masticophis flagellum ruddocki*)	SSC
Western spadefoot toad (*Scaphiopus hammondii hammondii*)	SSC
Giant kangaroo rat (*Dipodomys ingens*)	SE/FE
Short-nosed kangaroo rat (*Dipodomys nitratoides brevinasus*)	SSC
Tulare grasshopper mouse (*Onychomys torridus tularensis*)	SSC
San Joaquin pocket mouse (*Perognathus inornatus inornatus*)	SSC
San Joaquin antelope squirrel (*Ammospermophilus nelsoni*)	ST
San Joaquin kit fox (*Vulpes macrotis mutica*)	ST/FE
American badger (*Taxidea taxus*)	SSC
Longhorn fairy shrimp (*Branchinecta longiantenna*)	FE
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FE
Vernal pool tadpole shrimp (*Lepidurus packardi*)	FT

* **Status legend:** CNPS List 1B = Plants rare or endangered in California and elsewhere (California Native Plant Society 1994), CNPS List 4 = Plants of Limited Distribution; SSC = Species of Special Concern (CDFG 1992), FE = Federally listed Endangered, FT = Federally listed Threatened, SE = State listed Endangered; ST = State listed Threatened and FP = State Fully Protected.

POWER PLANT SITE, LAYDOWN AREA & SUNRISE SWITCHYARD

The SCPP area contains a mixture of annual grasslands and some saltbush shrubs (*Atriplex* spp.). The power plant site and the surrounding region has a long history of oil development as evidenced by the presence of oil production wells, steam generators and steam lines and other oil field related facilities found in the project vicinity.

The annual grasslands and saltbush scrub vegetation types found in the vicinity of proposed power plant, laydown, and new Sunrise switching station is potential habitat for a variety of sensitive species including the San Joaquin kit fox, blunt-nosed leopard lizard, and the San Joaquin antelope squirrel. Construction of the power plant and use of the laydown area will permanently impact 12.4 acres and temporarily impact 13.8 acres. Construction of the Sunrise switching station will permanently impact 3.2 acres of annual grassland habitat.

TRANSMISSION LINE ALTERNATIVES

Route A, the original transmission line route identified in the AFC, was proposed to travel due east where it would connect with an existing transmission line at a new substation, the Valley Acres substation. At the Valley Acres substation the transmission line would tie into the existing 230 kV California Department of Water Resources (CDWR) transmission line and travel in a northerly direction and terminate at the PG&E Midway substation near Buttonwillow. On May 21, 1999, SCPC filed supplemental testimony (SCPP 1999k) that indicated that additional routes (Routes B, D, E, F) were being considered since the CDWR line did not appear to be available to SCPC on acceptable commercial terms. As a result, SCPC does not consider Route A to be the preferred transmission line interconnection route.

Since Route A is no longer a viable option, the preferred transmission line route is Route B. Route B would connect the SCPP directly to the PG&E Midway substation near Buttonwillow. Route B actually represents a corridor with three alternatives (Routes D, E, and F) utilizing what is identified as the Route B corridor. The alternatives consist of consolidating one or more transmission lines planned by other developers with the SCPP transmission line. Route D would connect the SCPP to a future Midway-Sunset Cogeneration Project (MSCC) switchyard, and then would connect MSCC and Midway with a joint-ownership transmission line. Route E would connect the SCPP and MSCC then would connect MSCC to the proposed La Paloma switchyard with a joint-ownership transmission line, and then would connect all parties to the Midway substation with a joint-ownership transmission line. Route F would connect the SCPP to the proposed La Paloma switchyard, and then would connect La Paloma and Midway with a joint-ownership transmission line.

Construction of any of the possible transmission line options has the potential to impact several sensitive species including the San Joaquin kit fox, blunt-nosed leopard lizard, San Joaquin antelope squirrel, various listed kangaroo rat species, and several sensitive plant species.

Along the transmission line corridor many seasonally wet depressions are known to occur. These depressions are not classified as vernal pools; however they may contain federally listed invertebrate species including the longhorn fairy shrimp (*Branchinecta longiantenna*), the vernal pool fairy shrimp (*Branchinecta lynchi*), and the vernal pool tadpole shrimp (*Lepidurus packardi*).

Field surveys for these species were completed for the La Paloma power plant project (98-AFC-2) during the spring of 1999 for the La Paloma transmission line route, and only the versatile fairy shrimp (*Branchinecta lindahli*), a common, non-federally listed

fairy shrimp species, was found (Arnold 1999). The SCPP transmission line Route B corridor includes the proposed La Paloma project transmission line route, so staff expects that the same common, non-listed species will be found associated with the SCPP Route B corridor.

As of June 30, 1999 (SCPP 1999k), the SCPP would, in the worst case (Route B), permanently impact 6.9 acres of privately owned habitat, temporarily impact 14.2 acres, temporarily impact 1.3 acres of conserved habitat, and permanently impact 3.5 acres of conserved habitat. These acreage impacts would be significantly lower if alternatives (Routes D, E, and F) are developed.

The Route B corridor crosses a 44,000-acre habitat conservation planning area identified as the Lokern Natural Area. The Lokern Natural Area contains two protected areas, the Lokern Preserve managed by the Center for Natural Lands Management (CNLM), a private habitat conservation organization, and the Lokern Ecological Reserve managed by the California Department of Fish and Game (CDFG). The Lokern Natural Area was first established as a high priority area for habitat conservation since it represents a rather large area of undisturbed habitat, which is home for the sensitive species known to occur in the region. Representatives of several public agencies and private landowners, including the Energy Commission, the Bureau of Land Management (BLM), CDFG, the U. S. Fish and Wildlife Service (USFWS), and CNLM work cooperatively as the Lokern Cooperative Group to protect and manage the publicly and privately owned lands within the Lokern Natural Area. Since there is extensive energy development in the region of the Lokern Natural Area, the Energy Commission is a signatory of the Memorandum-of-Understanding developed to help guide the management of the habitat contained in the Lokern Natural Area.

NATURAL GAS SUPPLY PIPELINE CORRIDOR

The natural gas supply pipeline for the proposed power plant will be roughly 60 feet long, and will tie into the existing Texaco California Inc. Main Utility Corridor. Construction of the SCPP natural gas pipeline will permanently impact 0.07 acres of saltbush scrub habitat. Loss of this habitat will affect sensitive species such as the San Joaquin kit fox and the blunt-nosed leopard lizard.

STEAM, FEEDWATER, FRESHWATER AND WASTEWATER PIPELINES

Since the SCPP will provide steam to enhance oil recovery efforts in the adjacent Midway-Sunset Oil Field, water and steam will be distributed in the immediate vicinity of the power plant. Construction of the steam, feedwater, and wastewater pipelines associated with the power plant will impact 1.4 acres of annual grassland habitat. In addition, construction of the freshwater supply pipeline will permanently impact 0.07 acres of annual grassland habitat. Loss of this habitat will affect sensitive species such as the San Joaquin kit fox, San Joaquin antelope squirrel, and the blunt-nosed leopard lizard.

ACCESS ROAD IMPROVEMENTS FOR POWER PLANT AND SWITCHYARD

Power plant and switching station access roads need to be constructed and improved which will result in the permanent loss of 3.5 acres of grassland habitat. Construction

of these access roads will permanently impact habitat utilized by sensitive species including the San Joaquin kit fox, the blunt-nosed leopard lizard, and the San Joaquin antelope squirrel.

NEW OIL PRODUCTION WELLS, STEAM INJECTION WELLS, STEAM LINES, IMPROVEMENTS TO THE PRODUCED WATER TREATMENT FACILITY & DIRT ACCESS ROADS

The SCPP power plant will produce approximately 120,000 barrels of steam per day for enhanced oil recovery in the Midway-Sunset oil field. This amount of steam is sufficient for roughly 2000 oil production wells and associated steam injection wells. Within the ¾-mile radius circle around the proposed power plant, which staff considers to be the sphere of influence of the steam produced by the power plant, roughly two-thirds (1300 wells) of the oil production wells and steam injection wells currently exist. In addition to these existing oil production wells and steam injection wells, roughly one-third (700 wells) will be new and are expected to be constructed.

Construction of these new oil production wells, steam injection lines and wells, and associated dirt access roads represent significant indirect impacts attributable to the SCPP. SCPC has provided information (SCPP 1999n) that helped staff calculate the amount of acreage (176.4 acres) that is expected to be permanently impacted as a result of the indirect impacts associated with the SCPP. This loss of habitat has the potential to affect sensitive species such as the San Joaquin kit fox, the blunt-nosed leopard lizard, and the San Joaquin antelope squirrel.

Improvements to the existing produced water treatment facilities will be necessary for the SCPP, however all improvements will occur within the existing 10-acre produced water treatment facility, so no new disturbance of additional habitat will occur (SCPP 1999n).

IMPACTS

PROJECT SPECIFIC DIRECT AND INDIRECT IMPACTS

In the CEQA Guidelines, direct impacts are defined as those impacts that are directly attributable to the project and occur at the same time and place. Indirect impacts are caused by the project, but can occur later in time or farther removed in distance, but are still reasonably foreseeable and related to the project.

During various workshops and site visits there have been several discussions between staff, SCPC, other agencies, and interveners about project scope. Staff and SCPC have reached an agreement on the project's scope that is contained in a document identified as a joint blueprint (CEC/SCPP 1999a). This document was submitted to the Energy Commission on May 21, 1999. This joint blueprint identifies what staff and SCPC believe are the project components that may result in direct, indirect, and cumulative impacts. The Sunrise Project Committee, in an order dated June 2, 1999 (CEC 1999uu), adopted the joint blueprint as the guiding document for the project scope and associated environmental analysis.

The proposed project may directly impact a variety of sensitive species known to occur in the project vicinity. However, SCPC has proposed a variety of sensitive species mitigation measures they intend to employ to minimize or totally avoid impacting individual sensitive species. A complete list of mitigation measures and implementation methods will be completed in consultation with the CDFG, BLM, and the USFWS and will be included in the project's Biological Resources Mitigation Implementation and Monitoring Plan. For more information about specific avoidance measures, see Biological Resources Conditions of Certification **BIO-1**, **BIO-5**, **BIO-6**, and **BIO-9**.

This project may also contribute to the fragmentation of habitat in the Midway-Sunset oil field. To address this issue, the applicant has indicated (SCPP 1999n) that they will minimize impacts to habitat and protect sensitive areas, including natural drainages and riparian corridors, and will meet all state and federal regulatory requirements. The applicant also intends to implement habitat restoration measures to lessen the project's temporary impacts to wildlife habitat.

It is staff's opinion that in spite of all the oil field development that is occurring in the Midway-Sunset oil field and that which will occur as part of this project, sensitive species such as the San Joaquin kit fox will continue to utilize this very disturbed habitat for denning and foraging. The San Joaquin kit fox and other sensitive species such as the San Joaquin antelope squirrel and the blunt-nosed leopard lizard currently are found in the Midway-Sunset oil field, and will continue to do so after this project is constructed and is operating. Thus, staff has recommended that a variety of mitigation measures be implemented to either minimize or totally avoid impacts to these and other sensitive species.

Loss of sensitive species habitat is the primary concern of staff since conversion of habitat by agricultural, industrial, and urban uses have eliminated these species from the majority of their historic range (USFWS 1998). Information provided by the applicant (SCPP 1999d and 1999f) and Radian (SCPP 1999k) in June 1999 helped quantify the SCPP direct and indirect, temporary and permanent, habitat acreage impacts. The following table **(Biological Resources Table 2)** identifies the SCPP acreage impacts to wildlife habitat.

BIOLOGICAL RESOURCES Table 2

DIRECT IMPACTS ACREAGES

Facility	Private lands (acres) Permanent	Private lands (acres) Temporary	Conserved lands (acres) Permanent	Conserved lands (acres) Temporary
Power plant/laydown area	12.4	13.8	--	--
Sunrise switchyard	3.2	--	--	--
Steam/feed/wastewater lines	1.4	--	--	--
Freshwater pipelines	0.07	--	--	--
Natural gas pipeline	0.07	--	--	--
Access road improvement	3.5	--	--	--
Worst case t-line Route B	7.0	14.2	1.3	3.5
IMPACT ACREAGE TOTALS	**27.5**	**28.0**	**1.3**	**3.5**

INDIRECT IMPACTS ACREAGE

Facility	Private lands (acres) Permanent Impact
700 new oil production wells & steam injection wells, steam lines & dirt roads	~~176.4~~ 177
IMPACT ACREAGE TOTAL	~~**176.4**~~ ~~**177**~~

Staff calculated the indirect acreage impacts (176.4 acres) using the following method:

SCPC has indicated that a combination of 700 new oil production wells and steam injection wells, plus associated new dirt roads and steam lines, will be added to the existing oil field within the ¾-mile radius area surrounding the proposed power plant. 90% of these new facilities will be located in already heavily disturbed (infill) areas, and 10% will be located outside the heavily developed (step-out) area (SCPP 1999n). SCPC has provided the acreage impacts that are expected, on average, for the infill wells, the step-out wells and associated new dirt roads and steam injection lines. The applicant has identified that 0.23 acre will be permanently impacted for each new well in the infill oil field area, and 0.45 acre per new well in the step-out area.

To calculate the acreage impacts and arrive at the total for the indirect impacts to wildlife habitat, staff performed the following calculations:

For infill development -

700 wells x 90% = 630 infill wells x 0.23 acres per well = 144.9 acres

For step-out development -

700 wells x 10% = 70 step-out wells x 0.45 acres per well = 31.5 acres

Total indirect impacts acreage impacts - 144.9 acres + 31.5 acres = 176.4 acres

Neither staff nor SCPC tried to quantify the temporary indirect effects of the addition of the 700 new oil production wells, steam injector wells, and additional access roads. However, temporary indirect impacts will occur when this development occurs, so staff will propose mitigation measures (Best Management Practices and take avoidance measures) to be implemented by the project owner to help minimize impacts to sensitive species and their habitat during the construction of the 700 new wells and related facilities. Recommended Best Management Practices to minimize impacts to sensitive species and other wildlife are identified in the Formal Consultation on the Oil and Gas Programmatic in Kings and Kern Counties, California (USFWS 1996). For more information about proposed Best Management Practices and take avoidance measures to help minimize habitat and species impacts, see Biological Resources Condition of Certification **BIO-5**.

TOXIC GAS EMISSIONS AND POTENTIAL EFFECTS ON SENSITIVE WILDLIFE SPECIES

Toxic air emissions, in particular hydrogen sulfide gas (H_2S), can occur in areas such as the Midway-Sunset oil field as a normal by-product of oil extraction activities. Other oil extraction-related toxic emissions include carbon monoxide and hydrocarbons which, if not controlled, could be emitted at levels that may be toxic to humans and wildlife.

H_2S is a colorless gas with a characteristic odor of rotten eggs that is one of the principal compounds involved in the natural cycle of sulfur in the environment (WHO 1981). It occurs in volcanic gases and is produced by bacterial action during the decay of both plant and animal protein. In addition to oil fields, H_2S can be found in geothermally active areas. H_2S is slightly heavier than air, so it is known to settle into low-lying areas.

There are no regional air quality monitoring stations located in the Midway-Sunset oil field area, so no regional ambient H_2S data have been gathered (Loyer personal communication 1999). The California Air Resources Board has established a regional ambient air quality standard for humans of 0.03 parts per million (ppm) for California for H_2S, but lists the Kern County oil field area as Unclassified[1] with regards to this standard. This concentration is significantly lower than the very high concentrations normally used in laboratory animal studies of effects as discussed below. These studies were reviewed to assess the potential for effects at levels existing at the proposed project site and in the region.

H_2S in relatively high concentrations can dizziness, breathing difficulties, and nausea and is known to be toxic to humans, so many governments have adopted worker occupational exposure limits of 7 – 10 ppm to protect against effects (WHO 1981). In experiments with animals, the most readily established effects of H_2S are the inhibition of the enzyme cytochrome *c* oxidase involved in tissue oxidative respiration. Such inhibition interferes with tissue use of oxygen such that metabolic demands can not be met.

[1] This classification means that there is not enough information to determine if the area is in violation of current ambient air quality standards.

H_2S STUDIES BY OTHERS

The World Health Organization (WHO 1981) reported results of several studies completed on a number of animals including canary, rat, guinea pig, cat, dog, and goat. In these studies, laboratory animals inhaling H_2S at various concentrations displayed symptoms as listed in the following table:

Concentrations	**H_2S Exposure Duration**			
	¼-hour	**½-hour**	**1-hour**	**Many hours**
100 – 150 ppm				Eye & throat irritation
200 – 300 ppm			Eye & mucous membrane irritation	Slight general effects
500 – 700 ppm			Local irritation & slight systemic signs	Death
900 ppm		Serious systemic effects	Death	
1500 ppm	Respiratory collapse	Death		
1800 ppm	Immediate respiratory collapse & death			

The California Environmental Protection Agency's (CalEPA's) Office of Environmental Health Hazard Assessment has produced a draft technical document (CalEPA 1999) regarding the determination of noncancer chronic reference exposure levels for H_2S. This draft document contains a chronic toxicity summary of the effects on animals exposed to H_2S at various levels. In studies completed by the Chemical Industry Institute of Toxicology (CIIT 1983 a, b, c) for example, rats and mice were exposed to 0, 10.1, 30.5, or 80 ppm H_2S for 6 hours per day, 5 days per week for 90 days. Measurements of the rat's neurological and hematological functions did not reveal any abnormalities, and a histological examination of the nasal passageway also revealed no significant exposure-related changes. There was however, a significant decrease in body weight of rats exposed to 80 ppm. For mice exposed to 80 ppm, the only exposure-related histological lesion was an inflammation of the nasal membrane. As with the rats, the mice also experienced significant weight loss, although neurological and hematological tests revealed no physiological abnormalities.

The California EPA draft document explains that the adverse effects reported in animal studies of chronic exposure occur at higher concentrations than effects seen in studies of human acute exposures (page A – 113). In human studies, irritation was reported at concentrations of 2.5 – 5 ppm for 15 minutes (Bhambhani and Singh 1985), however no effects on laboratory animals were observed at concentrations of up to 80 ppm for 90 days.

STUDIES BY THE ENERGY COMMISSION

A concern over H_2S emissions, and their potential effects on local sensitive wildlife species of the Midway-Sunset oil field, prompted the California Energy Commission to fund two preliminary studies to try to ascertain whether or not oil field pollutants were having an effect on the San Joaquin kit fox and other sensitive wildlife.

Spiegel and Dao (1997) measured levels of H_2S in kit fox dens, rodent burrows, and ambient air at oil-developed and control sites for six days in southwestern Kern County. The purpose of the study was to measure H_2S levels in the Midway-Sunset oil field and compare these concentrations with concentrations measured at an undeveloped site, the Lokern Natural Area, located approximately 7.7 miles away. Study samples were gathered using an H_2S gas meter at each kit fox den site from ambient air, 30 cm in from the den entrance, and 60 cm in from the den entrance. For rodent burrows, study samples were gathered from ambient air and from 15 cm in from the burrow entrance.

Spiegel and Dao's mean level of H_2S concentration (ppm) results were as follows:

	Lokern Natural Area (mean)	**Midway-Sunset Oil Field (mean)**
AMBIENT AIR	0.23 ppm	0.31 ppm
KIT FOX DENS		
Ambient	0.25 ppm	0.33 ppm
30-cm depth	0.30 ppm	0.39 ppm
60-cm depth	0.32 ppm	0.43 ppm
RODENT BURROWS		
Ambient	0.20 ppm	0.30 ppm
15-cm depth	0.43 ppm	0.52 ppm

Even though their mean results were found at times to be 10 times higher than the regional ambient standard (0.03 ppm) established in California for human exposure, the authors concluded that H_2S levels in ambient air, kit fox dens, and rodent burrows at both study sites were well below concentrations known to cause health effects in experimental animals. Spiegel (personal communication 1999) indicated that the meters used may not have been sensitive enough to accurately read levels below 1 ppm, which would explain why Spiegel and Dao's data are higher than those concentrations gathered by the California Union for Reliable Energy (CURE) mentioned below.

Given the limitations of the measurement methods used, the reported concentrations should not necessarily be regarded as accurate measurements. These study results should be seen only as useful for comparing the relative H_2S concentrations of the Midway-Sunset oil field with an undeveloped site, and the only appropriate conclusions are that H_2S levels are, as expected, higher in the oil field than in the undeveloped site 7.7 miles away, but lower than levels known to cause toxic effects to wildlife.

In an unpublished report funded by the Energy Commission (Charlton 1997), clinical studies were completed to determine whether differences in deer mice (*Peromyscus maniculatus*) histology, kit fox hematologic and serum chemistry values, deer mice hepatic mono-oxygenase activity, and kit fox tissue trace metal concentrations could be detected between animals inhabiting the Midway-Sunset oil field and the Lokern Natural Area. According to Dr. Charlton (personal communication 1999), the hematology data she collected from the foxes and the histopathology she completed on deer mice showed some differences between the two populations, but nothing definitive. In addition, she found no reason to conclude that exposure to H_2S was the cause for the differences in the blood and tissue samples she studied. For this reason, staff has not relied upon this study for conclusions on the possible impacts of oil field related H_2S emissions in Kern County.

Dr. Charlton concluded that after completing her toxicological studies she felt that more work needed to be done before any definitive conclusions can be drawn. She recommends a study that exposes "clean" laboratory animals to the environment to rule out factors such as genetics, nutrition, age, and reproductive status, all of which could have contributed to her findings. Even if effects could be definitively demonstrated, it would be nearly impossible to attribute them <u>specifically</u> to H_2S exposure, given the extremely complex mixture of chemicals present in the oil field environment. (Charlton, personal communication, 1999.)

The Energy Commission also funded studies (CEC 1996) that did not address the H_2S issue specifically, but compared San Joaquin kit fox survivorship and reproductive success in the undeveloped Lokern Natural Area and oil-developed areas of the Midway-Sunset oil field. This study found that oil field activities did not appear to affect kit fox survivorship or reproduction. The study documented fewer kit foxes in the oil-developed areas, however when the oil-field foxes were compared to non-oil field developed area foxes the author found that there appeared to be no significant difference in how long the oil-field developed foxes lived and how many pups they had. These findings were made in spite of the fact that there is, among other things, the potential for high concentrations of H_2S in the Midway-Sunset oil field.

