

Preliminary Staff Assessment

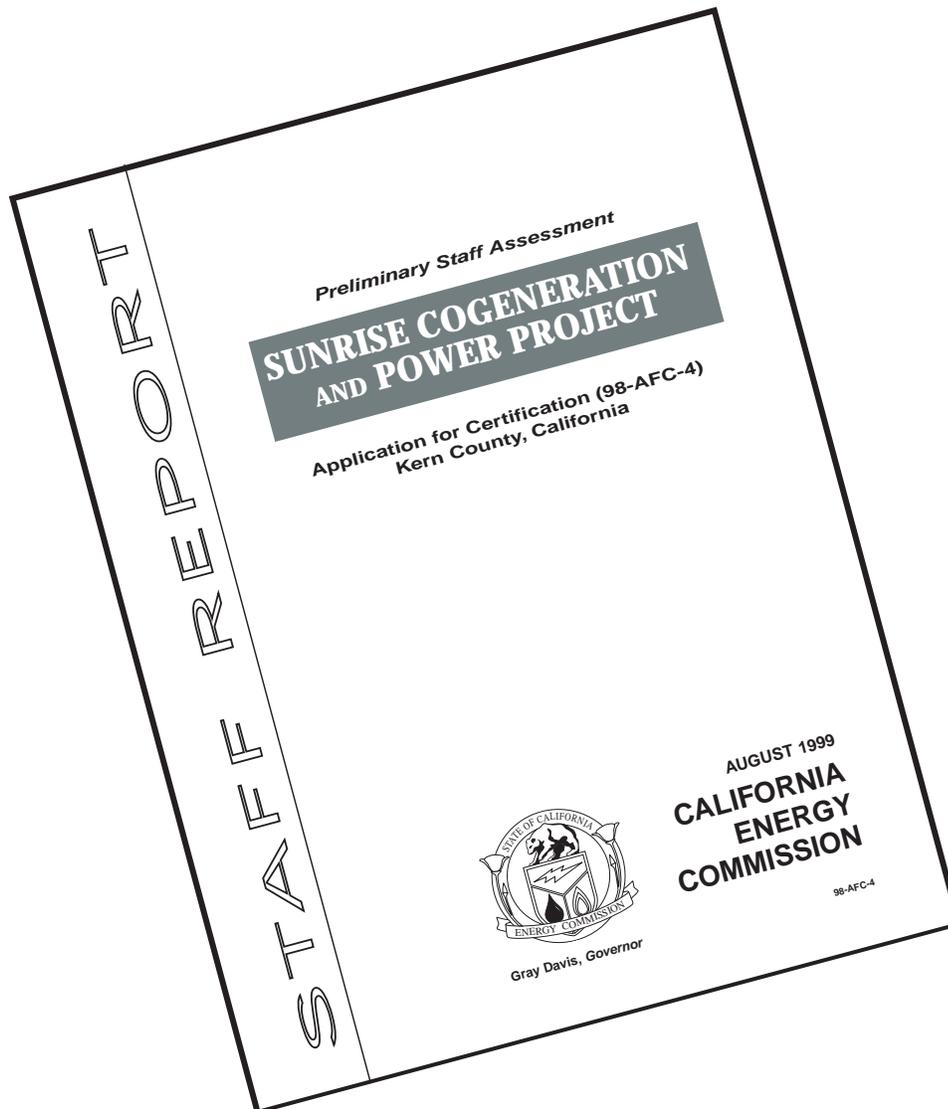
**SUNRISE COGENERATION
AND POWER PROJECT**

**Application for Certification (98-AFC-4)
Kern County, California**



Gray Davis, Governor

**AUGUST 1999
CALIFORNIA
ENERGY
COMMISSION**



CALIFORNIA ENERGY COMMISSION

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EXECUTIVE SUMMARY

INTRODUCTION

This Preliminary Staff Assessment (PSA) 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 (Sunrise). The Sunrise 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. This PSA is a staff document and it examines engineering and environmental aspects of the Sunrise project, based on the information available at that time of document creation. The PSA 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 PSA a preliminary or proposed decision on the proposal. The PSA 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 Sunrise project. 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 PSA 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; and 6) independent field studies and research.

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 Sunrise project. 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 Sunrise project 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 12-inch pipeline interconnecting to the 20-inch natural gas pipeline serving on 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 PSA.

STAFF'S ASSESSMENT

Each technical area section of the PSA contains a discussion of impacts, mitigation measures and conditions of certification. The PSA 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 19 technical areas:

Need Conformance	Socioeconomics
Public Health	Waste Management
Transmission System Engineering	Soil and Water Resources
Hazardous Materials Handling	Paleontological Resources
Transmission Line Safety & Nuisance	Worker Safety
Land Use	Facility Design and Geology
Traffic and Transportation	Reliability
Noise	Efficiency
Visual Resources	Alternatives
Cultural Resources	Closure and Compliance

However, staff notes that SCPC, agencies, other parties, and the public have not had an opportunity to review and comment on these sections. Therefore, there is a potential that SCPC, other parties, agencies, and the public may have comments or suggestions regarding the findings, conclusions and recommendations we have not had the opportunity to consider. To the extent that staff believes it appropriate to address those comments, this PSA should not be considered complete in those areas.

INCOMPLETE ANALYSES

Two technical areas, air quality and biological resources are incomplete.