CALIFORNIA UNION FOR RELIABLE ENERGY FIELD DATA

CURE gathered H_2S field data (CURE 1999g, Exhibit 5) in the Midway-Sunset oil field and the Lokern Natural Area on August 28th, August 30th, and September 1st, 1999. A summary of CURE's mean H_2S readings is as follows:

Date	Lokern Natural Area (mean)	Midway-Sunset oil field (mean)
8/28/99	0.0058 ppm	0.0103 ppm
8/31, 9/1/99	0.0032 ppm	0.0235 ppm

CURE pointed to these mean concentrations as exceeding the ambient air quality standard (0.03 ppm) established by the California Air Resources Board, however they do not. Some (26%) of CURE's individual field readings were above the ambient standard, however the mean concentrations are not. Staff can not confirm the accuracy or representativeness of CURE's measurements, and has not relied upon

them for conclusions regarding possible health impacts of the Midway-Sunset oil field-related H_2S at existing levels. As with the previously noted Energy Commission study, CURE's measurements point to differences between H_2S levels in an oil field and an undeveloped area a significant distance away. Given that significant effects in wildlife would be possible only at levels that would be intolerable to humans, CURE's limited data can not be regarded as supporting CURE's argument that wildlife exposure is a reason for additional H_2S mitigation in the project area.

CONCLUSIONS

Studies have shown that laboratory animals (such as dogs, rats, and mice) similar to sensitive species found in the Midway-Sunset oil field (kit fox, antelope squirrels, and kangaroo rats) are impacted after long-term laboratory exposures (90 days) to H_2S concentrations 1000 times higher than concentrations found in the Midway-Sunset oil field. Staff does not believe that there is evidence to show that sensitive species found in the Midway-Sunset oil field are being negatively affected by H_2S, or that the SCPP H_2S contribution to the overall air quality situation will be large enough to impact the local wildlife species.

For a discussion of the H_2S issue and the potential for human health effects, see the **Public Health** and **Air Quality** sections.

CUMULATIVE IMPACTS

The California Environmental Quality Act defines cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." Cumulative impacts can occur when individually minor but collectively significant projects taking place over time.

The Sunrise project will, if built, be located in an area of western Kern County that has experienced extensive energy development, and this development will continue. There is the potential for at least three additional power plants (La Paloma, Midway-Sunset, and Elk Hills), in addition to the Sunrise project, to be built in the region in the near future. In addition, the proposed project will provide steam to approximately 1300 existing wells for enhanced oil recovery. Current oil field development in the region includes the installation of a new aboveground utility corridor to be utilized for water, natural gas, and steam distribution. Also, the entire Kern River Gas Transmission Company/Mojave Pipeline Company interconnecting 20-inch natural gas pipeline is currently being installed to link up with the TCI Main Utility Corridor and provide natural gas to the proposed SCPP power plant. Finally, there is the overall anticipated expansion of the Midway-Sunset oil field that is expected over the next few years.

All of this energy-related, oil field development in the Midway-Sunset oil field has the potential to impact sensitive species and their habitats. As an example, individual sensitive species may be hit by vehicles. In addition, permanent habitat losses will occur as projects are constructed. Some of this energy development requires only Kern County approval, while other types require state agencies approval from agencies such as the Energy Commission and the Division of Oil and Gas and Geothermal Resources.

Because there are so many sensitive species in the region, federal agencies such as USFWS and BLM are also involved in developing regional strategies to minimize impacts to sensitive species and their habitat. BLM and USFWS have implemented an oil and gas programmatic (a "biological opinion") for Kings and Kern Counties (USFWS 1996) that addresses, for BLM leaseholds, the protection of sensitive species and their habitat. SCPC will be required to abide by the oil and gas programmatic established by the USFWS and BLM to address sensitive species issues related to oil field development. In addition, SCPC will be required to abide by the conditions of certification established by Energy Commission staff to avoid impacts whenever possible, and to minimize impacts when impacts are unavoidable.

Habitat loss in western Kern County is an ongoing regional concern of CDFG, BLM, USFWS, and the Energy Commission. To address this issue for western Kern County, CDFG and the USFWS look for habitat compensation when habitat losses are anticipated for all development projects, including energy projects.

For the SCPP, the applicant has indicated (SCPP 1999n) that they intend to provide suitable habitat compensation funds to The Center for Natural Lands Management so suitable compensation habitat can be purchased and added to the current Lokern Preserve in the Lokern Natural Area. SCPC has also indicated that they intend to implement take avoidance measures to minimize impacts to individual species. Habitat compensation will involve the purchase of an agreed-to amount of compensation habitat and the establishment of a suitable endowment to guarantee perpetual protection of the compensation habitat. Implementation of take avoidance measures will help minimize impacts to individual species. By doing so, SCPC will not only be addressing its direct and indirect habitat compensation responsibilities and instituting take avoidance measures, but also eliminating staff's concern that the project will contribute to any cumulative species or habitat losses. The SCPC habitat compensation will occur within the geographic area that is to be impacted, and the compensation will be provided to an existing regional preserve to address the regional habitat loss problem associated with the region's continuing energy development. In addition, far more habitat will be protected than is being impacted, and the protected habitat will be of much higher quality and value for the region's sensitive species than that which is being impacted.

SCPP will be creating some H_2S emissions during construction and operation of the anticipated 700 new oil production and steam injection wells, and the SCPP contribution will be added to what is already present in the region as a result of other oil field development activities. In high enough concentrations (80+ ppm) this toxic gas has been shown to impact laboratory animals. However, the late August and early September 1999 ambient mean concentrations of 0.0103 ppm and 0.0235 ppm recorded by the California Union for Reliable Energy (CURE 1999) are well below concentrations where laboratory animals experience eye and throat irritation. For this reason, staff does not believe that the SCPP H_2S contribution to the current mean ambient H_2S concentration will create a situation where additional mitigation is necessary to address cumulative impacts.

For all of these reasons, staff does not believe that the project will create any incremental effects that are cumulatively considerable; and the combined impact

associated with Sunrise's incremental effect and the effects of other related projects is therefore not considered to be significant.

FACILITY CLOSURE

Sometime in the future, the SCPP will experience either a planned closure, or be unexpectedly (either temporarily or permanently) closed. When facility closure occurs, it must be done in such a way as to protect the environment and public health and safety. To address facility closure, an "on-site contingency plan" will be developed by the project owner, and approved by the Energy Commission Compliance Project Manager (See **General Conditions** section in **Facility Closure** and Biological Resources Condition of Certification **BIO-11**). Facility Closure mitigation measures will also be included in the Biological Resources Mitigation Implementation and Monitoring Plan (See Biological Resources Condition of Certification **BIO-9**).

PLANNED OR UNEXPECTED PERMANENT FACILITY CLOSURE

The region surrounding the proposed project site is a mosaic of disturbed and undisturbed valley saltbush scrub and non-native annual grassland habitats. The undisturbed and disturbed habitats are dominated by native and non-native plant species that provide food and cover for the associated species, including several protected plant and wildlife species. Since the proposed project area currently provides habitat for these species, the facility closure plan needs to address habitat restoration measures to be implemented in the event of a planned or an unexpected permanent closure. Habitat restoration measures that should be addressed include such tasks as the removal of all power plant site structures and the immediate implementation of habitat restoration measures to re-establish native plant species and native habitat types (e.g., valley saltbush scrub). In addition, planned or unexpected permanent facility closure may also trigger the removal of the transmission conductors, and possibly the entire transmission line, since birds are known to collide with transmission conductors.

UNEXPECTED TEMPORARY CLOSURE

Staff does not have any biological resource facility closure recommendations in the event of an unexpected temporary closure of the Sunrise power plant. However, in the event that the Energy Commission CPM decides that the facility is permanently closed, the above-mentioned facility closure measures need to be given careful consideration.

MITIGATION

SPCP has developed a mitigation strategy that maximizes the avoidance of impacts to sensitive species and their habitat (SCPP 1998a). Where avoidance is not possible, SPCP has proposed to implement a habitat compensation strategy for both temporary and permanent, direct and indirect impacts associated with the project. In the AFC, SPCP has provided mitigation strategies for project design and siting, pre-construction, construction, post-construction, operation and maintenance activities.

The applicant's proposed mitigation measures include avoidance of sensitive areas, designing/building transmission line towers to minimize bird electrocutions and collisions, implementing a worker environmental awareness program, designating a biologist to oversee the implementation of all biological resource mitigation measures, implementation of sensitive species take avoidance measures, minimization of habitat disturbance activities, monitoring all activities that could result in a take of a sensitive species, implementation of a habitat reclamation plan once temporary habitat disturbance is completed, prohibiting firearms and pets from the work site, acquisition of compensation habitat, and establishment of an endowment. For a complete list of mitigation measures proposed by SCPC, see Biological Resources Condition of Certification **BIO-1**.

To make certain that all proposed mitigation measures are properly implemented during project construction and operation, SCPC will educate its workers about the sensitive biological resources in the project region (Worker Environmental Awareness Program) and create a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP). A first draft of the BRMIMP (SCPP 1999n) was provided on June 15, 1999, and has been reviewed by staff. The BRMIMP, when finalized prior to the start of any project-related habitat disturbance activities, will identify:

- Specific take avoidance measures to protect sensitive species during project construction;
- Worker Environmental Awareness Program material;
- Specific measures to avoid sensitive species during project operation (e.g., speed limits, prohibition of firearms at the project site, and trash controls);
- Habitat rehabilitation measures for temporarily disturbed areas; and
- Habitat compensation and endowment amount for direct and indirect impacts.

For information about the Worker Environmental Awareness Program and the BRMIMP, see Biological Resources Conditions of Certification **BIO-6** and **BIO-9**.

SCPC will also work with staff to develop a landscape plan that will provide a suitable visual screen for the project site that utilizes trees and/or shrubs that are suitable for wildlife species of western Kern County. See the **Visual Resources** and the **Land Use** sections for more information.

BLUNT-NOSED LEOPARD LIZARD

The blunt-nosed leopard lizard is a Fully Protected species (Fish and Game Code section 5050), and the Fish and Game Code prohibits take of any species with this classification. As a result, SCPC must employ all feasible means to avoid take during project construction and operation. Avoidance measures (e.g. use of fiber optics to locate active burrows and barrier fencing to keep leopard lizards out of work areas) will be developed in consultation with the CDFG and USFWS, and included in the SCPP Biological Resources Mitigation Implementation and Monitoring Plan. See

Biological Resources Condition of Certification **BIO-9** for more information about the mitigation implementation and monitoring plan.

BURROWING OWL

The burrowing owl is protected by the Migratory Bird Treaty Act (Fish and Game Code 3513) since it does migrate each year from areas that have cold winter temperatures. Burrowing owls found in the project area of western Kern County and other areas of California's Central Valley do not migrate, but are residents since winter temperatures are more favorable. To avoid impacting the burrowing owl, SCPC must implement avoidance measures during project construction and operation. Examples of recommended avoidance measures include avoiding nesting burrows during nesting season, constructing artificial burrows when appropriate, and using passive relocation methods instead of trapping. Implementation measures for final burrowing owl avoidance protocols will be developed in consultation with CDFG and USFWS, and be included in the SCPP Biological Resources Mitigation Implementation and Monitoring Plan. See Biological Resources Condition of Certification **BIO-9**.

SCPC HABITAT COMPENSATION

The sensitive species list is long for western Kern County because a significant portion of the natural habitat has been lost to various types of development, including energy development and agriculture. To adequately address habitat loss associated with the SCPP, SCPC has proposed, and staff will require, that mitigation funds be provided for habitat compensation. Staff feels that habitat conservation through habitat compensation can help promote the recovery of several of the state and federally listed species that occur in western Kern County.

Habitat compensation ratios to calculate the amount of compensation acreage to be purchased to compensate for the amount of acreage to be disturbed were provided by the USFWS and CDFG during pre-filing discussions held between agency personnel, staff and the SCPC. The following habitat compensation ratios (numbers of acres to be purchased per each acre to be impacted) will be utilized by SCPC:

TYPE OF HABITAT IMPACT	COMPENSATION RATIO
Permanent impacts to "conserved" land	4.0:1
Permanent impacts to other private land	3.0:1
Temporary impacts to conserved land	2.1:1
Temporary impacts to other private land	1.1:1

"Conserved" lands are defined as lands owned by the state or federal government or lands that are privately owned that are currently managed to benefit local wildlife. For the SCPP, the Route B transmission line corridor will cross "conserved" lands. Public lands managed by BLM, private lands owned and managed by The Center for Natural Lands Management as part of its Lokern Preserve, and state-owned land managed

by the California Department of Fish and Game at the Lokern Ecological Reserve are all found within the Route B corridor.

As of June 15,1999, SCPC has identified that the SCPP direct impacts will result in the following acreage impacts and require the following compensation:

	Impact Acreages	Comp. Ratio	Comp. Acreages
Permanent impacts to "conserved" habitat	= 1.3 acres	x 4.0 =	5.2 acres
Permanent impacts to other private habitat	= 27.5 acres	x 3.0 =	82.5 acres
Temporary impacts to conserved habitat	= 3.5 acres	x 2.1 =	7.4 acres
Temporary impacts to other private habitat	= 28.0 acres	x 1.1 =	30.8 acres
TOTAL COMPENSATION ACREAGE FOR DIRECT IMPACTS			**125.9 acres**

In addition, the Sunrise project's indirect impacts will result in the following acreage loss and require the following compensation:

	Impact Acreage	Comp. Ratio	Comp. Acreage
Permanent impacts other private habitat	= 176.4 acres	x 3.0 =	529.2 acres
TOTAL COMPENSATION ACREAGE FOR INDIRECT IMPACTS			**529.2 acres**

The total of the direct and indirect compensation acreages, 655.1 acres (125.9 acres + 529.2 acres), SCPC will be required to provide adequate funds to cover all the costs associated with the purchase of at least **655.1 acres** of suitable habitat.

Staff recommends that the required compensation funds be provided by the project owner to CNLM, and that the funds be used to purchase at least 655.1 acres of compensation habitat in the immediate vicinity of the CNLM Lokern Preserve within the Lokern Natural Area of western Kern County. The CNLM Lokern Preserve, located within the Lokern Natural Area, is located approximately 10 miles north of the proposed Sunrise power plant site. The CNLM preserve contains the same types of habitat and sensitive species that will be impacted during Sunrise project construction. The Lokern Preserve was originally established by The Nature Conservancy in the late 1980's, however it is now owned and managed by CNLM, a private, non-profit organization dedicated to the protection and management of natural resources.

It is staff's opinion that the location of the proposed habitat compensation will, when completed, provide a significant overall net benefit to the local species and habitat protection efforts because at least 655 acres of high quality habitat will be purchased and protected as part of the Lokern Preserve to compensate for the direct permanent loss of 28.8 acres, temporary disturbance to 31.5 acres, and the indirect permanent loss of 176.4 acres. The vast majority of this project's habitat impacts will not be to high quality habitat found in the vicinity of the Lokern Preserve, but instead to habitat found in a heavily developed oil field.

To calculate the dollar amount needed for habitat compensation if CNLM assumes responsibility for the habitat purchases, staff consulted Brenda Pace (CEC 1999tt), Administrative Director for CNLM. Ms. Pace indicated that the required amount must be large enough to cover all acreage purchases, as well as all administrative costs including initial and capital costs, and the establishment of a suitable endowment for perpetual care of the habitat.

The per acre costs identified by CNLM are:

- Average price = $500;
- All administrative costs including initial and capital expenses = $170; and
- Endowment = $330

Total dollar amount required by CNLM = $1000 per acre

Habitat compensation will be required for 655.1 acres, and CNLM requires $1000 per acre to assume the responsibility of purchasing the compensation habitat to add the required compensation acreage to its Lokern Preserve. As a result, staff will require SCPC to provide $655,100 to CNLM prior to the start of any project-related ground disturbance activity.

Additional habitat compensation funds may be required if more habitat is disturbed than is anticipated. For additional information about the Sunrise project habitat compensation, refer to Biological Resources Condition of Certification **BIO-10**.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

To be in compliance with applicable laws, ordinances, regulations and standards, SCPC must obtain, and build and operate the SCPP within the terms and conditions provided in a state Incidental Take Permit and a federal Biological Opinion. As a result of the need for SCPC to obtain a right-of-way permit from BLM for a portion of the transmission line route, BLM will be required to initiate a Section 7 consultation with the USFWS, which will result in the USFWS issuing a federal Biological Opinion. In addition, SCPC, per section 2081.1 of the Fish and Game Code, must also acquire an Incidental Take Permit. These documents will provide mitigation measures required by each regulatory agency. For further information on these documents, see Biological Resources Conditions of Certification **BIO-7** and **BIO-8**.

To help the project owner comply with laws, ordinances, regulations, and standards and the biological resource mitigation measures associated with this project, SCPC must designate a biological resource specialist ("Designated Biologist"), prior to the beginning of any project-related ground disturbance, who is familiar with the biological resource issues of the Sunrise project. The Designated Biologist will help the project owner ensure that all biological resources mitigation measures are complied with during project construction and operation. For more information about the roles and

responsibilities of the Designated Biologist, see Biological Resource Conditions of Certification **BIO-2**, **BIO-3**, **BIO-4** and **BIO-5**.

UNRESOLVED ISSUES, CONCLUSIONS, AND RECOMMENDATIONS

UNRESOLVED ISSUES

FEDERAL BIOLOGICAL OPINION & STATE INCIDENTAL TAKE PERMIT

A federal Biological Opinion from the USFWS and an Incidental Take Permit from CDFG have not been received by SCPC as of this Final Staff Assessment, so final mitigation requirements from these agencies are unknown at this time. However, mitigation measures recommended by SCPC in their application and in their draft Biological Resources Mitigation Implementation and Monitoring Plan (SCPP 1999n) have not been rejected by representatives of either agency. As a result, staff expects that when the federal and state documents are provided, the required mitigation will be consistent with what SCPC and staff have proposed, and SCPC will implement all required mitigation. Staff has been informed by the USFWS that the federal Biological Opinion will be available no sooner than the end of October 1999 (Jones personal communication 1999). The state Incidental Take Permit will not be provided until after the Energy Commission final decision document is released.

CONCLUSIONS

If SCPC abides by the terms and conditions of the state Incidental Take Permit, the federal Biological Opinion, and the conditions of certification contained in this staff assessment, then the SCPP should be able to be constructed and operated in full compliance with all state and federal species protection laws and regulations.

RECOMMENDATIONS

To help make certain that the SCPP is in compliance with all law, ordinances, regulations, and standards during project construction and operation, staff recommends that the Energy Commission adopt the following Biological Resources Conditions of Certification.

CONDITIONS OF CERTIFICATION

The following Biological Resources Conditions of Certification are proposed by staff.

SCPC MITIGATION

BIO-1 The project owner will implement the mitigation measures identified in Section 8.2, pages 8.2-20 to 8.2-22 of the SCPC Application for Certification (SCPP 1998a). The project owner's proposed mitigation measures will be incorporated into the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) (see Condition of Certification **BIO-9**, below) unless the mitigation measures conflict with mitigation required by the U. S. Fish and Wildlife Service and the California Department of Fish and Game

contained in the federal Biological Opinion and state Incidental Take Permit, respectively. If there is a conflict between the draft BRMIMP and the federal Biological Opinion and/or the state Incidental Take Permit, then the federal and/or state conditions or mitigation measures will supercede those found in the BRMIMP.

Protocol:

1. Prior to the onset of ground-disturbance activities, project personnel shall be briefed on the occurrence and distribution of listed species in the project area, measures that are being implemented to protect these species during project actions, and the reporting requirements should incidental take occur. New workers will receive training within 15 days of their first day of employment.

2. No more than 14 days prior to commencement of construction activities, a qualified biologist(s) shall conduct pre-activity surveys of proposed work zones (for the power plant, natural gas pipelines, water pipeline, and transmission line) and the 500-foot buffer around each area. During pre-activity surveys, the status of previous surveys shall be reviewed. San Joaquin kit fox dens and kangaroo rat and blunt-nosed leopard lizard burrows shall be flagged for avoidance, as necessary, and additional habitat features, if any, shall be identified and flagged as necessary.

3. Biological monitors (an SCPC term) shall:

- Accompany initial grading crews throughout the project area at all times that activities with the potential to affect listed species are being conducted;
- Conduct pre-activity surveys as described above;
- Aid project crews in satisfying avoidance criteria and implementing project mitigation as described in this assessment;
- Aid in relocating access roads and laydown areas as necessary;
- Inspect open trenches and footing holes for stranded wildlife and remove as necessary each morning;
- Observe and note all pertinent information concerning project effects on listed species; and,
- Assist project personnel in conducting the proposed project in such a manner as to minimize adverse impacts on listed species.

4. Pets shall not be permitted on the project site during construction activities.

5. All food-related trash shall be disposed of in closed containers only and regularly removed from the project site.

6. All spills of hazardous materials within listed species habitat shall be cleaned up immediately.

7. No firearms will be allowed in the project area.

8. All construction activities conducted during the project shall be confined to daylight hours, unless within a site perimeter fence or unless circumstances warrant night work and approval is obtained from CDFG and USFWS.

9. All project-related vehicles shall observe a speed limit of 20 miles per hour or less on all routes that traverse listed species habitat, except on state and county highways and roads.

10. Project-related vehicles shall be confined to existing primary or secondary roads or to specifically delineated project areas (i.e., areas that have been surveyed and described in existing documentation). Otherwise, no off-road vehicle travel shall be permitted.

11. All open trenches and footing holes shall be covered each night or ramped in such a way as to allow wildlife that may enter to escape unharmed. Ramps will be no more than 1,000 feet apart and no more than 45 degrees.

12. All known and potential San Joaquin kit fox dens, giant kangaroo rat burrows, San Joaquin antelope squirrel burrows, and burrows potentially inhabited by blunt-nosed leopard lizards shall be protected by implementing the following procedures. Such protection will help prevent incidental take of dens and burrows in excess of the take limits allowed by the resource agencies.

    All avoidable San Joaquin kit fox dens, giant kangaroo rat, San Joaquin antelope squirrel and blunt-nosed leopard lizard burrows within the immediate vicinity of work areas shall be prominently staked and/or flagged as necessary to alert project personnel to their presence. All project-related flagging shall be collected and removed after completion of the project construction.

    The project owner shall make every reasonable effort to prevent the collapse of dens and burrows by relocating temporary access roads and laydown areas to avoid dens and burrows or other means as determined to be appropriate for the sensitive wildlife and botanical resources.

Avoidance criteria for sensitive wildlife and botanical resources:

- 200 feet from San Joaquin kit fox pupping dens;

- 100 feet from known San Joaquin kit fox dens;
- 50 feet from potential San Joaquin kit fox dens;
- 50 feet from giant kangaroo rat burrow systems;
- 50 feet from burrows where San Joaquin antelope squirrels or blunt-nosed leopard lizards were sighted;
- 50 feet from potential blunt-nosed leopard lizard burrows; all small mammal burrows of sufficient size will be considered potential blunt-nosed leopard lizard burrows in areas where potential habitat for this species exists; and
- 30 feet from any sensitive annual plant population that is in the state of reproduction (germination-seed set).

13. Within 45 calendar days after completion of construction, the project proponent shall submit a post-activity compliance report that details the following information: dates that construction occurred; pertinent data concerning success in meeting project mitigation measures, if any; known project effects on San Joaquin kit fox, blunt-nosed leopard lizards, and giant kangaroo rats or other sensitive species, if any (including specific number of dens and small mammal burrows damaged or destroyed); occurrences of incidental take of federally listed species, if any; an assessment of the extent and severity of project impacts on all sensitive wildlife habitat; and other pertinent information.

14. The top 4 inches of topsoil shall be stockpiled near all lands that will be temporarily disturbed by grading during construction activities. These sites shall be recontoured and preserved topsoil shall be spread to aid in the reclamation of these sites after construction is complete.

15. The project owner will acquire agency-approved lands containing habitat similar to the habitat being disturbed during construction and operation of the proposed facilities (that will be preserved and managed for sensitive wildlife and plant species into perpetuity) or purchase credits in an established preserve in the following amounts:

- 3.0 acres for each acre of habitat permanently disturbed (private lands);
- 1.1 acres for each acre of habitat temporarily disturbed (private lands);
- 4.0 acres for each acre of habitat permanently disturbed (conserved lands and BLM)
- 2.1 acres for each acre of habitat temporarily disturbed (conserved lands and BLM)

Verification: At least 60 days prior to start of any project related ground disturbance activities, the project owner shall provide the Energy Commission Compliance Project Manager (CPM) with the ~~final version of the~~ Biological Resources Mitigation Implementation and Monitoring Plan for the SCPP, and the CPM will determine the plans acceptability within 15 days of receipt of the ~~final~~ plan. Implementation of the above measures will be included in the BRMIMP.

DESIGNATED BIOLOGIST

BIO-2 Construction site and/or ancillary facilities preparation (described as any ground disturbing activity other than Energy Commission approved geotechnical work) shall not begin until an Energy Commission CPM approved Designated Biologist is available to be on site.

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

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

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

3. One year of field experience with biological resources found in or near the project area; and

4. An ability to demonstrate to the satisfaction of the CPM the appropriate education and experience for the biological resources tasks that must be addressed during project construction and operation.

If the CPM determines the proposed Designated Biologist to be unacceptable, the project owner shall submit another individual's name and qualifications for consideration. If the approved Designated Biologist needs to be replaced, the project owner shall obtain approval of a new Designated Biologist by submitting to the CPM the name, qualifications, address, and telephone number of the proposed replacement. No disturbance will be allowed in any designated sensitive areas until the CPM approves a new Designated Biologist and the new biologist is on site.

Verification: At least 90 days prior to the start of any ground disturbance activities, the project owner shall submit to the CPM for approval, the name, qualifications, address and telephone number of the individual selected by the project owner as the Designated Biologist. If a Designated Biologist is replaced, the information on the proposed replacement, as specified in the condition, must be submitted in writing at least ten working days prior to the termination or release of the preceding Designated Biologist.

BIO-3 The CPM approved Designated Biologist shall perform the following during project construction and operation:

16. Advise the project owner's Construction Manager on the implementation of the Biological Resource Conditions of Certification;

17. 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; and

18. Notify the project owner and the CPM of any non-compliance with any Biological Resources Condition of Certification.

Verification: During project construction, the Designated Biologist shall maintain written records of the tasks described above, and summaries of these records shall be submitted along with the Monthly Compliance Reports to the CPM. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report.

BIO-4 The project owner's Construction Manager shall act on the advice of the Designated Biologist to ensure conformance with the Biological Resources Conditions of Certification.

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

The Designated Biologist shall:

1. Inform the project owner and the Construction Manager when to resume construction, and

2. Advise the CPM if any corrective actions are needed or have been instituted.

Verification: Within two (2) working days of a Designated Biologist notification of non-compliance with a Biological Resources condition of certification or a halt of construction, the project owner shall notify the CPM by telephone of the circumstances and actions being taken to resolve the problem or the non-compliance with a condition. For any necessary corrective action taken by the project owner, a determination of success or failure will be made by the CPM within five (5) working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.

BIO-5 To minimize impacts to sensitive species and their habitat ~~D~~during construction of the expected 700 new oil production wells, steam injection wells, and appurtenant facilities within the ¾-mile radius zone of influence of the SCPP, the project owner and the Designated Biologist will implement Best Management Practices and take avoidance measures listed in the USFWS Formal Consultation on the Oil and Gas Programmatic in Kings and Kern Counties, California (USFWS 1996) to minimize impacts to the San

Joaquin kit fox, their dens, and their habitat. These Best Management Practices and take avoidance measures will be implemented for BLM leaseholds as well as on private leaseholds as identified as well development areas for this project.

Protocol:

1. Habitat surveys will be completed to locate San Joaquin kit fox dens. Surveys will be completed to look for natal, known, and potential dens. A 200-foot buffer around the proposed area of construction will also be surveyed.

2. Natural lands and habitat features will be avoided as practicable. Previously disturbed sites will be utilized whenever practicable.

3. Specific San Joaquin kit fox protection measures will be followed.

4. Natural drainage patterns will be maintained to the greatest extent practicable.

5. Large drainages containing saltbush and other native shrubs will be avoided to the greatest extent practicable.

6. The speed limit on unpaved roads not maintained by the county, shall be a maximum of 25 mph, in order to minimize wildlife casualties.

7. All spills of hazardous materials within endangered species habitats shall be cleaned up immediately.

8. Listed species shall be protected from the hazards posed by oil sumps. All exposed oil sumps shall be screened or eliminated. All screening of sumps shall meet the following specifications: 1. Be not greater than 2 inch nominal mesh, 2. Be of sufficient strength to restrain entry of wildlife, and 3. Be supported in such a manner so as to prevent contact with the sump fluid. Oil sumps shall be designed, constructed, and maintained so as to not be a hazard to people, livestock, or wildlife, including birds. Oil sumps shall be filled with earth after removal of harmful materials.

9. Biologists and law enforcement personnel from the CEC, California Department of Fish and Game, and the U. S. Fish and Wildlife Service shall be given complete access to the project area to review monitoring and mitigation activities.

10. Project activities that are likely to cause the amount or extent of take to be exceeded shall cease immediately.

11. The wildlife protection measures being implemented for listed species shall be extended to candidate and proposed species in the project area to the maximum extent practicable.

12. Restoration will be required when a project or lease is abandoned. Restoration will be encouraged for unused portions of the project area or oil and gas lease. The BLM will be contacted for specific restoration requirements upon project completion.

Verification: Documentation of completion of the surveys, and a discussion of mitigation measures that were implemented, will be provided by SCPC in the SCPP Annual Report provided to the CEC Compliance Project Manager. Survey protocols and mitigation measures will be included in the SCPC Biological Resources Mitigation Implementation and Monitoring Plan and implemented by the project owner and the Designated Biologist. For a complete list of what must be included in this mitigation and monitoring plan, see Condition of Certification **BIO–9**.

WORKER ENVIRONMENTAL AWARENESS PROGRAM

BIO-6 The project owner shall develop and implement a CPM approved Worker Environmental Awareness Program in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or related facilities during construction and operation, are informed about sensitive biological resources associated with the project.

Protocol: The Worker Environmental Awareness Program must:

1. Be developed by 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; and

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

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

Each participant in the on-site Worker Environmental Awareness Program shall sign a statement declaring that the individual understands and shall abide by the guidelines set forth in the program materials. The person administering the program shall also sign each statement.

Verification: At least 60 days prior to the start of rough grading, the project owner shall provide copies of the Worker Environmental Awareness Program and all supporting written materials prepared by the Designated Biologist and the name and qualifications of the person(s) administering the program to the CPM for approval. The project owner shall state in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. The signed statements for the construction phase shall be kept on file by the project owner and made available for examination by the CPM for a period of at least six (6) months after the start of commercial operation. During project operation, signed statements for active project operational personnel shall be kept on file for the duration of their employment and for six (6) months after their termination.

CALIFORNIA DEPARTMENT OF FISH & GAME INCIDENTAL TAKE PERMIT

BIO-7 Prior to start of any ground disturbance activities, the project owner shall acquire an Incidental Take Permit from CDFG in accordance with Section 2081(b) of the California Fish and Game Code and implement the permit terms and conditions.

Verification: No less than five (5) days prior to the start of any project related ground disturbance activities, the project owner shall submit to the CPM a copy of the final CDFG Incidental Take Permit. Permit terms and conditions will be incorporated into the Biological Resources Mitigation Implementation and Monitoring Plan. See also Condition of Certification **BIO-9**.

U. S. FISH & WILDLIFE SERVICE SECTION 7 BIOLOGICAL OPINION

BIO-8 Prior to the start of any ground disturbance activities, the project owner shall provide a final copy of the Biological Opinion in accordance with Section 7 of the federal Endangered Species Act obtained from the U. S. Fish and Wildlife Service and incorporate the terms of the opinion into the Biological Resources Mitigation Implementation and Monitoring Plan. The project owner will implement the terms and conditions contained in the federal Biological Opinion.

Verification: At least 60 days prior to the start of any project related ground disturbance activities, the project owner shall submit to the CPM a copy of the Biological Opinion. Permit terms and conditions will be incorporated into the Biological Resources Mitigation Implementation and Monitoring Plan. See also Condition of Certification **BIO-9**.

BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION & MONITORING PLAN

BIO-9 The project owner shall submit to the CPM for review and approval a copy of the final Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) and shall implement the measures identified in the plan. Any changes made to the adopted BRMIMP must be made in consultation with the CEC as well as with the Bureau of Land Management and the U. S. Fish and Wildlife Service.

Protocol: The final BRMIMP shall identify:

1. All mitigation, monitoring, and compliance conditions included in the Commission's Final Decision;

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

3. All mitigation measures provided in the USFWS Biological Opinion and the CDFG Incidental Take Permit;

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

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

6. A detailed description of measures (including Best Management Practices and take avoidance measures to be implemented during construction of the 700 new oil production wells, steam injection wells, and appurtenant facilities) that will be implemented to avoid and/or minimize impacts to San Joaquin kit fox as well as other sensitive species from oil and steam field construction activities;

7. All locations, on a map of suitable scale, of laydown areas and areas requiring temporary protection and avoidance during construction;

8. Aerial photographs of all areas to be disturbed during project construction activities - one set prior to site disturbance and one set subsequent to completion of mitigation measures. Include planned timing of aerial photography and a description of why times were chosen;

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

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

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

12. A discussion of biological resource-related facility closure measures; and

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

Verification: At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide the CPM with the final version of the BRMIMP for this project, and the CPM will determine the plans acceptability within 15 days of receipt of the final plan. All modifications to the approved BRMIMP must be made only after consultation with CEC, BLM and USFWS. The project owner shall notify the CPM five (5) working days before implementing any CPM approved modifications to the BRMIMP.

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

HABITAT COMPENSATION

BIO-10 To compensate for temporary and permanent, direct and indirect, impacts to sensitive wildlife habitat, the project owner will provide a cashier's check for $655,100 to the Center for Natural Lands Management. Additional funds may be required if additional habitat is disturbed beyond that identified in ~~the~~ this Final Staff Assessment.

Verification: Within one (1) week of project certification, the project owner must provide written verification to the CPM that the required compensation funds have been provided to CNLM.

Within 180 days after completion of project construction, the project owner shall provide the CPM aerial photographs taken after construction and an analysis of the amount of any additional habitat disturbance beyond that identified in the Energy Commission Final Staff Assessment. The CPM will notify the project owner of any additional funds required to compensate for any additional habitat disturbances at the adjusted market value at the time of construction to acquire and manage habitat.

FACILITY CLOSURE

BIO-11 The project owner will incorporate into the planned permanent or unexpected permanent closure plan measures that address the local biological resources. The biological resource facility closure measures will also be incorporated into the Sunrise project BRMIMP. (See Condition of Certification **BIO-9**, above)

Protocol: The planned permanent or unexpected permanent closure plan will require the following biological resource-related mitigation measures:

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

2. Removal of all power plant site facilities; and

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

Verification: At least 12 months (or a mutually agreed upon time) prior to the commencement of closure activities, the project owner shall address all biological resource-related issues associated with facility closure in a Biological Resources Element. The Biological Resources Element will be incorporated into the Facility Closure Plan, and include a complete discussion of the local biological resources and proposed facility closure mitigation measures.

REFERENCES

Arnold 1999. Update on the fairy shrimp survey findings. Sent to Sandy Guldman, Toyon Environmental Consultants, March 6, 1999.

Bhambhani Y, and Singh M. 1985. Effects of hydrogen sulfide on selected metabolic and cardio-respiratory variables during rest and exercise. Report submitted to Alberta's Worker's Health and Safety and Compensation. June 1985.

California Department of Fish and Game 1999. Natural Diversity Database Special Plants List. Biannual publication mimeograph, 119 pp.

California Environmental Protection Agency (CalEPA) 1999. Draft Technical Support Document for the Determination of Noncancer Chronic Reference Exposure Levels (Hydrogen Sulfide). CalEPA's Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program Risk Assessment Guidelines. Pages A – 110 to A – 115.

CDFG (California Department of Fish and Game) 1992. Bird Species of Special Concern. Unpublished document from the Wildlife Management Division, Non-game Bird and Mammal Section.

CEC (California Energy Commission) 1996. Studies on the San Joaquin kit fox in undeveloped and oil-developed areas. Linda K. Spiegel, Project manager and principal author. August 1996.

CEC (California Energy Commission) 1999tt. Report of conversation between Brenda Pace of the Center for Natural Lands Management and Rick York of the California Energy Commission, regarding habitat compensation financing. Submitted to the California Energy Commission on June 22, 1999.

CEC (California Energy Commission) 1999uu. Committee order on scope of project. From Michal C. Moore, Presiding Committee Member, June 2, 1999.

CEC/SCPP (California Energy Commission/K. Bergquist and Sunrise Cogeneration & Power Project/J. Harris) 1999a. Joint Blueprint (98-AFC-4). Submitted to the California Energy Commission, May 21, 1999.

Charlton, K. 1997. Unpublished report to the California Energy Commission on H_2S related clinical findings in kit foxes and deer mice inhabiting the Midway-Sunset oil field in the Southern San Joaquin Valley of California (1991 – 1993). April 1997.

Charlton, K. 1999. Personal communication with Rick York regarding H_2S effects. September 3, 1999.

Charlton, K. 1999. Personal communication with Rick York. September 30, 1999.

CIIT (Chemical Industry Institute of Toxicology) 1983a. 90-day vapor inhalation toxicity study of hydrogen sulfide in Fischer-344 rats. U. S. EPA, Office of Toxic Substances Public Files. Fiche number 0000255.0. Document number FYI-OTS-0883-0255.

CIIT (Chemical Industry Institute of Toxicology) 1983b. 90-day vapor inhalation toxicity study of hydrogen sulfide in Sprague-Dawley rats. U. S. EPA, Office of Toxic Substances Public Files. Fiche number 0000255-0. Document number FYI-OTS-0883-0255.

CIIT (Chemical Industry Institute of Toxicology) 1983c. 90-day vapor inhalation toxicity study of hydrogen sulfide in B6C3F1 mice. U. S. EPA, Office of Toxic Substances Public Files. Fiche number 0000255-0. Document number FYI-OTS-0883-0255.

CNPS (California Native Plant Society) 1994. Inventory of Rare and Endangered Vascular Plants of California. Special Publication No. 1, 5th Edition. 338 pp.

County of Kern and the U. S. Fish and Wildlife Service 1998. Administrative Draft Copy of the Kern County Valley Floor Habitat Conservation Plan and the Kern County General Plan Endangered Species Element. Environmental Impact Report/Environmental Impact Statement DEP No. SCH No. 97111010. May 15, 1998.

Jones, Susan. Personal communication with Rick York regarding USFWS Biological Opinion. California Energy Commission. September 7, 1999.

Loyer, Joe 1999. Personal communication with Rick York regarding ambient air quality data for Midway-Sunset oil field. California Energy Commission, September 7, 1999.

SCPP (Sunrise Cogeneration and Power Project) 1999k. Transmission Alternatives Supplement Two. Submitted to the California Energy Commission, May 21, 1999.

SCPP (Sunrise Cogeneration and Power Project) 1999m. Data Responses, Set 1. Submitted to the California Energy Commission, June 4, 1999.

SCPP (Sunrise Cogeneration and Power Project) 1999n. Data Responses, Set 2. Submitted to the California Energy Commission, June 15, 1999.

SCPP (Sunrise Cogeneration and Power Project 1999q. Responses to CEC staff questions during June 14, 1999 workshop, June 30, 1999.

SCPP (Sunrise Cogeneration and Power Project) 1998a. Application for Certification, Sunrise Cogeneration and Power Company (98-AFC-4). Submitted to the California Energy Commission, December 21, 1998.

SCPP (Sunrise Cogeneration and Power Project) 1999e. Data Responses, Set 1. Submitted to the California Energy Commission, March 31, 1999.

SCPP (Sunrise Cogeneration and Power Project) 1999g. Data Responses, Set 1A. Submitted to the California Energy Commission, April 15, 1999.

Spiegel, L. and Dao, T. 1997. The occurrence of hydrogen sulfide gas in San Joaquin kit fox dens and rodent burrows in an oil field in California. California Fish and Game 83(1):38-42.

U. S. Fish and Wildlife Service (USFWS) 1996. Formal Consultation on the Oil and Gas Programmatic in Kings and Kern Counties, California.

U. S. Fish and Wildlife Service (USFWS) 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California.

WHO (World Health Organization) 1981. Hydrogen sulfide. Environmental Health Criteria 19. International Programme on Chemical Safety.

GEOLOGY

Testimony of Robert Anderson

INTRODUCTION

The geology section discusses the project's potential impacts regarding geological hazards, geological and paleontological resources, and surface water hydrology. The purpose of the geology analysis is to verify that the applicable laws, ordinances, regulations, and standards (LORS) have been identified and that the project can be designed and constructed in accordance with all applicable LORS, and in a manner that protects environmental quality and assures public health and safety. The objective of staff is to ensure that there will be no significant adverse impacts to significant geological and paleontological resources, and surface water hydrology during project construction, operation and closure. The joint blueprint between the California Energy Commission and the Sunrise Cogeneration and Power Company is not used in this section since the topics discussed do not lend themselves to the effects format in the blueprint. The section concludes with the staff's proposed monitoring and mitigation measures with respect to geological hazards, geological and paleontological resources, and surface water hydrology, with the inclusion of nine conditions of certification.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable LORS are contained in the Application for Certification (AFC), in Sections 8.14.5, 8.15.4, 18.16.1 and Appendix I Section 2.2 (SCPP 1998a). A brief description of the LORS for geological hazards and resources, paleontological resources, and drainage and erosion control follows:

FEDERAL

There are no federal LORS for geological hazards and resources, or grading and erosion control. The United States Bureau of Land Management (BLM) requires an excavation permit for excavations and grading on land under their jurisdiction. A portion of the electric transmission line crosses land under BLM jurisdiction.

STATE AND LOCAL

The California Building Code (CBC) 1998 edition is based upon the Uniform Building Code (UBC), 1997 edition, which was published by the International Conference of Building Officials. The CBC is a series of standards that are used in investigation, design (Chapters 16 and 18) and construction (including grading and erosion control as found in Appendix Chapter 33). It is based upon the UBC, and includes supplemental standards specific to California. The CBC has been adopted by Kern County Engineering and Survey Services Department and supplements their grading and construction ordinances.

The California Environmental Quality Act (CEQA) Guidelines Appendix G provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts.

Section (V) (c) asks if the project will directly or indirectly destroy a unique paleontological resource or site or unique geological feature.

Sections (VI) (a), (b), (c), (d), and (e) pose questions that are focused on whether or not the project would expose persons or structures to geological hazards.

Sections (X) (a) and (b) pose questions about the project's affect on mineral resources.

The Standard Procedures, Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources (Society of Vertebrate Paleontology) are a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. They were adopted in October 1994 by a national organization of vertebrate paleontologists (the Society of Vertebrate Paleontologists).

Kern County Development Standards (dated August 1995) Division Four Section 401-1 (Standards for Drainage) and Division Eight, Sections 408-1 and 408-2 (Retention Basin Volume and Hydraulic Design) apply to the site.

STAFF ANALYSIS

SETTING

Sunrise is located in the Midway-Sunset Oil Field, in western Kern County. Geology at the site is made up of alluvial sands and silts. The electric transmission line corridor "B, D, E, and F" crosses alluvium, the Tulare Formation, the Etchegoin Formation, the Santa Margarita Formation, the Belridge Diatomite, the Monterey Shale and the McLure Shale. The soil overlying most of the power plant footprint area has been disturbed. The site slope gradient is very shallow, so the potential for slope stability problems is remote. Groundwater at the site is in excess of 300 feet below existing grade.

GEOLOGICAL HAZARDS

FAULTING AND SEISMICITY

No active faults are known to cross the proposed power plant footprint. The project is located within seismic zone 4 as delineated on Figure 16-2 of the 1998 edition of the CBC. The San Andreas Fault Zone is located approximately 7.2 miles southwest of the proposed power plant. The estimated peak horizontal ground acceleration at the site is 0.48g. The potential for surface ground rupture at the power plant footprint is negligible since there are no known faults at the power plant footprint. The applicant has indicated that there are three fault traces that either cross or intersect the electric transmission line corridor designated "B". All three fault traces are shown to be located in the Tulare Formation, but not in the alluvium. The applicant has indicated in supplements to the AFC (SCPP 1999k, 1999m) that the fault traces are not active. Energy Commission staff have reviewed "Maps of

Known Active Near Source Zones in California and Adjacent Portions of Nevada" (ICBO 1998) and the "Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions" (CDMG, 1994). The above mentioned documents do not indicate that the fault traces are active. The fault traces are not considered to be the major contributors to strong ground motion for the design earthquake.

LIQUEFACTION

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. Soil liquefaction usually occurs within the upper fifty feet of a soil column if it occurs at all. The depth to groundwater at the proposed powerplant footprint is in excess of 300 feet. This aspect points to a negligible potential for liquefaction at the site.

HYDROCOMPACTION AND COLLAPSING SOILS

Hydrocompaction is the process of the loss of soil volume upon the application of water to a partially saturated soil with a loosely arranged soil matrix. Two criteria used to help identify soil prone to hydrocompaction and collapsing of the soil structure are low dry unit weight and low to moderate soil moisture content. Energy Commission staff reviewed the geotechnical investigation summary presented in Appendix I-7 (SCPP 1998a). Eleven soil borings were advanced as a part of a preliminary geotechnical investigation for the Sunrise project, including route "A". No soil borings or test pits were advanced along the "B, D, E, F" electric transmission line corridor. It is noted that the low blow count soils and low unit weight soils and low to moderate moisture contents are not pervasive in the soil boring samples. The applicant has studied the potential for collapsing soils and is prepared to address the potential of collapsing soils during their final site design.

EXPANSIVE SOILS

Soils that contain a high percentage of expansive clay minerals are prone to expansion, if subjected to an increase in water content. Expansive soils are usually measured with an index test such as the expansive index potential. In order for a soil to be a candidate for testing, the soil must have a high clay content. Near surface soils reported in the AFC, Appendix I-7 (SCPP 1998a) are not considered to have a high enough clay content to be of concern with respect to expansion.

GEOLOGICAL AND PALEONTOLOGICAL RESOURCES

Surficial soils at the site have been disturbed by past oil field activities. There are no geological resources accessible at the natural surface of the power plant footprint or along the linear facilities or the substation. The project is located in an active oil field. There are no oil wells located in the footprint of the power plant. Directional drilling methods allow the oil and any natural gas to be developed without adversely affecting proposed project operations. The Department of Conservation, Division of Oil and Gas and Geothermal Resources (DOGGR) requires requirement of a minimum fifty foot setback from existing oil wells will be maintained for the proposed pipelines associated with the project. In addition the proposed pipelines are to maintain a minimum of a 125 foot setback from existing

oil wells at least in one direction, in order to allow wells to be maintained, developed or plugged and abandoned. The project therefore will have no adverse impacts on geological resources.

Several geologic units in the vicinity of the project are known to contain either vertebrate or invertebrate fossils or both (Etchegoin Formation, McLure Shale, Belridge Diatomite, Monterey Shale, Tulare Formation, and the McKittrick Tar Seeps). None of these formations are likely to be encountered during construction of the proposed project and linear facilities. No paleontological resources were identified by the applicant in the Paleontological Resource Inventory (Paleo 1998a) at the project's powerplant footprint. It is staff's understanding that the applicant is working on a supplemental paleontological resources location map that will cover the section of the electric transmission line corridor from the end of the current paleontological resources map entitled "Paleontological Features Near Routes B, D, E, and F page 3 of 3" (undated) to the Midway substation. Along with the map, the applicant is understood to be preparing a key that identifies paleontological resources that have been encountered along the electric transmission line corridor as marked on the paleontological resources maps.

The applicant has discussed the potential for paleontological resources both within and adjacent to the electric transmission line corridor. The following geologic units in the vicinity of the site are known to contain paleontologic resources: Alluvium (scattered terrestrial vertebrate fossils); the Tulare Formation (scattered terrestrial vertebrate fossils); the Etchegoin Formation (near shore marine fossils such as clams, barnacles and sandollars); and the McKittrick Tar Seeps (terrestrial vertebrate and invertebrate fossils). Energy Commission staff have encountered fossil barnacles, sand dollars, and clams in the Etchegoin Formation, and rodent fossils in the McKittrick Tar Seeps in previous projects in western Kings and Kern Counties. Since there are some known paleontological resource locations along and adjacent to the proposed electric transmission lines, Energy Commission staff have proposed conditions of certification that will enable the applicant to mitigate impacts to paleontological resources to a less than significant level should they be encountered during construction, operation, and closure of the project.

SURFACE WATER HYDROLOGY

The project is not located in a 100-year flood zone. Minimum grade for the power plant area will be 1% and all drainage will be directed away from buildings within the footprint. Spill containment features are described by the applicant to have a minimum of one foot of freeboard. The construction and operation of the facility is not likely to adversely affect surface water flow at or down stream from the power plant, or along the linear facility corridor.

IMPACTS

SITE SPECIFIC IMPACTS

The project and the development of seven hundred new wells is not likely to have any impact on geological or paleontological resources since oil and gas can be

recovered by drilling adjacent to the power plant and linear facilities. In addition, no paleontological resources are known to be within the footprint of the powerplant and the installation of new wells disturbs a very minor amount of surface soils. No active faults are known to cross the project or linear facilities. Strong ground shaking at the site and along the linear facilities may be moderate to high but are not unreasonable. The site and linear facilities are not likely to be susceptible to liquefaction due to the extreme depth to ground water. Preliminary geotechnical data for the site does not suggest that on-site soils are prone to expansion.

It is Energy Commission staff's understanding a final geotechnical report for the design of the project has been completed. The report is understood (among other things) to include a review of the potential for collapsible soils at the project site. Surface water drainage is not considered to be adversely impacted due to the shallow slope of the site footprint and the well developed natural drainages near the site and along the linear facilities. Should paleontological resources be encountered either at the power plant or along the linear facilities, the paleontological resources mitigation measures proposed in the conditions for certification should ensure that the paleontological resources are not significantly adversely affected. There will be a minor, insignificant increase in the surface water drainage off-site.

CUMULATIVE IMPACTS

The nearby La Paloma Generating Project and Elk Hills Power Project are located on alluvium and the Tulare Formation. The oil well field in which any new wells would be built is already being developed and has been in operation for many years. The construction and operation of the La Paloma Generating Project, the Elk Hills Power Project, and Sunrise Cogeneration and Power Project are not likely to adversely impact the geologic or paleontologic resources or surface water hydrology if the Sunrise Cogeneration and Power Project is constructed according to the proposed conditions of certification.

FACILITY CLOSURE

There are three kinds of facility closure. A definition and general approach to closure is presented in the General Conditions section of this document. Facility closure activities are not anticipated to impact geological or paleontological resources. This is due to the fact that no paleontological or geological resources are known to exist at the power plant location. In addition, decommissioning and closure of the power plant should not negatively affect geological or paleontological resources since the majority of the ground disturbed in plant decommissioning and closure would have been disturbed in the construction of the plant. Surface water hydrology impacts will depend upon the closure activities proposed.

MITIGATION

Based upon the literature and archives search, field surveys and the preliminary geotechnical investigation for the proposed project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the

power plant and electrical transmission line. Specific engineering geologic design criteria may be included in the upcoming final geologic report for the siting of the project. Energy Commission staff agree with the applicant that there is a low probability that vertebrate fossils will be encountered during construction of the power plant and related features. The mitigation measures provide for identification, evaluation, and recovery of paleontological resources should they be encountered during construction. The mitigation measures proposed by the applicant are listed in Section 8.16.5 through 8.16.5.5 of the application (SC&PP 1998a).

The proposed conditions of certification are to allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure LORS applicable to geological hazards, geological and paleontological resources, and surface water hydrology for the project are complied with.

CONCLUSION AND RECOMMENDATIONS

The applicant will likely be able to comply with applicable LORS. The project should have no adverse impact with respect to geological and paleontological resources and surface water hydrology. Staff propose to ensure compliance with applicable LORS for geological hazards, geological and paleontological resources and surface water hydrology with the adoption of the proposed conditions of certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

GEO-1 Prior to the start of construction, the project owner shall assign to the project an engineering geologist(s), certified by the State of California, to carry out the duties required by the 1998 edition of the California Building Code (CBC) Appendix Chapter 33, Section 3309.4. The certified engineering geologist(s) assigned must be approved by the CPM (the functions of the engineering geologist can be performed by the responsible geotechnical engineer, if that person has the appropriate California license).

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the Kern County Chief Building Official ((CBO)) prior to the start of construction, the project owner shall submit to the CPM the name(s) and license number(s) of the certified engineering geologist(s) assigned to the project. The submittal should include a statement that CPM approval is needed. The CPM will approve or disapprove of the engineering geologist(s) and will notify the project owner of its findings within 15 days of receipt of the submittal. If the engineering geologist(s) is subsequently replaced, the project owner shall submit for approval the name(s) and license number(s) of the newly assigned individual(s) to the CPM. The CPM will approve or disapprove of the engineering geologist(s) and will notify the project owner of the findings within 15 days of receipt of the notice of personnel change.

GEO-2 The assigned engineering geologist(s) shall carry out the duties required by the 1998 CBC, Appendix Chapter 33, Section 3309.4 – Engineered Grading Requirement, and Section 3318.1 - Final Reports. Those duties are:

1. Prepare the Engineering Geology Report. This report shall accompany the Plans and Specifications when applying to the CBO for the grading permit. The report and project Plans and Specifications shall also be submitted to the Energy Commission's CPM at the same time that the report submittal is made to the CBO.

2. Monitor geologic conditions during construction.

3. Prepare the Final Engineering Geology Report.

The Engineering Geology Report required by the 1998 CBC, Appendix Chapter 33, Section 3309.3 - Grading Designation, shall include an adequate description of the geology of the site, conclusions and recommendations regarding the effect of geologic conditions on the proposed development, and an opinion on the adequacy, for the intended use, of the site as affected by geologic factors.

The Final Engineering Geology Report to be completed after completion of grading, as required by the 1998 CBC, Appendix Chapter 33, Section 3318.1, shall contain a final description of the geology of the site and any new information disclosed during grading, and a description of the effect of same on recommendations incorporated in the approved grading plan. The engineering geologist shall submit a statement that, to the best of his or her knowledge, the work within their area of responsibility is in accordance with the approved Engineering Geology Report and applicable provisions of this chapter.

Verification: (1) Within 15 days after submittal of the application(s) for grading permit(s) to the CBO, the project owner shall submit a signed statement to the CPM stating that the Engineering Geology Report has been submitted to the CBO as a supplement to the plans and specifications and that the recommendations contained in the report are incorporated into the plans and specifications. (2) Within 90 days following completion of the final grading, the project owner shall submit copies of the Final Engineering Geology Report required by the 1998 CBC, Appendix Chapter 33, Section 3318 - Completion of Work, to the CPM and the CBO.

GEO-3 Pipelines shall be located with a minimum setback from oil wells (producing wells, idle wells, or plugged and abandoned wells) of fifty feet. All above-ground pipelines shall be located with a minimum setback from oil wells of 125 feet in at least one direction, so that a portable derrick may be raised over the oil well.

Protocol: The project owner shall submit a linear facility (transmission lines and utility lines) development plan, addressing any actions to be undertaken by the project owner to ensure no hazard or problems will be created with the existing wells in the construction site and laydown areas, to the Department of Conservation, Division of Oil and Gas, and geothermal Resources (DOGGR) for review and comment. The linear facility development plan shall include a discussion of how a minimum setback from existing oil wells is to be maintained.

Verification: At least sixty (60) days prior to the start of construction, the project owner shall submit to the CPM a copy of DOGGR's letter commenting on the linear facility development plan. Within fifteen days (15) days of the receipt of the development plan and the DOGGR comment letter on the plan, the CPM will either approve or comment and deny the plan, and transmit the approval or denial letter to the project owner.

PAL-1 Prior to the start of any project-related construction activities (defined as any construction-related vegetation clearance, ground disturbance and preparation, and site excavation activities), the project owner shall ensure that the designated paleontological resources specialist approved by the CPM is available for field activities and prepared to implement the conditions of certification.

The designated paleontological resources specialist shall be responsible for implementing all the paleontological conditions of certification and for using qualified personnel to assist in this work.

Protocol: The project owner shall provide the CPM with the name and statement of qualifications for the designated paleontological resources specialist.

The statement of qualifications for the designated paleontological resources specialist shall demonstrate that the specialist meets the following minimum qualifications: a degree in paleontology or geology or paleontological resource management; and at least three years of paleontological resource mitigation and field experience in California, including at least one year's experience leading paleontological resource mitigation and field activities.

The statement of qualifications shall include a list of specific projects the specialist has previously worked on; the role and responsibilities of the specialist for each project listed; and the names and phone numbers of contacts familiar with the specialist's work on these referenced projects.

If the CPM determines that the qualifications of the proposed paleontological resources specialist do not conform with the above requirements, the project owner shall submit another individual's name and qualifications for consideration.

If the approved, designated paleontological resources specialist is replaced prior to completion of project mitigation, the project owner shall obtain CPM approval of the new designated paleontological resources specialist by submitting the name and qualifications of the proposed replacement to the CPM, at least ten (10) days prior to the termination or release of the preceding designated paleontological resources specialist.

Should emergency replacement of the designated specialist become necessary, the project owner shall immediately notify the CPM to discuss the qualifications of its proposed replacement specialist.

Verification: Ninety (90) days prior to the start of construction, or a lesser period of time mutually agreed to by the project owner and the CPM, the project owner shall submit the name and resume and the availability for its designated paleontological resources specialist, to the CPM for review and approval. The CPM shall provide written approval or disapproval of the proposed paleontological resources specialist.

At least ten (10) days prior to the termination or release of a designated paleontological resources specialist, the project owner shall obtain CPM approval of the replacement specialist by submitting to the CPM the name and resume of the proposed new designated paleontological resources specialist. Should emergency replacement of the designated specialist become necessary, the project owner shall immediately notify the CPM to discuss the qualifications of its proposed replacement specialist.

PAL-2 Prior to the start of project construction, the designated paleontological resources specialist shall prepare a Paleontological Resources Monitoring and Mitigation Plan that identifies general and specific measures to minimize potential impacts to sensitive paleontological resources, and submit this plan to the CPM for review and approval. After CPM approval, the project owner's designated paleontological resources specialist shall be available to implement the Monitoring and Mitigation Plan, as needed, throughout project construction.

In addition to the project owner's adoption of the guidelines of the Society of Vertebrate Paleontologists, dated 1996, the Paleontological Resources Monitoring and Mitigation Plan shall include, but not be limited to, the following elements and measures:

- A discussion of the sequence of project-related tasks, such as any pre-construction surveys, fieldwork, flagging or staking; construction monitoring; mapping and data recovery; fossil preparation and recovery; identification and inventory; preparation of final reports; and transmittal of materials for curation;

- Identification of the person(s) expected to assist with each of the tasks in this condition of certification and a discussion of the tasks and their responsibilities;

- Where monitoring of project construction activities is deemed necessary, the extent of the areas where monitoring is to occur and a schedule for the monitoring;

- An explanation that the designated paleontological resources specialist shall have the authority to halt or redirect construction in the immediate vicinity of a vertebrate fossil find until the significance of the find can be determined;

- A discussion of equipment and supplies necessary for recovery of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

- Expeditious inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontologists standards and requirements for the curation of paleontological resources; and

- Identification of the institution that has agreed to receive any data and fossil materials recovered during project-related monitoring and mitigation work, discussion of any 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.

Verification: Sixty (60) days prior to the start of construction on the project, or a lesser period of time mutually agreed to by the project owner and CPM, the project owner shall provide the CPM with a copy of the Monitoring and Mitigation Plan prepared by the designated paleontological resources specialist for review and approval. If the plan is not approved, the project owner, the designated paleontological resources specialist, and the CPM shall meet to discuss comments and negotiate necessary changes.

PAL-3 Prior to the start of construction, and throughout the project construction period as needed for all new employees, the project owner and the designated paleontological resources specialist shall prepare and conduct CPM-approved training to all project managers, construction supervisors, and workers who operate ground disturbing equipment. The project owner and construction manager shall provide the workers with the CPM-approved set of procedures for reporting any sensitive paleontological resources or deposits that may be discovered during project-related ground disturbance.

Protocol: The paleontological training program shall discuss the potential to encounter fossil resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

The training shall also include the set of reporting procedures that workers are to follow if paleontological resources are encountered during project activities. The training program shall be presented by the designated paleontological resources specialist and may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern.

Verification: Thirty (30) days prior to the start of project construction, or a lesser period of time mutually agreed to by the project owner and the CPM, the project owner shall submit to the CPM for review, comment, and written approval, the proposed employee training program and the set of reporting procedures the workers are to follow if paleontological resources are encountered during project construction.

If the employee training program and set of procedures are not approved, the project owner, the designated paleontological resources specialist, and the CPM shall meet to discuss comments and negotiate necessary changes, before the beginning of construction.

Documentation for training of additional new employees shall be provided in subsequent Monthly Compliance Reports, as appropriate.

PAL-4 The designated paleontological resources specialist shall be present at all times he or she deems appropriate to monitor construction-related grading, excavation, trenching, and/or augering in areas where potentially fossil-bearing sediments have been identified. If the designated paleontological resources specialist determines that full-time monitoring is not necessary in certain portions of the project area or along portions of the linear facility routes, the designated specialist shall notify the project owner.

Verification: The project owner shall include in the Monthly Compliance Reports a summary of paleontological activities conducted by the designated paleontological resources specialist.

PAL-5 The project owner, through the designated paleontological resources specialist, shall ensure recovery, preparation for analysis, analysis, identification and inventory, the preparation for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during the monitoring, data recovery, mapping, and mitigation activities related to the project.

Verification: The project owner shall maintain in its compliance files copies of signed contracts or agreements with the designated paleontological resources specialist and other qualified research specialists who will ensure the necessary data and fossil recovery, mapping, preparation for analysis, analysis, identification and inventory, and preparation for and delivery of all significant paleontological resource materials collected during data recovery and mitigation for the project. The project owner shall maintain these files for a period of three years after completion and approval of the CPM-approved Paleontological Resources Report and shall keep these files available for periodic audit by the CPM.

PAL-6 The project owner shall ensure preparation of a Paleontological Resources Report by the designated paleontological resources specialist. The Paleontological Resources Report shall be completed following completion of the analysis of the recovered fossil materials and related information. The project owner shall submit the paleontological report to the CPM for approval.

Protocol: The report shall include, but not be limited to, a description and inventory list of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the paleontological resources specialist that project impacts to paleontological resources have been mitigated.

Verification: The project owner shall submit a copy of the Paleontological Resources Report to the CPM for review and approval under a cover letter stating that it is a confidential document. The report is to be prepared by the designated paleontological resources specialist within 90 days following completion of the analysis of the recovered fossil materials.

PAL-7 The project owner shall include in the facility closure plan a description regarding facility closure activity's potential to impact paleontological resources. The conditions for closure will be determined when a facility closure plan is submitted to the CPM twelve months prior to closure of the facility. If no activities are proposed that would potentially impact paleontological resources, then no mitigation measures for paleontological resource management are required in the facility closure plan.

Protocol: The closure requirements for paleontological resources are to be based upon the Paleontological Resources Report and the proposed grading activities for facility closure.

Verification: The project owner shall include a description of closure activities described above in the facility closure plan.

REFERENCES

CDMG (California Division of Mines and Geology). 1994. Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions.

ICBO (International Conference of Building Officials). 1998. Maps of Known Active Near Source Zones in California and Adjacent Portions of Nevada, February. Map Sheet J-27.

Paleo (Paleo Environmental Associates/E.B. Lander) 1998a. Paleontological Resource Inventory/Impact Assessment Technical Report prepared in support of Proposed Texaco Sunrise Cogeneration Project, Kern County, CA. Submitted to Radian International, LLC on December 21, 1998 (revised June 30, 1999).

SCPP (Sunrise Cogeneration and Power Project). 1998a. Application for Certification, Sunrise Cogeneration and Power Project (98-AFC-4). Submitted to the California Energy Commission, December 21,1998.

SCPP (Sunrise Cogeneration & Power Project) 1999k. Transmission Alternatives, Supplement Two. Submitted to the California Energy Commission on May 21 1999.

SCPP (Sunrise Cogeneration & Power Project) 1999m. Transmission Supplemental 2 – Sections 3.0, 4.0, remaining Appendices and Errata. Submitted to the California Energy Commission on June 4, 1999.

SVP (Society of Vertebrate Paleontologists). 1994. Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources: Standard Procedures. October.

FACILITY DESIGN

Testimony of Steve Baker, Kisabuli and Al McCuen

INTRODUCTION

The purpose of the Facility Design analysis is to verify that applicable laws, ordinances, regulations and standards (LORS) have been identified and that the project and ancillary facilities have been described in sufficient detail, including design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all those LORS enacted to protect environmental quality and assure public health and safety.

This analysis also examines whether special design features should be considered during final design to deal with conditions unique to the site which could influence public health and safety, environmental protection or the operational reliability of the project. This analysis further establishes conditions of certification to ensure that a design review and construction inspection process will be employed that carries out the intent of the LORS and any special design requirements.

FINDINGS REQUIRED

The Warren Alquist Act requires the commission to "prepare a written Decision ….which includes…(a) Specific provisions relating to the manner in which the proposed facility is to be designed, sited, and operated in order to protect environmental quality and assure public health and safety [and] (d)(1) Findings regarding the conformity of the proposed site and related facilities…with public safety standards…and with other relevant local, regional, state and federal standards, ordinances, or laws…(Pub. Resources Code, §25523).

SUBJECTS DISCUSSED

Subjects covered in this analysis include:

1. Identification of the LORS applicable to facility design;

2. Evaluation of the applicant's proposed design criteria, including the identification of those which are essential to ensuring protection of the environment and/or public health and safety;

3. Proposed modifications and additions to the AFC that are necessary to comply with applicable LORS; and

4. Conditions of certification proposed by staff to ensure that the project will be designed and constructed to comply with all those LORS enacted to protect environmental quality and assure public health and safety.

SETTING

The applicant proposes to construct and operate the Sunrise Cogeneration and Power Project (SCPP or the Sunrise project), a 320-megawatt (MW) powerplant in western Kern County, California. Sunrise is located on a 20-acre site, in Section 23, Township 31 South, Range 22 East in western Kern County, California. Sunrise is located in seismic zone 4, the highest seismic shaking zone in the country. Additional engineering details of the proposed project are contained in the Application for Certification (AFC), in Appendices I-1 through I-7 (SCPC 1998a).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable LORS for each engineering discipline, civil, structural, mechanical and electrical are included as part of the engineering appendices, Appendix I and summarized in Section 9.0, Engineering (SCPC 1998a). A summary of these LORS include: Title 24, California Code of Regulations, which adopts the current edition of the CBC as minimum legal building standards; the 1998 California Building Code (CBC) for design of structures; the 1996 Structural Engineers Association of California's Recommended Lateral Force Requirements, for seismic design; ASME-American Society of Mechanical Engineers Boiler and Pressure Vessel Code; and NEMA-National Electrical Manufacturers Association.

ANALYSIS

The basis of this analysis is the applicant's proposed analysis methods, construction methods, and list of LORS, and design criteria, set forth in the AFC. Applicable engineering sections include:

Section 1.2	Project Ownership
Section 1.5	Project Schedule
Section 2	Project Description
Section 4	Facility Closure
Section 6	Electric Transmission
Section 7	Natural Gas Supply

Appendices

1. Appendix I-1 Civil Engineering Design Criteria
2. Appendix I-2 Structural Engineering Design Criteria
3. Appendix I-3 Mechanical Engineering Design Criteria
4. Appendix I-4 Electrical Engineering Design Criteria
5. Appendix I-5 Control Systems Engineering Design Criteria
6. Appendix I-6 Chemical Engineering Design Criteria

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 Appendix I-1 for a list of the applicable industry standards), design practices, and construction methods in preparing and developing the site. The applicant's proposed methods follow industry standard practices. Staff concludes that the project, including its linear facilities, is likely to comply with the applicable site preparation LORS, and proposes conditions of certification included below 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 or that require a long lead time to repair or replace or those used for the storage, containment, or handling of hazardous or toxic materials. Major structures and equipment are listed in the conditions of certification (**GEN-2** below).

The AFC contains a list of the civil, structural, mechanical and electrical design criteria which demonstrate the likelihood of compliance with applicable LORS essential to ensuring that the project is designed in a manner which protects the environment and/or public health and safety. The purpose of the code (1998 CBC) is to provide a minimum standard to safeguard life or limb, health, property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all building and structures. For example, the earthquake provision is primarily to safeguard against major structure failure and loss of life, not to limit damage or maintain function. The code also regulates the design and construction of piping, tubing, tanks and other vessels containing combustible, corrosive, irritants and other hazardous materials.

PROPOSED MODIFICATIONS

The AFC (SCPP 1998a, Appendices I-1 and I-2) identifies applicable LORS, which include the 1997 UBC. The project should be designed and constructed to the 1998 edition of the CBC, and other applicable codes and standards, in effect at the time design and construction of the project actually commence. In the event the design of Sunrise is submitted to the Chief Building Official (CBO)[1] for review when the successor to the 1998 CBC is in effect, the 1998 CBC provisions, identified herein, shall be replaced with the applicable successor provisions.

CODE DESIGN CRITERIA

The procedures and limitations for the design of structures by the 1998 CBC are determined considering zoning, site characteristics, occupancy, structural configuration, structural system and height. Two of the major parameters in the selection of design criteria are occupancy and structural configuration.

Four categories of occupancy are defined in Table 16-K of the 1998 CBC: Essential, Hazardous, Special and Standard. The CBC defines two categories of structural

[1]CBO is the City or County Chief Building Official, his or her representative or the California Energy Commission's duly appointed representative.

irregularities in Tables 16-L (Vertical Structural Irregularities) and 16-M (Plan Structural Irregularities). Regular structures are defined as having no significant physical discontinuities in plan or vertical configuration or in their lateral force-resisting systems such as those identified for irregular structures.

Two different design and analysis procedures are recognized in the 1998 CBC for determining seismic effects on structures. Dynamic Analysis Procedures of Section 1631 is always acceptable for design. The Static Force Procedure of Section 1630 is allowed only under certain conditions of regularity, occupancy and height.

STATIC ANALYSIS

In seismic Zones 3 and 4, the static lateral force procedure of Section 1630 may be used for the following:

1. Regular structures under 240 feet in height with lateral force resistance provided by systems, listed in Table 16-N, except where Section 1629.8.4, Item 4, applies. (Structures, regular or irregular, located on Soil Profile Type S_F, that have a period greater than 0.7 second require dynamic analysis.)

2. Irregular structures not more than five stories or 65 feet in height.

DYNAMIC ANALYSIS

In seismic zones 3 and 4, the dynamic lateral-force procedure of Section 1631 shall be used for all other structures, including the following:

1. Structures having a stiffness, weight or geometric vertical irregularity of Type 1, 2 or 3, as defined in Table 16-L, or structures having irregular features not described in Table 16-L or 16-M, except as permitted by Section 1630.4.2 (Where a combination of structural systems is included in the same structure, the structure can be analyzed as two independent structures for purposes of determining regularity.)

2. Structures over five stories or 65 feet, not having the same structural system throughout their height except as permitted by Section 1631.2. (An elastic design response spectrum constructed in accordance with Figure 16-3 of the 1998 CBC, using the values of C_a and C_v consistent with the specific site can be used.)

3. Structures, regular or irregular, located on Soil Profile Type S_F, that have a period greater than 0.7 seconds.

STRUCTURES REQUIRING DYNAMIC ANALYSIS

Because of structural irregularity, the following major structures, equipment and components may be subjected to dynamic analysis requirements of Section 631 of the 1998 CBC: Combustion turbine generator (CTG) foundation, heat recovery steam generator (HRSG) structure and foundation, exhaust stack and foundation, feedwater storage tank and foundation and step-up transformers and foundations. Other structures and components may also be candidates for dynamic analysis; see

the list of major structures and equipment included in Proposed Condition of Certification **GEN-2** below.

In order to ensure that those structures, components and pieces of equipment requiring dynamic analysis to comply with the code actually receive this treatment, staff proposes that the applicant and staff agree to a list of such items before design progresses. This requirement is incorporated in Proposed Condition of Certification **STRUC-1** below.

CIVIL/STRUCTURAL FEATURES

The Sunrise project will consist of two cogeneration trains, each comprising one CTG, one HRSG and one stack. The balance of plant (BOP) will include a single 2.4 million gallon feedwater storage tank, a 4,500 gallon anhydrous ammonia storage tank and feedwater pumps. The CTGs and HRSGs will be located outdoors. The applicant proposes that these major components will be supported on reinforced concrete mat foundations at grade. Each HRSG will be provided with a self-supporting steel stack. The stacks will extend 100 feet above grade.

Information provided in AFC, Appendix I-7, - indicates that the site soil is susceptible to hydrocompaction, therefore supporting such major pieces of equipment on mat foundations would not be appropriate. Staff recommends that pile foundations be used to support the major project structures and equipment. An alternative method would be to over-excavate the soil at the powerplant footprint and replace it with engineered fill. The review and approval of the design, plans, specifications and drawings of the major structure foundations, including pile foundations, is incorporated in proposed Condition of Certification **STRUC-1** below.

MECHANICAL SYSTEMS

Mechanical features of the project include two CTGs and HRSGs. Each CTG system will be capable of producing approximately 165 MW of electricity at site conditions. Power will be generated by the CTGs at 18 kV and stepped up by two transformers to 230 kV in a new substation (the Sunrise Substation) directly east of the cogeneration plant.

Exhaust gas from each CTG will flow directly through an unfired "single-pass" HRSG with an SCR, before passing through an exhaust stack. Each HRSG will be designed to produce steam at operating conditions of approximately 574° F and at 1,250 pounds per square inch gauge to Texaco California, Inc. (TCI) steam injection wells for use in enhanced oil recovery (EOR).

The CTGs will be equipped with dry-low NO_X combustors used to control NO_X. The HRSG will be equipped with anhydrous ammonia, selective catalytic reduction (SCR) system and associated support equipment The CTGs will also be equipped with evaporative cooling for power augmentation. The Sunrise project will not incorporate HRSG bypass stacks. As such, the HRSG will always be in operation when the associated CTG is operating. Operation of the CTG without generation of cogeneration steam will not be possible.

Other features of the project include: water and wastewater treatment equipment; pressure vessels, piping systems and pumps; anhydrous ammonia storage, handling and piping system; air compressors; fire protection systems; and heating, ventilation, air conditioning (HVAC), potable water, plumbing and sanitary sewage systems.

MECHANICAL LORS AND DESIGN CRITERIA

The application (SCPC 1998a, Appendix I-3) lists and describes the mechanical codes, standards and design criteria that will be employed in project design documents, procurement specifications and contracts. Design work will be performed in accordance with the appropriate LORS. This list indicates that the applicant is aware of the codes, standards, and design criteria appropriate for such a project. This approach will likely assure the project's mechanical systems are designed to the appropriate codes and standards. Staff has proposed conditions of certification (**MECH-1** through **MECH-4**, below) to monitor compliance with this requirement.

ELECTRICAL SYSTEMS

Multiple 230 kV transmission line alternatives are being considered to interconnect the Sunrise project to the grid. Route B which is 23.3 miles long (preferred) would connect the Sunrise project directly to PG&E's Midway Substation (Midway) near Buttonwillow.

Routes D, E, and F (parallel to route B) are subsets of the route B corridor and consist of consolidating one or more transmission lines planned by other developers with the Sunrise project transmission line. Route D, 23.7 miles long, would connect the Sunrise project to a future Midway-Sunset Cogeneration Company (MSCC), substation, and then would connect MSCC and Midway with a joint-ownership transmission line.

Route E, 24.2 miles long, would connect the Sunrise project and MSCC then would connect MSCC to the La Paloma substation with a joint-ownership transmission line, and then would connect all parties to Midway with a joint-ownership transmission line. Route F, 24.2 miles long, would connect the Sunrise project to the proposed La Paloma substation, and then would connect La Paloma and Midway with a joint-ownership transmission line.

Other major electrical features of the project include generators, power control wiring, protective relaying, grounding system, cathodic protection system and site lighting (SCPC 1998a, Appendix I-4).

1. Power and Control Wiring. In general, conductors will be insulated on the basis of a normal maximum conductor temperature of 90ºC in 40ºC ambient air with a maximum emergency overload temperature of 130ºC and a short circuit temperature of 250ºC. In areas with higher ambient temperatures, larger conductors will be used or higher temperature rated insulation will be selected.

2. Protective Relaying. These relays protect equipment in the auxiliary power supply system, generator terminal systems, 230 kV system, 4.16 kV systems, turbine-generator system, and the electrical loads powered from these systems. The protective relaying scheme will be designed to remove or alarm any of the abnormal occurrences.

3. Classification of Hazardous Areas. Areas where flammable and combustible liquids, gases, and dusts are handled and stored will be classified for determining the minimum criteria for design and installation of electrical equipment to minimize the possibility of ignition. The criteria for determining the appropriate classification are specified in Article 500 of the National Electrical Code (NFPA/ANSI C1).

4. Grounding. The station grounding system will be an interconnected network of bare copper conductors and copper clad ground rods. The system will be provided to protect plant personnel and equipment from hazard, which can occur during power system faults and lightning strikes. The station-grounding grid will be designed for adequate capacity to dissipate heat from ground current under the most severe conditions in areas of high ground fault current concentrations.

5. Site Lighting. The site lighting system will provide personnel with illumination for the performance of general yard tasks, safety, and plant security. Power used to supply outdoor roadway and area lighting, will be 277 volts.

6. Freeze Protection. A freeze protection system will be provided for selected outdoor piping as required. Parallel circuit type heating cable will be utilized where possible.

7. Cathodic Protection System. Cathodic protection and other corrosion control measures for all plant structures, including the exterior surface of underground piping and bottoms of surface mounted steel tanks will be provided as required.

The AFC (SCPC 1998a, Appendix I4) lists and describes the electrical codes, standards and design criteria that will be employed in project design documents, procurement specifications and contracts. Design work will be performed in accordance with the appropriate LORS. This list indicates that the applicant is aware of the codes, standards, and design criteria appropriate for such a project. This approach will likely assure the project's electrical systems are designed to the appropriate codes and standards.

Staff concludes that the applicant can design the electrical systems in accordance with all LORS and in a manner which protects the environment and public health and safety by complying with the applicable LORS and electrical design criteria (SCPP 1998a, Appendix I4). Staff has proposed conditions of certification (**ELEC-1** and **ELEC-2**, below) to monitor this compliance.

ANCILLARY FACILITIES

NATURAL GAS FUEL LINE

A new 60-foot natural gas supply pipeline will be built to interconnect with a TCI gas pipeline.

EMISSION CONTROLS

NOx emissions from the combustion process will be reduced to 2.5 parts per million by volume dry (ppmvd), or less, at 15 percent oxygen, by utilizing dry low NOx combustion technology and a SCR system. The SCR system will use anhydrous ammonia for the reduction process.

WATER SUPPLY

The facility's consumptive fresh water requirements will be minimal, since the primary project water supply will be pretreated, produced water from the adjacent oilfield operations. A small quantity of potable water and service water will be required for domestic purposes and possibly evaporative cooler makeup. It is anticipated that the West Kern Water District will be the source of this fresh water.

WASTE WATER

Small quantities of non-hazardous waste water, comprised mainly of process drains and evaporative cooler blowdown will be directed to a new waste water line, approximately 600 feet west of the site to the TCI Main Utility Corridor, and ultimately to the Valley Waste system. Valley Waste is a cooperative that handles wastewater from area oil field operations.

STEAM LINE

A steam line of approximately 600 feet in length and 24 inches in diameter will be constructed west of the site fence-line to interconnect with the TCI main utility corridor. The steam line will be constructed of insulated steel in accordance with piping for chemical and petroleum plants, American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME) B31.3.

PROJECT QUALITY PROCEDURES

The AFC 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 powerplant (SCPP 1998a, §2.4.5). Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this QA/QC program will likely ensure that the project is designed, procured, fabricated and installed in accordance with LORS.

COMPLIANCE MONITORING

Staff has developed conditions of certification (see the section below, titled "Proposed Conditions of Certification") to ensure that the design measures and LORS requirements are carried out in a manner that results in the protection of the

environment and of public health and safety. Some of these facility design conditions address the roles, responsibilities and qualifications of 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 proceed without approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

FACILITY CLOSURE

A facility closure was evaluated under three scenarios. Planned Closure, Unexpected Temporary Closure and Unexpected Permanent Closure.

PLANNED 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. 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 and Kern County for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of the following items:

1. Proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;

2. All applicable LORS, local/regional plans, and a discussion of the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;

3. The activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and

4. Decommissioning alternatives, other than complete site restoration.

UNEXPECTED TEMPORARY CLOSURE

Under this scenario, it is expected that the facility is closed unexpectedly, on a short-term basis. Natural disasters, such as an earthquake or severe storm, can cause an unexpected temporary closure of the facility. If damage to the facilities is too great, the temporary closure may become permanent.

If the facility is closed on a temporary basis, the applicant shall secure the site in order to protect public health and safety. If temporary closure becomes permanent,

the applicant shall follow the “Planned Closure” procedures outlined in the Planned Closure.

UNEXPECTED PERMANENT CLOSURE

Under this scenario, the project owner closes the facility unexpectedly on a permanent basis. In this case, the project owner shall implement the closure procedures outlined above for “Planned Closure”.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. To ensure that these measures are included in the Facility Closure Plan, staff has proposed a Condition of Certification (**GEN-9**) 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 AFC, and the project LORS and design criteria in the record. Staff concludes that the design, construction and eventual closure of the project are likely to comply with applicable LORS. If properly implemented, design criteria, including staff proposed modifications, will ensure that LORS are met during the project design and construction phases.

3. The conditions of certification proposed will ensure that the proposed facilities are designed, constructed, operated, and eventually closed in accordance with applicable LORS. This will occur through the use of design review, plan checking and field inspections, which are to be performed by the local CBO or other commission delegate agent. Staff will audit the CBO or delegate agent 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 required by **GEN-9**, prior to the commencement of decommissioning, that the decommissioning procedure is likely to result in satisfactory decommissioning performance.

RECOMMENDATIONS

If the Energy Commission certifies the project, staff recommends that:

1. The Conditions of Certification proposed herein be adopted to ensure that the project is designed and constructed to comply with those LORS enacted to protect environmental quality, and assure public health and safety;

2. The project be designed and built to the 1998 CBC (or successor standard, if such is in effect);

3. The CBO reviews the final designs, conducts plan checking and performs field inspections during construction and staff audit and monitor the CBO to ensure satisfactory performance; and

4. Since the site soil is susceptible to hydrocompaction, use pile foundations to support the major project structures and equipment. An alternative method would be to replace the soil at the powerplant footprint with engineered fill.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct and inspect the project in accordance with the 1998 California Building Code (CBC)[2] and all other applicable LORS in effect at the time initial design plans are submitted to the CBO for review and approval. The CBC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously.

In the event that the SCPP is submitted to the CBO when a successor to the 1998 CBC is in effect, the 1998 CBC provisions identified herein shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction, or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

Verification: Within 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) after receipt of the Certificate of Occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation and inspection requirements of the applicable LORS and the Energy Commission's Decision have been met for facility design. The project owner shall provide the

[2] The Sections, Chapters, Appendices and Tables, unless otherwise stated, refer to the Sections, Chapters, Appendices and Tables of the 1998 California Building Code (CBC).

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 The project owner shall furnish to the Energy Commission 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 description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major structures and equipment below). To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Table 1: Major Equipment List

Quantity	Description	Size/Capacity*	Remarks
2	Combustion Turbine (CT).	164.2 MW.	Dry low No_X combustion control and starter package.
2	CT inlet filter.		Two-stage, media type.
2	Inlet air cooling system.		Evaporative type.
2	Fuel gas scrubbers.	43.80 MMSCFD.	340 psig minimum inlet pressure.
2	Heat Recovery Steam Generator (HRSG).	900,000 lb./hr minimum.	
2	HRSG stack.		19' dia. X 100' high.
2	Selective catalytic reduction (SCR).		Sized to achieve BACT/LEAR.
2	Ammonia injection skid.		Two blowers per HRSG.
1	Anhydrous ammonia storage tank.	5,300 gal.	To injection skid.
3	HRSG feed pump.	2,050 gpm.	From tank to HRSGs.
1	Feedwater storage tank.	1.4 million gal.	To feed water pumps.
1	Demineralized water storage tank.	18,800 gal.	
2	Generator transformers.	18/230 kV.	To Sunrise Substation.
2	Auxiliary transformer.	4.16/18 kV.	To Cogen plant loads.

Table 2: Major Structures, Equipment and Associated Foundations

Quantity	Description	Dimensions (ft)*		
		Length	Width	Height
2	Combustion gas turbine generator and starter package (CT).	64	30	30
2	CT air inlet filter with air cooling system.	40	30	57
2	Generator with enclosure.	36	25	30
2	Fuel gas scrubber.	--	2.5 dia.	7
2	Heat Recovery Steam Generator (HRSG).	100	70	30
2	HRSG stack.		19 dia.	100
2	Selective catalytic reduction skid (SCR).	10	6	6
2	Generator breaker.	12	10	8
4	Auxiliary transformer.	14	10	14
2	Step-up transformer.	35	18	30
1	Demineralized water storage tank.	--	12 dia.	24
1	Feedwater storage tank.	--	67dia.	40
1	Anhydrous ammonia storage tank.	25	6 dia.	--
1	Switchyard, buses and towers.	--	22 (3 phases)	28 (high bus)
1	Electrical/equipment building.	35	20	12
1	Wastewater collection basin.	26.5	8	15
1	Switchyard control building (Sunrise).	40	20	14
1	Common Service Building.	152	30	20

***All capacities and dimensions are approximate and may change during project final design.**

Verification: At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The project owner shall provide schedule updates in the Monthly Compliance Report.

GEN-3 The project owner shall make payments to the CBO for design review, plan check and construction inspection, equivalent to 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. If Kern County has adjusted the CBC fees for design review, plan check and construction inspection, the project owner shall pay the adjusted fees.

Verification: The project owner shall make the required payments to the CBO at the time of submittal of the plans, design calculations, specifications, or soil reports. 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 fee has 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 of Regs., tit. 24, § 4-209, Designation of Responsibilities).]

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.

Protocol: The RE shall:

1. Monitor construction progress to ensure compliance with LORS;

2. Ensure that construction of all the facilities 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 a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the name, qualifications 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 name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

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 geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer who is either a structural engineer or a civil engineer who is fully competent and proficient in the design of power plant structures and equipment supports; D) a mechanical engineer; and E) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730 and 6736. Requires state registration to practice as a civil engineer or structural engineer in California.]

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 engineers assigned to the project. [1998 CBC, Section 104.2, Powers and Duties of Building Official.]

If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Protocol: A: The civil engineer shall:

1. Design, or be responsible for design, stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads, and sanitary sewer systems; and

2. Provide consultation to the RE during the construction phase of the project, and recommend changes in the design of the civil works facilities and changes in the construction procedures.

Protocol: B: The geotechnical engineer or civil engineer, experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports, and prepare final soils grading report;

2. Prepare the soils engineering reports required by the 1998 CBC, Appendix Chapter 33, Section 3309.5 – Soils Engineering Report, and Section 3309.6 – Engineering Geology Report;

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;

4. Recommend field changes to the civil engineer and RE;

5. Review the geotechnical report, field exploration report, laboratory tests, and engineering analyses detailing the nature and extent of the site soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load; and

6. Prepare reports on foundation investigation to comply with the 1998 CBC, Chapter 18 section 1804, Foundation Investigations.

This engineer shall be authorized to halt earthwork and to require changes; if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations. [1998 CBC, section 104.2.4, Stop orders.]

Protocol: C: 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 LORS;

4. Evaluate and recommend necessary changes in design; and

5. Prepare and sign all major building plans, specifications and calculations.

Protocol: D: 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.

Protocol: E: The electrical engineer shall:

1. Be responsible for the electrical design of the project; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

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.

Protocol: 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; 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 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 The project owner shall keep the CBO informed regarding the status of engineering and construction. If any discrepancy in design and/or construction is discovered, the project owner shall document the discrepancy and recommend the corrective action required. The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, the applicable sections of the CBC and/or other LORS.

Verification: The project owner shall submit monthly construction progress reports to the CBO and CPM. The project owner shall transmit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, 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. 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.]

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, (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.

GEN-9 The project owner shall file a closure/decommissioning plan with Kern County and the CPM for review and approval at least 12 months (or other mutually agreed to time) prior to commencing the closure activities. If the project is abandoned before construction is completed, the project owner shall return the site to its original condition.

Protocol: The closure plan shall include a discussion of the following:

1. The proposed closure/decommissioning activities for the project and all appurtenant facilities constructed as part of the project;

2. All applicable LORS, all local/regional plans, and a discussion of the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;

3. Activities necessary to restore the site if the SCPP decommissioning plan requires removal of all equipment and appurtenant facilities; and

4. Closure/decommissioning alternatives, other than complete restoration of the site.

Verification: At least 12 months prior to closure or decommissioning activities, the project owner shall file a copy of the closure/decommissioning plan with Kern County and the CPM for review and approval. Prior to the submittal of the closure plan, a meeting shall be held between the project owner and the CPM for discussing the specific contents of the plan.

CIVIL-1 Prior to the start of site grading, the project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils report as required by the 1998 CBC, Appendix Chapter 33, Section 3309.5, Soils Engineering Report and Section 3309.6, Engineering Geology Report.

Verification: At least 15 days prior to the start of site grading, the project owner shall submit the documents described above to the CBO for 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 geotechnical engineer or civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area. [1998 CBC, Section 104.2.4, Stop orders.]

Verification: The project owner shall notify the CPM, within five days, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within five days of the CBO's approval, the project owner shall provide to the CPM a copy of the CBO's approval to resume earthwork and construction in the affected areas.

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 shall be subject to inspection by the CBO and the CPM.

If, in the course of inspection, it is discovered that the work is not being done in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The project owner shall prepare a written report detailing all discrepancies and non-compliance items, and the proposed corrective action, and send copies to the CBO and the CPM.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a Non-Conformance Report (NCR), and the proposed corrective action. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following Monthly Compliance Report.

CIVIL-4 After completion of 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, the project owner shall submit to the CBO for review and approval the applicable designs, plans and drawings, and a list of those project structures, components and major equipment items that will undergo dynamic structural analysis. Designs, plans and drawings shall be those for:

1. Major project structures;
2. Major foundations, equipment supports and anchorage;
3. Pile foundations to support major structures and equipment;
4. Large field fabricated tanks;
5. Turbine/generator pedestal; and
6. Switchyard structures.

Protocol: The project owner shall:

1. Obtain agreement with the CBO and California Energy Commission staff on the list of those structures, components and major equipment items to undergo dynamic structural analysis;
2. Meet the pile design requirements of the 1998 CBC. Specifically, Section 1807, General Requirements, Section 1808, Specific Pile Requirements, and Section 1809, Foundation Construction (in seismic zones 3 and 4);

3. 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];

4. 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 90 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

5. 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 a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of any increment of construction, the project owner shall submit to the CBO, with a copy to the CPM, the responsible design engineer's signed statement that the final design plans, specifications and calculations conform with all of the requirements set forth in the Energy Commission's Decision.

If the CBO discovers non-conformance with the stated requirements, the project owner shall resubmit the corrected plans to the CBO within 20 days of receipt of the nonconforming submittal with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and are in conformance with the requirements set forth in the applicable LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following:

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 structure 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 to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 1998 CBC, Chapter 1, Section 106.3.2, Submittal documents, and Section 106.3.3, Information on plans and specifications, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the Monthly Compliance Report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in Chapter 3, Table 3-E of the 1998 CBC shall, at a minimum, be designed to comply with Occupancy Category 2 of the 1998 CBC. Chapter 16, Table 16–K of the 1998 CBC requires use of the following seismic design criteria: $I = 1.25$, $I_p = 1.5$ and $I_W = 1.15$.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of installation of the tanks or vessels containing the above specified quantities of highly toxic or explosive substances that would be hazardous to the safety of the general public if released, the project owner shall submit to the CBO for 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 Prior to the start of any increment of piping construction, the project owner shall submit, for CBO review and approval, the proposed final design drawings, specifications and calculations for each plant piping system (exclude domestic water, refrigeration systems, and small bore piping, i.e., piping and tubing with a diameter equal to or less than two and one-half inches). The submittal shall also include the applicable QA/QC procedures. The project owner shall design and install all piping, other than domestic water, refrigeration, and small bore piping to the applicable edition of the

CBC. Upon completion of construction of any piping 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.]

Protocol: The responsible mechanical engineer shall submit a signed and stamped statement to the CBO when:

1. The proposed final design plans, specifications and calculations conform with all of the piping requirements set forth in the Energy Commission's Decision; and

2. All of the other piping systems, except domestic water, refrigeration systems and small bore piping have been designed, fabricated and installed in accordance with all applicable ordinances, regulations, laws and industry standards, including, as applicable:

   - 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); and
   - Specific City/County code.

   The CBO may require the project owner to employ special inspectors to report directly to the CBO to monitor shop fabrication or equipment installation. [1998 CBC, Section 104.2.2, Deputies.]

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of any increment of piping construction, the project owner shall submit to the CBO for approval, with a copy of the transmittal letter to the CPM, the proposed final design plans, specifications, calculations and quality control procedures for that increment of construction of piping systems, including a copy of the signed and stamped engineer's certification of conformance with the Energy Commission's Decision. The project owner shall transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

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 a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for review and approval, final design plans, specifications and calculations, 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 send copies of the CBO plan check approvals to the CPM in the following Monthly Compliance Report. The project owner shall also transmit a copy of the CBO's and/or Cal-OSHA inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-3 Prior to the start of construction of any heating, ventilating, air conditioning (HVAC) or refrigeration system, the project owner shall submit to the CBO for review and approval the design plans, specifications, calculations and quality control procedures for that 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 applicable edition of the CBC. 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 a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans and specifications, including a copy of the

signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable edition of the CBC, with a copy of the transmittal letter to the CPM.

The project owner shall send copies of CBO comments and approvals to the CPM in the next Monthly Compliance Report. The project owner shall transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-4 Prior to the start of each increment of plumbing construction, the project owner shall submit for CBO's approval the final design plans, specifications, calculations, and QA/QC procedures for all plumbing systems, potable water systems, drainage systems (including sanitary drain and waste), toilet rooms, building energy conservation systems, and temperature control and ventilation systems, including water and sewer connection permits issued by the local agency. Upon completion of any increment of construction, the project owner shall request the CBO's inspection approval of said construction. [1998 CBC, Section 108.3, Inspection Requests, Section 108.4, Approval Required.]

Protocol: The project owner shall design, fabricate and install:

1. Plumbing, potable water, all drainage systems, and toilet rooms in accordance with Title 24, California Code of Regulations, Division 5, Part 5 and the California Plumbing Code (or other relevant section(s) of the currently adopted California Plumbing Code and Title 24, California Code of Regulations); and

2. Building energy conservation systems and temperature control and ventilation systems in accordance with Title 24, California Code of Regulations, Division 5, Chapter 2-53, Part 2.

The final plans, specifications and calculations shall clearly reflect the inclusion of approved criteria, assumptions and methods used to develop the design. In addition, the responsible mechanical engineer shall stamp and sign all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with all of the requirements set forth in the Energy Commission's Decision.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction of any of the above systems, the project owner shall submit to the CBO the final design plans, specifications and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable edition of the CBC, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

The project owner shall transmit a copy of the CBO's inspection approvals to the CPM in the next Monthly Compliance Report following completion of that increment of construction.

ELEC-1 For the 480 volts and higher systems, the project owner shall not begin any increment of electrical construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. [1998 CBC, Section 108.4, Approval Required, and Section 108.3, Inspection Requests.]

Protocol: The following activities shall be reported in the Monthly Compliance Report:

1. receipt or delay of major electrical equipment;
2. testing or energization of major electrical equipment; and
3. the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for electrical equipment and systems 480 volts and greater, including a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

ELEC-2 The project owner shall submit to the CBO the required number of copies of items A and B for review and approval and one copy of item C [CBC 1998, Section 106.3.2, Submittal documents.]

A. Final plant design plans to include:
   1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems;
   2. system grounding drawings;
   3. general arrangement or conduit drawings; and
   4. other plans as required by the CBO.

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;

7. lighting energy calculations; and
8. other reasonable calculations as customarily required by the CBO.

C. 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 a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of electrical equipment installation, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations, for electrical equipment and systems 480 volts and greater enumerated above, including a copy of the signed and stamped statement from the responsible electrical engineer certifying compliance with the applicable LORS. The project owner shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

REFERENCES

CEC (California Energy Commission) 1998g. Sunrise Cogeneration and Power Project, Data Adequacy Recommendation. Submitted to Commissioners Michal Moore, Jananne Sharpless, William Keese, Robert Laurie and David Rohy on January 15, 1999.

CEC (California Energy Commission) 1999j. Sunrise Cogeneration and Power Project Data Adequacy Recommendation. Submitted to Commissioners Michal Moore, William Keese, Jananne Sharpless, Robert Laurie and David Rohy on February 1, 1999.

CEC (California Energy Commission/Kisabuli) 1999pp. Sunrise Data Responses, A Conversation with Robert Stephenson, Black & Veatch. May 27, 1999.

CEC (California Energy Commission/Steve Baker) 1999qq. Telephone Conversation with Texaco, Sunrise Facility Design Data Requests. May 27, 1999.

SCPC (Sunrise Cogeneration and Power Company) 1998a. Application for Certification, Sunrise Cogeneration and Power Project (98-AFC-4). Submitted to the California Energy Commission, December 21, 1998.

POWER PLANT RELIABILITY

Testimony of Steve Baker

INTRODUCTION

In this analysis, 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 the resulting project would likely not degrade the overall reliability of the electric system it serves, and because no special reliability requirements pertain to the project.

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 the applicant has predicted a level of reliability for the power plant (see below), staff believes the applicant should not be held responsible for achieving this goal, so long as the plant's reliability matches or exceeds that of similar plants.

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.

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 seven- to ten-percent reserve margin, meaning that sufficient capacity was on call to quickly replace from seven to ten percent of total system resources. This margin proved adequate, in part because of the reliability of the power plants that constituted the system.

Now, in the newly restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the California Independent System Operator (Cal-ISO), a newly-formed entity that will work with the California Power Exchange to purchase, dispatch and sell electric power throughout the state. How Cal-ISO will ensure system reliability is not yet thoroughly understood; protocols are now 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 currently being considered to ensure an adequate supply of reliable power (Mavis 1998, pers. comm.).

These mechanisms apparently are being 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 will 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 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 have become accustomed.

The applicant proposes to operate the project as a 320 MW baseload unit operating at output levels from 60 to 100 percent of baseload at a capacity factor between 92 and 98 percent, with a target annual capacity factor of 95 percent (SCPC 1998a, AFC §§ 1.1, 1.7, 2.2.16, 2.4.1). The applicant speaks of no plans to sell reliability-related power services, such as voltage support or spinning reserve. In the new competitive electric power industry, if such service were desired, the market would put a price on that service. If the price were high enough, the applicant or others would move to serve the need. Since the project does not profess to provide voltage support, spinning reserve or other reliability-related services, staff proposes to place no special reliability requirements on it.

ANALYSIS

A reliable power plant is one that is available when called upon to operate. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the Sunrise project, and compares them to industry norms. If they compare favorably, staff can conclude that the Sunrise project will not degrade utility system reliability.

Throughout its intended life, the project will be expected to perform reliably in baseload duty. Baseload power plant systems must be able to operate for extended periods (sometimes months on end) without shutting down for

maintenance or repairs. This requirement for equipment availability is typically addressed by control of quality in machinery design, construction, and installation. Plant reliability is further assured by providing for plant maintainability and sufficient redundancy of critical equipment, fuel and water availability, and resistance to natural hazards.

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, by procuring equipment from qualified vendors and suppliers, and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

QA/QC PROGRAM

The QA/QC program delineated by the applicant (SCPC 1998a, AFC § 2.4.5) describes a program typical of the power industry. Equipment and supplies will be purchased from qualified suppliers and will be inspected upon receipt, and construction and installation will be inspected and systems tested, all in accordance with the QA plan. 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**.

QUALIFIED VENDORS AND SUPPLIERS

Vendors of plant equipment and materials will be selected from lists of qualified suppliers, those with known capabilities. To appear on the list of qualified suppliers, a vendor must show satisfactory personnel qualifications, production capability, past performance, and quality assurance program (SCPC 1998a, AFC § 2.4.5). Procured items will be subjected to a system of inspections, audits and independent testing contracts that ensures the expected quality. This describes an industry standard approach to vendor selection, which staff expects to lead to the acquisition of quality, reliable equipment and materials.

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 some redundancy of function (SCPC 1998a, AFC §§ 2.2.3.1, 2.2.4.3; Table 2-4; Appendix I-6). For example:

- The following plant components are provided in a set of three 100 percent capacity units:

  - boiler feed pumps.
- The following plant components are provided in sets of two 100 percent capacity units:
  - lube oil coolers;
  - auxiliary transformers;
  - wastewater transfer pumps; and
  - emergency backup battery chargers.
- The following plant components are provided in a set of three 50 percent capacity units:
  - feedwater pumps.
- The plant's service air and control air needs will be served by two 100 percent capacity air compressors, two 100 percent capacity air filters, and two 100 percent capacity air dryers.
- The computerized control and protective system for the gas turbine generators and HRSGs, known as the Distributed Control and Information System (DCIS), will exhibit typical redundancy.

While some power plants exhibit slightly greater levels of equipment redundancy, the fact that the project consists of two parallel 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). With this opportunity for continued operation in the face of equipment failure, staff believes that the equipment redundancy described here represents an adequate design approach for a project such as this.

MAINTENANCE PROGRAM

The applicant proposes to establish a plant maintenance program typical of the industry (SCPC 1998a, AFC §§ 2.4.1, 2.4.5). In conjunction with an overall plant quality control program (SCPC 1998a, AFC § 2.4.5), staff expects that this will allow the project to 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

Fuel (natural gas) will be supplied to the project from the Kern River Gas Transmission Company/Mojave Pipeline Company (KRGTC/MPC) interstate gas transmission line by a 60 foot-long, twelve-nch diameter gas line from the new TCI twenty-inch diameter gas line located in the TCI Main Utility Corridor (SCPC 1998a, AFC §§ 1.6.5, 2.2.5). The applicant plans to purchase gas supplies on the open market through KRGTC/MPC (SCPC 1998a, AFC §§ 2.4.3, 5.5, 7.0). 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 greatest water consumer of most gas turbine power plants is the cooling tower, which cools the steam condenser of a combined cycle power plant. The Sunrise project, however, will be a simple cycle cogeneration plant. As such, there are no steam turbines, and thus no steam condensers that require cooling. The greatest water demand of the Sunrise project will be the feedwater for cogeneration steam to be delivered to the TCI oilfield. The project will utilize produced (recycled) oilfield water from TNAP to satisfy its feedwater need (SCPC 1998a, AFC §§ 1.6.2, 1.6.6, 2.2.6.2, 2.4.4). Staff agrees with applicant that this is an adequately reliable source of water.

Potable water, firewater, and water for gas turbine evaporative inlet air cooler makeup will be supplied by the West Kern Water District (SCPC 1998a, AFC §§ 1.6.6, 1.9.14, 2.2.6.2, 2.2.6.3, 2.4.4). This rate of consumption will total less than one percent of the District's total production (SCPC 1998a, AFC § 1.9.14); staff regards this arrangement as an adequately reliable supply. (Please refer to that portion of this document entitled **Soil and Water Resources**.)

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, flooding,[1] 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 (see that portion of this document entitled **Facility Design**).

SEISMIC SHAKING

The site lies within Seismic Zone 4. The project will be designed and constructed to the latest appropriate LORS. 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. (Please see that section of this document entitled **Facility Design**.) 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. 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.

[1] The project is located outside of a 100-year floodplain (SCPC 1998a, AFC §§ 1.8, 2.3.1).

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 1993 through 1997 (NERC 1998):

For Simple Cycle units (50 MW and larger)
Availability Factor = 90.03 percent

The GE gas turbines that will be employed in the project have been on the market for several years now, and can be expected to exhibit typically high availability. The applicant's prediction of an annual availability factor from 92 to 98 percent (SCPC 1998a, AFC §§ 1.7, 2.2.16) is not out of line with the NERC figure for similar plants throughout North America (see above). In fact, these new, large machines can well be expected to outperform the fleet of various gas turbines that make up the NERC statistics. Further, since the plant will 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 (SCPC 1998a, AFC §§ 2.4.1, 2.4.5). This practice holds out the promise of adequately high plant availability. 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 project reliability. Reliability impacts on the electric system from facility closure, should there be any, are dealt with in that portion of this document entitled **Transmission System Engineering**.

CONCLUSION

The applicant predicts an equivalent availability factor from 92 to 98 percent, which agrees well with the industry norm of 90 percent for this type of plant. Based on a review of the proposal, staff concludes that the plant will be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No impacts, individual or cumulative, are possible from the operation or closure of this project.

REFERENCES

SCPC (Sunrise Cogeneration and Power Company). 1998a. Application for Certification, Sunrise Cogeneration and Power Project (98-AFC-4). Submitted to the California Energy Commission, December 21, 1998.

Mavis, Steve. 1998. Transmission Planner, California Independent System Operator. Telephone conversation with Steve Baker (California Energy Commission), January 23, 1998.

McGraw-Hill (McGraw-Hill Energy Information Services Group). 1994. *Operational Experience in Competitive Electric Generation, an Executive Report*, 1994.

NERC (North American Electric Reliability Council). 1998. 1993-1997 Generating Availability Report.

POWER PLANT EFFICIENCY

Testimony of Steve Baker

INTRODUCTION

PROJECT DESCRIPTION

Sunrise Cogeneration and Power Company (SCPC) proposes to construct the Sunrise Cogeneration and Power Project (SCPP or Sunrise), a (nominal) 320 MW cogeneration power plant, to generate baseload power and supply 1.8 million pounds per hour of high-pressure steam to Texaco California, Inc. (TCI) for use in thermally enhanced oil recovery (SCPP 1998a, AFC §§ 1.1, 1.6.2, 1.7, 2.2.16). SCPP will consist of two General Electric F-class combustion turbine generators with evaporative inlet air coolers producing approximately 165 MW each, and two single-pressure heat recovery steam generators (HRSGs) (SCPP 1998a, AFC §§ 1.1, 1.6.2, 1.6.6, 2.2.2, 2.2.3.1, 2.2.3.2).

PURPOSE OF THE ANALYSIS

The Energy Commission makes findings as to whether energy use by the SCPP 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 Sunrise project's consumption of energy creates 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.

Operating a power plant in compliance with the state definition of a cogeneration facility (Pub. Resources Code § 25134) is a means of exempting an applicant from the requirement to file a Notice of Intention (NOI). Eliminating this step in the licensing of the facility can shorten the certification process by a year or more. In this analysis, staff examines whether the SCPP qualifies for exemption from the NOI process due to its status as a cogeneration power plant.

SCOPE OF THE ANALYSIS

In order to support the Energy Commission's findings, this analysis will:

- determine whether the Sunrise project meets the state definition of a cogeneration facility;
- determine whether the facility will likely present any adverse impacts upon energy resources;
- determine whether these adverse impacts are significant; and if so,
- determine whether feasible mitigation measures exist that would eliminate the adverse impacts, or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

No federal laws apply to the efficiency of this project.

STATE

CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA requires that an environmental analysis be completed prior to determining whether to approve an Application for Certification of a power plant. This analysis must include an identification of the significant effects of a project on the environment, feasible mitigation measures, and alternatives to the project (Pub. Resources Code, § 21002.1).

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)). The Guidelines further require consideration of 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, Appendix F).

WARREN-ALQUIST ACT

The Warren-Alquist Act requires the submittal to the Energy Commission of an NOI prior to filing an AFC (Pub. Resources Code, § 25502); this NOI process commonly takes twelve months. Exemption from the NOI process is allowed for certain projects, including cogeneration plants (Pub. Resources Code, § 25540.6(a)(1)). Cogeneration, in turn, is defined in terms of efficiency standards (Pub. Resources Code, § 25134).

LOCAL

No local or county ordinances apply to power plant efficiency.

ANALYSIS

ADVERSE IMPACTS ON ENERGY RESOURCES

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. Energy impacts can include (Cal. Code Regs., tit. 14, Appendix F, para. II C):

- 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. SCPP will burn natural gas at a maximum rate approaching 74 billion Btu per day (SCPP 1998a, AFC Appendix I-8). This is a substantial rate of energy consumption, and could hold the potential to impact energy supplies.

Under expected project conditions, electricity will be generated at a peak load efficiency of approximately 35.4 percent LHV[1] (SCPP 1998a, AFC Appendix I-8); this is equivalent to the average fuel efficiency of a typical utility company baseload power plant at approximately 35 percent LHV. This figure ignores the efficiency benefits of cogeneration. A more meaningful measure is the overall efficiency of energy generation (electric and thermal) by the project; this total cogeneration efficiency will be approximately 85 percent LHV.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

SCPC has described its sources of supply of natural gas for the SCPP (SCPP 1998a, AFC §§ 1.6.5, 2.4.3, 5.5, 7.0). Gas will be purchased on the open market. Sunrise will have access to supplies from the Southwest and Canada, transmitted via the joint Kern River/Mojave gas pipeline system. These sources represent far more gas than would be required for a project this size. It is therefore highly unlikely that the Sunrise 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 via a new 60-foot long stub line leading from the 20 inch diameter gas line serving the TCI Main Utility Corridor. This line, in turn, draws gas from the joint Kern River Gas Transmission Company/ Mojave Pipeline Company high pressure interstate gas line (SCPP 1998a, AFC §§ 1.6.5, 2.4.3, 5.5, 7.0). As the natural gas supply system in California is so large and well-established, there is no real likelihood that the SCPP will require development of any new sources of energy.

COMPLIANCE WITH ENERGY STANDARDS

The efficiency standards applicable to the SCPP involve its compliance with the definition of a cogeneration facility. This compliance is analyzed below.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT AND UNNECESSARY ENERGY CONSUMPTION

The SCPP could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce the project's use of fuel.

[1] Lower heating value.

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 to generate power.

Project Configuration

The SCPP will be configured as a cogeneration power plant. Cogeneration involves the concurrent generation of electricity and useful thermal energy. By making use of waste heat from the electric generation process that would otherwise be lost, a cogeneration power plant is inherently more efficient than the separate power plant and industrial heat source (boiler or heater) that it replaces.

SCPP will further be configured as a simple cycle power plant, in which electricity is generated by two gas turbine generators. Such a configuration is appropriate for a cogeneration plant in which thermal energy (heat) output is a chief consideration.

The project could have been designed as a combined cycle power plant, in which steam from the HRSGs powers a steam turbine generator; steam extracted from the steam turbine would then be available for cogeneration use. Such a cycle is inherently more efficient for electricity generation than a simple cycle plant because waste heat in the gas turbine exhaust is utilized to generate more electricity, in the steam turbine generator, before being sent to the cogeneration host. Where electric generation is the prime consideration, and cogeneration secondary, such a cycle is often desirable. The SCPP however, is intended largely to satisfy a cogeneration need; electric generation is not necessarily the prime consideration.

The number of turbines further contributes to efficiency at part load. Gas turbine generators operate most efficiently at one particular output level, typically at full load. Whenever desired output is less than full load, the unit must be throttled back. Rather than being forced to throttle back one large turbine, with the consequent reduction in efficiency, the power plant operator will have the option of shutting off one gas turbine. This allows the plant to generate at half load while maintaining optimum efficiency.

Equipment Selection

Modern gas turbines, at the leading edge of design and manufacturing progress, embody the most fuel-efficient electric generating technology available today. The "F-class" gas turbines to be employed at the SCPP represent some of the most modern and efficient such machines available at this time. SCPC will employ gas turbine generators from a prominent manufacturer, the General Electric PG7241(FA) (referred to as the "Frame 7F"), nominally rated at 171.7 MW and 36.2 percent efficiency LHV at ISO[2] conditions (GTW 1998).

[2] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level). Performance at standard conditions is a useful measure for comparing different machines.

One possible alternative to the GE machine is the Siemens-Westinghouse 501F, nominally rated at 184.4 MW at 36.9 percent efficiency LHV; another is the ASEA Brown-Boveri GT-24, nominally rated at 183 MW and 38.3 percent efficiency LHV (GTW 1998). Any differences among the three in actual operating efficiency would be insignificant. Selecting among these machines is thus based on other factors, such as generating capacity, cost, ability to meet air pollution limitations, and commercial availability (SCPP 1998a, AFC § 5.3.1).

Efficiency of Alternatives to the Project

The project objectives include generation of baseload electricity, to be sold on the open market through the California Power Exchange, through other states' power exchanges, or directly to contract users, with concurrent production of 1.8 million pounds per hour of cogeneration steam for use in thermally enhanced oil recovery (SCPP 1998a, AFC §§ 1.1, 1.2, 1.6.2, 1.7, 2.2.16).

Alternative Generating Technologies

SCPC considers alternative generating technologies in its application (SCPP 1998a, AFC § 5.3). Oil-burning, coal-burning, solar, wind, hydroelectric, biomass, geothermal and nuclear technologies (that is, non-natural gas-burning technologies) are not considered; this is appropriate, as none of these are likely to be at once available, economic, and capable of meeting air pollution restrictions. Given the project objectives, location and air pollution control requirements, staff agrees with SCPC 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 large, stationary gas turbines, aided by the incorporation into these machines of technological advances made in the development of aircraft jet engines, has created a situation in which several large manufacturers compete vigorously to sell their machines. This, combined with the cost advantages of assembly-line manufacturing, has driven down the prices of these machines. Thus, the power plant developer can purchase a turbine generator that not only offers the best available fuel efficiency, but at the same time sells for the lowest per-kilowatt capital cost.

One possible alternative to an F-class gas turbine is the Siemens-Westinghouse 501G gas turbine generator, which employs partial steam cooling to allow slightly higher temperatures, yielding greater efficiency. The 501G is rated at 251.5 MW and 39.1 percent efficiency, 2.9 percent higher than the GE Frame 7F's nominal rating of 36.2 percent (GTW 1998). The efficiency improvement promised by the G-class turbine is minor; staff deems this an insignificant difference.

A further choice of alternatives involves the selection of gas turbine inlet air cooling methods. The two commonly used techniques are the evaporative cooler and the chiller; both devices increase gas turbine power output by cooling the gas turbine inlet air. A 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 efficiency. An evaporative cooler boosts power output best on dry days; it uses less electric power than a chiller, thus yielding slightly higher operating efficiency. The difference in efficiency between these two techniques is so small as to be insignificant. SCPC plans to install evaporative cooling (SCPP 1998a, AFC §§ 1.6.6, 2.2.2, 2.2.3.1). Given project climate and the relative lack of superiority of one system over the other, staff deems this an approach that will yield no adverse energy impacts.

The project configuration (simple cycle cogeneration) and generating equipment ("F-class" gas turbines) chosen appear to represent a combination that will satisfy the project objectives while minimizing adverse impacts on energy resources. In conclusion, given the substantial environmental and economic benefits of employing oil field produced water as feedwater for cogeneration steam needs, there are no alternatives that could significantly reduce energy consumption.

EXEMPTION FROM REQUIREMENT TO FILE A NOTICE OF INTENTION

SCPC has projected the facility to operate 95 percent of the time (SCPP 1998a, AFC §§ 1.7, 2.2.16, 2.4.1). The plant is to generate up to 320 MW of electricity while supplying up to 1.8 million pounds per hour of steam at 1,250 psig[3] and 574°F to TCI for use in thermally enhanced oil recovery (SCPP 1998a, AFC §§ 1.1, 1.6.2, 2.2.3.2; Appendix I-8). Based upon these assumptions, SCPC has calculated that the plant will achieve an operating standard of 58.7 percent and an efficiency standard of 60.5 percent (SCPP 1998a, AFC Appendix I-8; SCPP 1999a); staff believes these figures are reasonable and achievable. These figures will qualify under the state definition of a cogeneration facility, as they greatly exceed the minimum values of five percent operating standard and 42.5 percent efficiency standard.[4] Under the Warren-Alquist Act (Pub. Resources Code, § 25540.6(a)(1)), this exempts the SCPP from the requirement to file an NOI. Staff has proposed a Condition of Certification (EFF-1, below) to ensure that these standards are achieved in actual operation.

CUMULATIVE AND INDIRECT IMPACTS

Nearby power plant projects that hold the potential for cumulative impacts when aggregated with the Sunrise project include the La Paloma Generating Project, the Elk Hills Power Project, and the Midway-Sunset Cogeneration West project. As discussed above, supplies of natural gas fuel, and the means for transporting this fuel to the facilities consuming it, are more than adequate. These several power plants will not strain the resource to a degree that could result in cumulative energy impacts.

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[3] Pounds per square inch, gage.

[4] These milestones must be achieved on an annual basis.

Staff believes that construction and operation of the SCPP will not bring about indirect impacts, in the form of additional fuel consumption, that would not have occurred but for the SCPP.

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 and California Power Exchange 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 SCPP, if constructed and operated as proposed, would generate 320 MW of electric power and 1.8 million pounds per hour of high pressure cogeneration steam at an overall cogeneration project fuel efficiency of 85.5 percent LHV. While it will consume substantial amounts of energy, it will do so in a reasonably efficient manner. 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. The project will comply with applicable energy standards. Staff therefore concludes that the SCPP would present no significant adverse impacts upon energy resources.

No cumulative or indirect impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

RECOMMENDATION

Staff recommends adoption of the following proposed Condition of Certification in order to assure compliance with the applicable efficiency standard, which defines a cogeneration facility.

PROPOSED CONDITION OF CERTIFICATION

EFF-1 The facility shall be operated to meet the standards contained in Public Resources Code Section 25134.

The project owner shall maintain monthly records of: 1) fuel consumption (including startup and shutdown); 2) net electrical energy produced; and 3) net thermal energy derived from cogeneration steam.

Based upon these records, the project owner shall annually prepare calculations of the operating standard and efficiency standard achieved by the plant, showing how the plant meets the minimum required standards.

Verification: The project owner shall maintain an on-site compliance file that contains the above records and the above calculations showing compliance with the required standards, and make it available for audit by the Compliance Project Manager (CPM) at any reasonable time. The project owner shall also submit the above calculations of the operating standard and efficiency standard to the CPM in each Annual Compliance Report following the first instance of power generation from the plant.

REFERENCES

GTW (Gas Turbine World). 1998. *Gas Turbine World 1998-1999 Performance Specs*, volume 18. December 1998.

Power (Power Magazine). 1994. "Operating and maintaining IPP/cogen facilities," *Power*, September 1994, p. 14.

SCPP (Sunrise Cogeneration and Power Project). 1998a. Application for Certification, Sunrise Cogeneration and Power Project (98-AFC-4). Submitted to the California Energy Commission, December 21, 1998.

SCPP (Sunrise Cogeneration and Power Project). 1999b. Supplementary AFC Material in Response to Data Adequacy Worksheets. Submitted to the California Energy Commission, January 28, 1999.

ALTERNATIVES

Eileen Allen

PURPOSE OF THE ALTERNATIVES ANALYSIS

The purpose of staff's alternatives analysis is to provide the Energy Commission with an analysis of a reasonable range of feasible alternatives which would attain most of the basic objectives the project but would substantially reduce or avoid any potentially significant adverse impacts of the proposed project. (Cal. Code Regs., tit. 14, §15126.6(a); tit. 20, § 1765). This analysis identifies the potentially significant impacts of the proposed project, and those project alternatives that are capable of reducing or avoiding significant impacts.

ALTERNATIVES ANALYSIS METHODOLOGY

To prepare this alternatives analysis, staff used the methodology summarized below:

- identify the basic objectives of the project;
- provide an overview of the project and potentially significant adverse impacts;
- identify and evaluate alternative electricity generation technologies; and
- conduct a screening analysis to assess the feasibility of the alternative sites discussed in the Application for Certification (AFC) and any others considered.[1]

SUNRISE COGENERATION AND POWER PROJECT

BASIC PROJECT OBJECTIVES

After studying the Sunrise Cogeneration and Power Project (SCPP) AFC, Energy Commission staff has determined the project's objectives to be:

- to build and operate a cogeneration facility which would produce high pressure steam for Texaco California, Incorporated's (TCI) thermally enhanced oil recovery operations in western Kern County, California;
- to generate approximately 320 megawatts of electricity which will be sold in the California electricity market through the California Independent System Operator (Cal-ISO);
- to provide an environmentally superior source of electricity; and

[1] This analysis does not address transmission line route alternatives, since the applicant presents two options as part of the overall project. Each technical section addresses those options in an overall project analysis.

- to make a highly efficient use of energy resources.

PROJECT DESCRIPTION

The SCPP project will be located on a 16-acre [2]parcel of land within the active Midway-Sunset Oilfield, approximately 3 miles northwest of the community of Fellows, and 35 miles southwest of Bakersfield, in western Kern County, California. The area in the vicinity of the SCPP is heavily developed and used by numerous petroleum companies for natural gas and oil production The closest residences are located approximately 1.25 miles from the proposed site.

The site consists of disturbed, currently unused land which had been used previously for oil and natural gas well development activities. The site is relatively flat. Adjacent land uses are also related to energy resource development, with existing facilities such as oil wells, pumps, pipe and equipment storage/laydown areas, storage tanks, and overhead transmission lines. The proposed site is located southwest of the intersection of Crocker Springs and Mocal Roads, in the south half of the southwest quarter of Section 23, Township 31 South, Range 22 East in western Kern County.

Development of a cogeneration facility at this site would be consistent with the Kern County General Plan's "Exclusive Agriculture" designation for this area, since energy facilities are considered a "compatible" use. Similarly, the Midway-Sunset Oil Field including the proposed site, is zoned "Exclusive Agriculture" with energy facilities permitted in this zone. A complete discussion of the project's conformance with Kern County's General Plan and Zoning Ordinance is contained in the **LAND USE** section of this FSA).

The proposed site was chosen because it is close to the thermal host/steam recipient, Texaco California, Inc. (TCI) which is currently building a main utility corridor to support enhanced oil recovery operations projects located throughout the Midway-Sunset Oil Field. Steam produced at the cogeneration facility will be sent through the utility corridor. The site location near the mid-point of the TCI Main Utility Corridor provides optimum flexibility to distribute steam to various locations throughout the oilfield. It is located on property owned by TCI and leased to the Sunrise Cogeneration and Power Company (SCPC). The proposed site is located on disturbed land, in an area with minimal cultural and biological resources. It is also located to avoid interference with oil production activities.

Electricity generated by the SCPP would be transmitted over an approximately 23.3-mile long, 230kV double-circuit transmission line to Pacific Gas and Electric Company's (PG&E) Midway Substation at Buttonwillow. The facility's consumptive fresh water requirements will be minimal, since the primary project water supply will be pretreated, produced water from the adjacent oilfield operations. A small quantity of potable water and service water will be required for domestic purposes and possibly evaporative cooler makeup. Fuel for the natural gas-fired turbines

[2] Note that the 16-acre site is part of a larger 20-acre lot. The current Kern County zoning designation at the proposed Sunrise site and throughout the Midway-Sunset Oilfield is Exclusive Agriculture ("A"). Land zoned "A" must be at least 20 acres in size.

would be provided through a 60-foot 12-inch pipeline interconnecting to the 20-inch natural gas pipeline contained on the TCI Main Utility Corridor. The 20-inch natural gas pipeline, in turn, interconnects with the large interstate Kern River Gas Transmission/Mojave Pipeline Company (KRGTC/MPC) natural gas pipeline. A complete description of the project is contained in the **PROJECT DESCRIPTION** section of this FSA.

FACTORS LIMITING THE RANGE OF SITE AND LINEAR FACILITY ROUTE ALTERNATIVES

The purpose of this section is to list the factors which staff believes limit the ability to examine a broad range of site alternatives, and alternatives to the proposed routes for the linear facilities.

- Cogeneration projects such as the proposed SCPP require a steam line connection between the power plant site and the existing industrial steam user (i.e., the steam host). The steam line for oil field cogeneration projects is generally limited to a length no greater than three-quarters of a mile, beyond which there is a significant loss of heat.[3] Therefore, potential sites and site alternatives usually need to be located within three-quarters of a mile of the steam host/recipient, which is the TCI Main Utility Corridor.

- The need for a site with a minimum size of 20 acres (per the Kern County Zoning Ordinance requirement for lot development with a minimum size of 20 acres in "A" zones, which is the zoning designation for the Midway-Sunset Oil Field).

- The infill development nature of the project in an existing oilfield with a moderate to dense level of development now, combined with the scarcity of undeveloped 20-acre parcels in the vicinity of the TCI Main Utility Corridor.

POTENTIALLY SIGNIFICANT ADVERSE IMPACTS

The environmental consequences of the proposal are discussed in detail in the individual sections of the FSA. Staff believes that potentially significant adverse impacts may occur in the air quality area, although project emissions may be adequately offset to mitigate their impacts. Similarly, staff believes that potentially significant impacts may occur in the biological resources area, although the impacts may be mitigated to insignificant levels.

Given that three power plant projects are currently proposed in the western Kern County area[4], cumulative transmission system impacts and biological resource

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[3] Cogeneration steam lines can never be perfectly insulated to reduce heat losses. When the oil field steam line is longer than about three quarters of a mile, the quality of steam that must be supplied detracts from the power plant's efficiency and can make the cogeneration project less economic.

[4] The proponents and their projects currently proposed in western Kern County are:

- PG&E. Generating Company: La Paloma (98-AFC-2) – 1,048 megawatts (MW) (Energy Commission approval expected October 6, 1999);
- Sunrise Generation and Power Company: Sunrise (98-AFC-4) – 320 MW; and
- Sempra/Occidental: Elk Hills Power Project (99-AFC-1) – 500 MW

impacts related to multiple transmission lines are a possibility. Staff will resolve the transmission system questions through discussions with the applicant, PG&E, and the Cal-ISO during the next several months. The potential biological resource impacts related to multiple transmission lines are discussed in the **BIOLOGICAL RESOURCES** section.

ALTERNATIVES TO THE PROJECT

GENERATION TECHNOLOGY ALTERNATIVES

Public Resources Code section 25305(c) limits the scope of alternatives analysis during a siting case under specific conditions. This section states that conservation, load management, or other demand reducing measures reasonably expected to occur shall be explicitly examined in the Energy Commission's Electricity Report and shall not be considered as alternatives to a proposed facility during the siting process. Thus, such alternatives are not included in this Final Staff Assessment (FSA).

Staff did compare various alternative technologies with the proposed project, scaled to meet the project's objectives. We examined the principal electricity generation technologies which do not burn fossil fuels such as natural gas. The technologies which could serve as alternatives to the proposed project are geothermal, solar, hydroelectricity, and wind. Each of these technologies could be attractive from an environmental perspective because of the absence or reduced level of air pollutant emissions.

There are no significant geothermal or hydroelectric resources in the vicinity of western Kern County. The Carrizo Plain region in eastern San Luis Obispo County was the site of a solar photovoltaic development ten to fifteen years ago, but it did not become a commercial scale resource. Furthermore, the approximately 20-mile distance from the Carrizo Plain to the Midway-Sunset Oilfield would preclude its use for a cogeneration project. The Tehachapi region to the east in Kern County does have a large area of wind generation activity. However, the intermittent nature of the wind resource and the approximately 60-mile distance from the Tehachapi area to the project site in western Kern County, would preclude its use for a cogeneration project. Staff believes there are no local generation technology alternatives that would reliably serve a cogeneration project with its need to be close to its industrial steam host.

Staff also considered the possibility of a smaller sized cogeneration alternative, such as a 240 MW gas fired combined cycle project. Although the actual quantity of emissions would be smaller, since the emissions from both the 320 MW proposed

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In addition to the above projects, Duke Energy (Morro Bay repower -- 530 MW) and, Midway-Sunset Cogeneration Company (Midway-Sunset -- 500 MW), have told the Commission that they plan to file projects in 1999 that may connect with PG&E's Midway Substation or the related regional transmission system.

project and a smaller project could be offset, the smaller project alternative would not result in a greater reduction of potential impacts.

ALTERNATIVE SITE SCREENING ANALYSIS

Alternative sites (see **ALTERNATIVES Figure 1**) were identified through a review of the applicant's AFC discussion of an alternative site, and staff discussion with the applicant. AFC Supplement 2 (filed June 4, 1999) presents two transmission line options, which have been analyzed in each technical section as part of the overall project. Therefore, this alternatives analysis does not discuss transmission route alternatives.

SITE ALTERNATIVES

SUNRISE'S SITE ALTERNATIVE

SITE DESCRIPTION

- The approximately 20 acre alternative site is located about one mile southwest of Sunrise's proposed site in Section 27, Range 31 South, Township, 22 East in the Midway-Sunset Oil Field.

- In 1994 the U.S. Generating Company proposed that this site be developed for the Fellows cogeneration project. This project was never filed as an AFC with the Energy Commission, and is now inactive.

- The surrounding land uses are similar to that of the proposed site.

- The alternative site has the same Kern County General Plan designation and Zoning Ordinance designation as the proposed site. The site is consistent with both the Plan and the Ordinance.

- The alternative site is characterized by fairly hilly land.

ADVANTAGES

- Staff is aware of no advantages.

DISADVANTAGES

- This alternative site is on largely undisturbed land. Use of this site would result in potentially greater impacts to biological resources, when compared with the proposed site.

- The hilly topography would require significantly more earthwork prior to construction.

- The alternative site is further from the TCI Main Utility Corridor, which would reduce flexibility for distributing steam within the oilfield.

ALTERNATIVES Figure 1
Site Alternatives

MIDWAY-SUNSET SITE ALTERNATIVE

SITE DESCRIPTION

- The approximately 20-acre site is located on Crocker Springs Road on the northern edge of the Midway-Sunset Oil Field.

- This alternative site is adjacent to the existing Midway-Sunset Cogeneration Plant which began operating in 1989.

- This alternative site has the same Kern County General Plan designation and Zoning Ordinance designation as the proposed site. The site is consistent with both the Plan and the Ordinance.

ADVANTAGES

- This alternative site is adjacent to the existing Midway-Sunset 230kV transmission line. Therefore, the transmission interconnection would be shorter than at the proposed site.

DISADVANTAGES

- This alternative site is approximately four miles from the proposed site. This distance would result in a steam line longer than three-quarters of a mile, which would make the steam quality uncertain, and the overall feasibility of a cogeneration project speculative.

- The site is not available, because the Midway-Sunset Cogeneration Company plans to file an AFC with the Energy Commission for their own power plant project at this site.

OTHER SITE ALTERNATIVE POSSIBILITIES WITHIN THE MIDWAY-SUNSET OIL FIELD

Staff has considered the overall oil field area surrounding the SCPP steam host/recipient, the TCI Main Utility Corridor, and the need for the cogeneration facility to be no further than three-quarters of a mile away. When a circle with a radius of three quarters of a mile is drawn around the utility corridor, there are few, if any, areas that do not have some level of oil well development. Siting a cogeneration facility occupying approximately 20 acres would require removal of some wells and related infrastructure. While this would be possible, staff is aware of no advantages when these moderately developed areas are compared with the proposed site.

THE "NO PROJECT" ALTERNATIVE

CEQA requires consideration of the "no project" alternative, to determine whether "no project" is environmentally preferable to the proposed project.

The project, described previously, would be an oil field cogeneration facility built in an area already developed by the petroleum industry. The site is on currently unused land, zoned “Exclusive Agriculture” with energy facilities permitted in this zone. The area surrounding the project site contains numerous petroleum extraction related facilities.

If the SCPP is approved and built with the environmental mitigation, Sunrise has proposed or already agreed to, staff believes there will be no environmental impacts that are potentially significant. If the project is not built, the project site could remain vacant. However, the site’s zoning permits energy facilities, and it is reasonably likely that another cogeneration project would eventually be constructed there. If the project is not approved or built, the energy efficiency advantages of a large thermally enhanced oil recovery cogeneration project would not be realized. This foregone benefit is both environmental (energy efficiency) and economic.

CONCLUSION

CEQA requires the project alternatives analysis to focus on measures that would mitigate a project’s potential impacts to less than significant levels. These impacts are in the air quality and biological resources area. Staff believes that the potential air quality impacts will be mitigated through the applicant’s purchase of air emission offsets. With respect to the biological resource impacts, staff is working on a mitigation and compensation plan to offset the impacts. Staff is working with the applicant, PG&E, and the Cal-ISO to determine the transmission impacts of the multiple projects proposed in this area, and possible mitigation options for the SCPP.

The option of a smaller project, such as a 240 MW combined cycle cogeneration unit would still have air quality and biological resources impacts similar to the proposed project. Therefore, the smaller project option is not better than the proposed project.

Regarding the alternative sites examined, each of them does nothing to reduce the potential for air quality impacts to a level lower than that of the proposed project. Additionally, each is undesirable for various reasons. Sunrise’s alternative site is further away from the center of the TCI Main Utility Corridor, which would reduce the flexibility for steam delivery. Use of that alternative site would also affect more undisturbed land.

While the Midway-Sunset site would have somewhat lower biological resource impacts due to a very short transmission connection to an existing line, it is not a feasible alternative. It is too far aware for a feasible oil field congeneration project, and the site is not available due to the Midway-Sunset Cogeneration Company’s plans for development of a competing power plant.

It is conceivable that other areas within the Midway-Sunset Oil Field could be developed for a cogeneration project with minimal to no biological resources if the

land was quite disturbed. However, this scenario would likely require removal of a number of oil wells, and air quality impacts would still need to be mitigated.

After analyzing various alternatives for the SCPP, staff concludes that the proposed project, with mitigation proposed by the applicant and additional mitigation as recommended by staff, is preferred.

REFERENCES

SCPP (Sunrise Cogeneration and Power Project) 1998a. Application for Certification for Sunrise Cogeneration and Power Project Vol.1. Submitted to the California Energy Commission, December 21, 1998.

SCPP (Sunrise Cogeneration and Power Project) 1999m. Transmission Supplement 2 – Sections 3.0, 4.0, remaining Appendices and Errata. Submitted to the California Energy Commission on June 4, 1999.

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND FACILITY CLOSURE

Nancy Tronaas

INTRODUCTION

The General Conditions, including Compliance Monitoring (Compliance Plan), have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the Sunrise Cogeneration and Power Project (SCPP) is constructed and operated in conjunction with air and water quality, public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission (Energy Commission) and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of the following elements:

19. General conditions that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions; and
- establish requirements for facility closure plans.

20. Specific conditions of certification which are found following each technical area that contain the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure to an insignificant level. Each specific condition of certification also includes a verification provision that describes the method of verifying that the condition has been satisfied.

COMPLIANCE PROJECT MANAGER (CPM) RESPONSIBILITIES

A CPM will oversee the compliance monitoring and shall be responsible for:

15. ensuring that the design, construction, operation, and closure of the project facilities is in compliance with the terms and conditions of the Commission Decision;

16. resolving complaints;

17. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;

18. documenting and tracking compliance filings; and,

19. 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, it should be understood that the approval would involve all appropriate staff and management.

The Energy Commission has established a toll free 800 number for the public to use for notifying the Energy Commission about power plant construction and operation related complaints or events of concern. The telephone number is **1-800-858-0784.**

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 or inadvertence and to preclude any last minute, unforeseen issues from arising.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain as a public record in either the Compliance file or Docket file for the life of the project (or other period as required):

1) all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;

2) all monthly and annual compliance reports filed by the project owner;

3) all complaints of noncompliance filed with the Energy Commission; and,

4) all petitions for project or condition changes and the resulting staff or Energy Commission action taken.

PROJECT OWNER RESPONSIBILITIES

It is the responsibility of the project owner and any successors in interest to ensure that the general compliance conditions and the conditions of certification are satisfied. The general compliance conditions regarding post-certification changes specify measures that the project owner and any successors in interest must take when requesting changes in the project design, compliance conditions, or ownership. Failure to comply with any of the conditions of certification or the general compliance conditions may result in reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate.

ACCESS

The CPM, designated staff, and delegated agencies or consultants, shall be guaranteed and granted 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.

COMPLIANCE RECORD

The project owner shall maintain project files on-site or at an alternative site approved by the CPM, for the life of the project. The files shall contain copies of all “as-built” drawings, all documents submitted as verification for conditions, and all other project-related documents for the life of the project, unless a lesser period is specified by the conditions of certification.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given access to the files.

COMPLIANCE VERIFICATIONS

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, regardless of 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
Sunrise Cogeneration and Power Project (98-AFC-4C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

If the project owner desires Energy Commission staff action by a specific date, the submittal shall so state and shall include a detailed explanation of the effects on the project if this date is not met.

Each condition of certification is number and 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, in most cases without full Energy Commission approval. (See Appendix A -Title 20, California Code of Regulations, section 1769, for when Commission approval is required.)

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) appropriate letters from delegate agencies verifying compliance;

3) Energy Commission staff audit of project records; and/or

4) Energy Commission staff inspection of mitigation and/or other evidence of mitigation.

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 Compliance Reports.

COMPLIANCE MATRIX

A compliance matrix is to 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 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) an indication of the compliance status for each condition (e.g., “not started”, “in progress” or “completed date”).

Completed or satisfied conditions do not need to be included in the compliance matrix after they have been identified as completed/satisfied in at least one monthly or annual compliance report.

MONTHLY COMPLIANCE REPORT

During construction of the project, the project owner or authorized agent shall submit Monthly Compliance Reports 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 which shows 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);

4) a list of conditions which have been satisfied during the reporting period, and a description or reference to the actions which 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 with, 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 within 48 hours by telephone, fax, or e-mail of any changes to the schedule that may occur prior to submittal of the next Monthly Compliance Report;

9) a listing of the month's additions to the on-site compliance file; and

10) any requests to dispose of items that are required to be maintained in the project owner's compliance file.

The first Monthly Compliance Report is due within 10 working days after the end of the month following the Energy Commission business meeting date in which the project was approved, unless the project owner notifies the CPM in writing that a delay is warranted. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the "Key Events List." *The Key Events List is found at the end of this section.*

ANNUAL COMPLIANCE REPORT

After the air district has issued a Permit to Operate, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The Permit to Operate is generally issued following the satisfactory completion of the required source test.

The annual 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 which shows 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 (i.e. total hours of operation, scheduled and unscheduled maintenance and any major repairs);

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 made 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, and

9) an evaluation of the on-site contingency plan for unexpected facility closure, including any suggestions necessary for bringing the plan up to date [see General Conditions for Facility Closure addressed later in this section].

CONFIDENTIAL INFORMATION

Any information, which 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, which 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

Pursuant to the provisions of Fish and Game Code Section 711.4, the project owner shall pay a filing fee in the amount of eight hundred and fifty dollars ($850). The payment instrument shall be provided to the Commission's Project Manager at the time of project certification and shall be made payable to the California Department of Fish and Game. The Commission's Project Manager will submit the payment to the Offfice of Planning and Research at the time of filing of the notice of decision pursuant to Public Resources Code Section 21080.5.

FACILITY CLOSURE

INTRODUCTION

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 which provide the flexibility to deal with the specific situation and project setting which will 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, unexpected temporary closure and unexpected permanent closure**.**

PLANNED CLOSURE

This planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

UNEXPECTED TEMPORARY CLOSURE

This unplanned 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

This unplanned closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. Not withstanding the unexpected closure, where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

GENERAL CONDITIONS FOR FACILITY CLOSURE

PLANNED CLOSURE

In order that a planned facility closure does not create adverse impacts, a closure process, that will provide 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 twelve 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.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Commission CPM for the purpose of discussing the specific contents of the plan.

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 all facilities and equipment that will a) be immediately removed from the site after closure (e.g. hazardous materials); b) temporarily remain on the site after closure (e.g., until the item is sold or scrapped); and c) permanently remain on the site after closure. The plan must explain both why the item cannot be removed and why it does not present a risk of harm to the environment and the public health and safety to remain insitus for in indefinite period.

4. Address conformance of the plan with all-applicable laws, ordinances, regulations, standards, local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

At the Energy Commission's discretion, workshops and/or hearings may be conducted as part of the Commission's approval procedure if there are significant issues associated with the proposed facility closure plan, or the desires of local officials or interested parties are inconsistent with 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 or the environment, but shall not commence any other closure activities, until Energy Commission approval of the facility closure plan is obtained.

Unexpected Temporary Closure

In order to ensure that public health and safety and the environment are protected in the event of an unexpected temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety, and environmental impacts, are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less that 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facilities 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 recommend 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 temporary 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.

In addition, consistent with requirements under unexpected permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unexpected temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, e-mail, etc., within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of circumstances and expected duration of the closure.

If it is determined that a temporary closure is likely to be permanent, or for a duration of more than twelve months, a closure plan consistent with that for a planned closure shall be submitted to the CPM within 90 days of the determination. The CPM and project owner may agree to a period of time other than the 90 days.

UNEXPECTED PERMANENT CLOSURE

In order to ensure that public health and safety and the environment are protected in the event of an unexpected permanent facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety, and environmental impacts, are taken in a timely manner (even in an unlikely abandonment scenario).

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 facilities 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 recommend 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, 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.

Furthermore, 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. The nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unexpected permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, e-mail, etc., within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

DELEGATE AGENCIES

To the extent permitted by law, the Energy Commission may delegate authority for compliance verification and enforcement to various state and local agencies that have expertise in subject areas where specific requirements have been established as a condition of certification. If a delegate agency does not participate in this program, the Energy Commission staff will establish an alternative method of verification and enforcement. Energy Commission staff reserves the right to independently verify compliance.

In performing construction and operation monitoring of the project, the Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). The Commission staff retains this authority when delegating to a local CBO. Delegation of authority for compliance verification includes the authority for enforcing codes, the responsibility for code interpretation where required, and the authority to use discretion as necessary, in implementing the various codes and standards.

Whenever an agency's responsibility for a particular area is transferred by law to another entity, all references to the original agency shall be interpreted to apply to the successor entity.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections, 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Commission Decision.

Moreover, to ensure compliance with the terms and conditions of certification and applicable laws, ordinances, regulations, and standards, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint is 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 are described below:

INFORMAL DISPUTE RESOLUTION PROCEDURE

The following procedure is designed to informally resolve disputes concerning interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents.

This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1230 et seq., but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The procedure encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be referred to the 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 (7) 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 forty-eight (48) hours, followed by a written report filed within seven (7) 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 fourteen (14) days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

21. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

22. secure the attendance of appropriate Energy Commission staff and staff of any other agency with expertise in the subject area of concern as necessary;

23. 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,

24. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum which 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

The project owner, Energy Commission staff, or any other party may file a complaint or a request for an investigation with the Energy Commission's Chief 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 formal process may be in lieu of or in addition to the informal process.

Within 30 days after receipt of a written complaint or a request for investigation, the Chairperson or, if one is assigned, the Committee may grant a hearing on the matter, consistent with the requirements of noticing provisions. The Commission shall have the authority to consider all relevant facts involved and make any appropriate orders consistent with its jurisdiction (Title 20, California Code of Regulations, sections 1232 - 1236).

POST CERTIFICATION CHANGES TO THE COMMISSION DECISION: AMENDMENTS, STAFF CHANGES AND VERIFICATION CHANGES

The project owner must petition or request 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; 3) transfer ownership or operational control of the facility; or 4) change a condition verification requirement.

The petition or request for a change should be submitted to the Energy Commission's Docket in accordance with Title 20, California Code of Regulations, section 1209. The criteria under section 1769 that determine which type of change process applies are explained below.

AMENDMENT

A proposed change will be processed as an amendment requiring Commission approval if it involves a change to the requirement or protocol (and in some cases the verification) portion of a condition of certification, an ownership or operator change, or a potential significant environmental impact.

INSIGNIFICANT STAFF CHANGE

The proposed change will be processed as an insignificant staff change not requiring Commission approval if it does not require changing the language in a condition of certification, does not have a potential significant environmental impact, and will not cause the project to violate laws, ordinances, regulations or standards.

VERIFICATION CHANGE

The proposed change will be processed as a verification or insignificant change if it involves only the language in the verification portion of the condition of certification. This procedure can only be used to change verification requirements that are of an administrative nature, usually the timing of a required action. In the event that verification language contains technical requirements, the proposed change must be processed as an amendment requiring Commission approval.

KEY EVENT LIST

PROJECT _____ DATE ENTERED

DOCKET # _____ PROJECT MANAGER

EVENT DESCRIPTION	***DATE ASSIGNED***
Date of Certification	
Start of Construction	
Completion of Construction	
Start of Operation (1st Turbine Roll)	
Start of Rainy Season	
End of Rainy Season	
Start T/L Construction	
Complete T/L Construction	
Start Fuel Supply Line Construction	
Complete Fuel Supply Line Construction	
Start Rough Grading	
Complete Rough Grading	
Start of Water Supply Line Construction	
Complete Water Supply Line Construction	
Start Implementing Erosion Control Measures	
Complete Implementing Erosion Control Measures	

GLOSSARY OF TERMS AND ACRONYMS

A

A	Ampere
AAL	All aluminum (electricity conductor)
AADT	Annual Average Daily Traffic
AAQS	Ambient Air Quality Standards
AC	Alternating Current
ACEC	Area of Critical Environmental Concern
ACGIH	American Conference of Government and Industrial Hygienists
ACE	(U.S.) Army Corps of Engineers
ACSR	Aluminum Covered Steel Reinforced (electricity conductor)
AERA	
AFC	Application for Certification
AFY	acre-feet per year
AHM	Acutely Hazardous Materials
AIHA	American Industrial Hygienists Association
ANSI	American National Standards Institute
APCD	Air Pollution Control District
APCO	Air Pollution Control Officer
AQMP	Air Quality Management Plan
ARB	Air Resources Board
ARCO	Atlantic Richfield Company
ASAE	American Society of Architectural Engineers
ASHRAE	American Society of Heating Refrigeration & Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ATC	Authority to Construct
AWS	American Welding Society

B

BACT	Best Available Control Technology
BARCT	Best Available Retrofit Control Technology
bbl	barrel
BCF	billion cubic feet
Bcfd	billion cubic feet per day
b/d	barrels per day
BO	Biological Opinion
BLM	(U.S.) Bureau of Land Management
BR	Biennial Report
BRMIMP	Biological Resources Mitigation and Monitoring Plan
Btu	British thermal unit

C

CAA	(U.S.) Clean Air Act

CAAQS	California Ambient Air Quality Standards
CalEPA	California Environmental Protection Agency
Cal-OSHA	California Occupational Safety and Health Administration
Cal-PX	California Power Exchange
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CATEF	California Toxic Emissions Factors
CBC	California Building Code
CBO	Chief Building Official
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDF	California Department of Forestry
CDFG	California Department of Fish and Game
CEERT	Coalition for Energy Efficiency and Renewable Technologies
CEM	Continuous Emissions Monitoring
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CESA	California Endangered Species Act
CFB	Circulating Fluidized Bed
CFCs	Chloro-fluorocarbons
cfm	cubic feet per minute
CFR	Code of Federal Regulations
cfs	cubic feet per second
CLUP	Comprehensive Land Use Plan
CNEL	Community Noise Equivalent Level
CNLM	Center for Natural Lands Management
CO	Carbon Monoxide
CO2	Carbon Dioxide
COC	Condition of Certification
CPM	Compliance Project Manager
CPUC	California Public Utilities Commission
CRTR	Cultural Resources Technical Report
CT	Combustion Turbine Current Transformer
CTG	Combustion Turbine Generator
CUPA	Certified Unified Program Agency
CURE	California Unions for Reliable Energy

D

dB	decibel
dB(A)	decibel on the A scale
DC	Direct Current
DCS	Distributed Control System
DCTL	Double Circuit Transmission Line
DEIR	Draft Environmental Impact Report
DEIS	Draft Environmental Impact Statement
DHS	(California) Department of Health Services
DISCO	Distribution Company
DOC	Determination of Compliance
DOE	(U.S.) Department of Energy
DOG	(California) Department of Oil and Gas
DSM	Demand Side Management
DTC	Desert Tortoise Council
DTSC	(CalEPA) Department of Toxic Substances Control
DWR	(California) Department of Water Resources

E

EA	Environmental Assessment
EDF	Environmental Defense Fund
EDR	Energy Development Report
EEGL	Emergency Response Planning Guidelines
EFS&EPD	Energy Facilities Siting and Environmental Protection Division
EIA	(U.S.) Energy Information Agency
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EJ	Environmental Justice
ELFIN	Electric Utility Financial and Production Simulation Model
EMF	Electromagnetic Field
EPA	(U.S.) Environmental Protection Agency
EPA-ARI	(U.S.) Environmental Protection Agency-Accidental Release Information Program
EPRI	Electric Power Research Institute
ER	Electricity Report
ERC	Emission Reduction Credit {offset}
ERNS	Emergency Response Notification System
ERPG	Emergency Response Planning Guidelines
ESA	Endangered Species Act (Federal) Environmental Site Assessment
ETSR	Energy Technologies Status Report

F

FAA	(U.S.) Federal Aviation Administration
FBE	Functional Basis Earthquake
FCAA	Federal Clean Air Act
FCC	Federal Communications Commission
FE	Federally (listed) Endangered
FEIR	Final Environmental Impact Report
FERC	Federal Energy Regulatory Commission
FIP	Federal Implementation Plan
FLPMA	Federal Land Policy Management Act
FONSI	Finding of No Significant Impact
FP	(State) Fully Protected
FSA	Final Staff Assessment
FT	Federally (listed) Threatened

G

GE	General Electric
GEP	Good Engineering Practice
GIS	Gas Insulated Switchgear Geographic Information System
gpd	gallons per day
gpm	gallons per minute
GW	gigawatt
GWh	gigawatt hour

H

H_2S	Hydrogen Sulfide
HCP	Habitat Conservation Plan
HHV	Higher Heating Value
HRA	Health Risk Assessment
HRSG	Heat Recovery Steam Generator
HV	High Voltage
HVAC	Heating, Ventilation and Air Conditioning

I

IAR	Issues and Alternatives Report
IDLH	Immediately Dangerous to Life and Health Level
IEA	International Energy Agency
IEEE	Institute of Electrical & Electronics Engineers
IIPP	Injury and Illness Prevention Program
IIR	Issues Identification Report
IMPLAN	Impact Analysis for Planning
IOU	Investor-Owned Utility
IS	Initial Study
ISO	Independent System Operator
ISCST3	Industrial Source Complex Short-Term model, Version 3

J

K

KCFD	Kern County Fire Department
KCM	thousand circular mils (also KCmil) (electricity conductor)
km	kilometer
KOP	Key Observation Point
kV	kilovolt
KVAR	kilovolt-ampere reactive
kW	kilowatt
kWe	kilowatt, electric
kWh	kilowatt hour
kWp	peak kilowatt

L

LAER	Lowest Achievable Emission Rate
lbs	pounds
lbs/hr	pounds per hour
lbs/MMBtu	Pounds Per Million British Thermal Units
LORS	Laws, Ordinances, Regulations and Standards
LOS	Level of Service

M

m (M)	meter, million, mega, milli or thousand
MCE	Maximum Credible Earthquake
MCF	thousand cubic feet
MCL	Maximum Containment Level
MCM	thousand circular mil (electricity conductor)
$\mu g/m^3$	micro grams (10-6 grams) per cubic meter
MG	milli gauss
mgd	million gallons per day
MOU	Memorandum of Understanding
MPE	Maximum Probable Earthquake
m/s	meters per second
MS	Mail Station
MVAR	megavolt-ampere reactive
MW	megawatt (million watts)
MWh	megawatt hour
MWp	peak megawatt

N

N-1	One transmission circuit out
N-2	Two transmission circuits out
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Council
NCR	Non-Conformance Report
NEC	National Electrical Code

NEPA	National Energy Policy Act National Environmental Policy Act
NERC	National Electric Reliability Council
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NIOSH	National Institute of Occupational Health and Safety
NMHC	nonmethane hydrocarbons
NO	nitrogen oxide
NOI	Notice of Intention
NO_x	nitrogen oxides
NO2	nitrogen dioxide
NOP	Notice of Preparation (of EIR)
NOV	Notice of Violation
NRC	National Research Council National Response Center
NRDC	Natural Resources Defense Council
NSPS	New Source Performance Standards
NSR	New Source Review

O

O_3	Ozone
OASIS	Open Access Same-Time Information System
OCB	Oil Circuit Breaker
OCSG	Operating Capability Study Group
O&M	Operation and Maintenance
OLM	Ozone Limiting Method
OSHA	Occupational Safety and Health Administration (or Act)

P

PAH	Polycyclic Aromatic Hydrocarbons
PG&E	Pacific Gas & Electric Company
PHC(S)	Prehearing Conference (Statement)
PIFUA	Federal Powerplant & Industrial Fuel Use Act of 1978
PM	Project Manager particulate matter
PMPD	Presiding Member's Proposed Decision
PM_{10}	Particulate matter 10 microns and smaller in diameter
$PM_{2.5}$	Particulate matter 2.5 microns and smaller in diameter
PPE	Personal Protective Equipment
ppb	parts per billion
ppm	parts per million
ppmvd	parts per million by volume, dry
ppt	parts per thousand
PSA	Preliminary Staff Assessment

PRC	(California) Public Resources Code
PSD	Prevention of Significant Deterioration
PT	Potential Transformer
PTO	Permit to Operate Participating Transmission Owner
PU	per unit
PURPA	Federal Public Utilities Regulatory Policy Act of 1978
PV	photovoltaic
PX	Power Exchange

Q

QA/QC	Quality Assurance/Quality Control
QF	Qualifying Facility

R

RACT	Reasonably Available Control Technology
RCRA	Resource Conservation and Recovery Act
RDF	Refuse Derived Fuel
RE	Resident Engineer
RMP	Risk Management Plan
ROC	Report of Conversation Reactive Organic Compounds
ROG	Reactive Organic Gas
ROW	Right-of-Way
RWQCB	Regional Water Quality Control Board

S

SARA	Superfund Amendments and Reauthorization Act of 1986
SB	Senate Bill
SCFM	standard cubic feet per minute
SCH	State Clearing House
SCR	Selective Catalytic Reduction
SCTL	Single Circuit Transmission Line
SE	State (listed) Endangered
SHPO	State Office of Historic Preservation
SIC	Standard industrial classification
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVUAPCD	San Joaquin Valley Unified Air Pollution Control District
SMP	Safety Management Plan
SNCR	Selective Noncatalytic Reduction
SNG	Synthetic Natural Gas
SO_2	Sulfur Dioxide
SO_x	Oxides of Sulfur
SO_4	Sulfates
SSC	Species of Special Concern

ST	State (listed) Threatened
STEL	Short Term Exposure Limit
STPEL	Short Term Public Emergency Limit(s)
STIG	Steam Injected Gas Turbine
SWP	State Water Project
SWRCB	State Water Resources Control Board

T

TAC	Toxic Air Contaminant
Tbtu	trillion Btu
TCF	trillion cubic feet
TCM	Transportation Control Measure
TDS	Total Dissolved Solids
TE	Transmission Engineering
TEOR	Thermally Enhanced Oil Recovery
TL	Transmission Line (or lines)
T-Line	Transmission Line
TLV	Threshold Limit Value
TOG	Total Organic Gases
TPD	tons per day
TPY	tons per year
TS&N	Transmission Safety and Nuisance
TSE	Transmission System Engineering
TSIN	Transmission Services Information Network
TSP	Total Suspended Particulate Matter

U

UBC	Uniform Building Code
UDC	Utility Displacement Credits
UDF	Utility Displacement Factor
UEG	Utility Electric Generator
UFC	Uniform Fire Code
USC	United States Code
USC(A)	United States Code (Annotated)
USCOE	U.S. (Army) Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

V

VISCREEN	
VOC	Volatile Organic Compound(s)
VRM	Visual Resource Management

W

W	Watt

WAA	Warren-Alquist Act
WEPEX	Western Energy Power Exchange
WHO	World Health Organization
WICF	Western Interconnection Forum
WIEB	Western Interstate Energy Board
WPLT	Western Pluvial Lakes Tradition
WRTA	Western Region Transmission Association
WSCC	Western System Coordination Council
WSPP	Western System Power Pool

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