AIR QUALITY

The analysis of air quality issues in this PSA is incomplete for two reasons. First, the SCPC has not yet fully defined in its proposed offset package how they intend to satisfy their PM10 offset liabilities. Second, the San Joaquin Valley Air Pollution Control District (District) has only recently issued its Preliminary Determination of Compliance (PDOC) on the project on July 27, 1999. The PDOC will include the conditions necessary for the Sunrise project to comply with the District's applicable regulations. Staff will review and comment on the PDOC and incorporate it into Staff Assessment for Air Quality.

BIOLOGICAL RESOURCES

The biological resources analysis contained in this PSA is as complete as possible, pending federal and state agency Biological Opinions (BO). The U.S. Fish and Wildlife Service's (USFWS) BO, initiated by the Bureau of Land Management as a Section 7 consultation, is expected to be issued after the Final Staff Assessment (FSA). However, staff understands that unforeseen issues may arise that could delay the USFWS BO.

California Department of Fish and Game (CDFG) will issue a separate BO and an Incidental Take permit. In addition, CDFG will provide their opinion after receiving

the federal opinion. It is unknown, at this time, when the CDFG and USFWS documents will be provided.

STAFF RECOMMENDATION

Staff has identified two technical areas that are incomplete in their analyses: air quality and biological resources. Although our analysis is potentially complete in 20 areas, resolution of any remaining issues in the other two areas will be crucial to the Energy Commission's Decision on this project.

Until the air quality and biological issues are settled, staff cannot be certain what changes may be required to its testimony. At this time, staff is unable to recommend that the project be certified.

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INTRODUCTION

Kristina C. Bergquist

PURPOSE OF THIS REPORT

The Preliminary Staff Assessment (PSA) presents the California Energy Commission (Energy Commission) staff's independent analysis of the Sunrise Cogeneration and Power Company's Application for Certification (AFC). The PSA is a staff document. It is neither a Committee document, nor a draft decision or proposed decision. The PSA 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 the project should be constructed and operated, if it is certified;
- g) project alternatives; and.
- h) Project closure

The analyses contained in this PSA 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; and 6) independent field studies and research. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification". The verification is not part of the proposed condition, but is the Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted requirements. The PSA presents conclusions and proposed conditions that apply to the design, construction, operation and closure of the proposed facility.

The Energy Commission staff's analyses were prepared in accordance with Public Resources Code section 25500 et seq. and Title 20, California Code of Regulation section 1701 et seq., and the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 15000 et seq.).

ORGANIZATION OF THE STAFF ASSESSMENT

This **INTRODUCTION** section of this PSA explains the purpose of the PSA 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 most recently adopted 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 and 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 the California Environmental Quality Act. No Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been

certified by the Resources Agency (Pub. Resources Code, section 21080.5 and Cal. Code Regs., tit. 14, section 15251 (k)).

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 their analysis, correct errors, and finalize conditions of certification to reflect areas where we have reached agreement with the parties.

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

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Members' Proposed Decision (PMPD). 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 PSA.

PROJECT DESCRIPTION

Kristina C. Bergquist

NATURE AND PURPOSE OF THE PROJECT

The Sunrise Cogeneration and Power Company (SCPC) proposes to construct and operate the Sunrise Cogeneration and Power Project (Sunrise), 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 North American Production, for use in thermally enhanced oil recovery operations (SCPC 1998a, p. 1-1).

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

POWER PLANT

PROJECT DESCRIPTION Figure 1 shows the vicinity of the proposed power plant. The power plant would be located on approximately 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.

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 TNAP 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. Water produced along with the crude oil

PROJECT DESCRIPTION Figure 1

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 gas line thermal host, TNAP. The Sunrise project will receive gas via a 60 foot long 12-inch gas pipeline from TNAP’s main gasline which is currently under construction and will interconnect with TNAP’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 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. Startup wastewater will be disposed into injection wells or will be returned to the TNAP utility corridor.

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

Multiple 230 kilovolt (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 2 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.

PROJECT DESCRIPTION Figure 2

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.

CONSTRUCTION AND OPERATION

SCPC plans to begin construction in the winter of 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.

NEED CONFORMANCE

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 (Sunrise Project) 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 are contained in the *1996 Electricity Report (ER 96)*, and is 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. Sunrise 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 Sunrise Application for Certification being found data adequate, the need conformance criterion of *ER 96* applies to the Sunrise project. Staff therefore evaluated the project based on the *ER 96* Need Conformance Criterion.

RECOMMENDATIONS

The Sunrise Project 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.

AIR QUALITY

Joseph M. Loyer

INTRODUCTION

This analysis evaluates the expected air quality impacts of the emissions of criteria air pollutants due to the construction and operation of the proposed Sunrise Cogeneration and Power Project (Sunrise). Criteria air pollutants are defined as those for which a state or federal ambient air quality standard has been established to protect public health. They include nitrogen dioxide (NO₂), sulfur dioxide (SO₂), carbon monoxide (CO), ozone (O₃), volatile organic compounds (VOC) and particulate matter less than 10 microns in diameter (PM₁₀).

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

- whether the Sunrise project is likely to conform with applicable Federal, State and San Joaquin Valley Unified Air Pollution Control District air quality laws, ordinances, regulations and standards, as required by Title 20, California Code of Regulations, section 1742.5 (b);
- whether the Sunrise project is likely to cause significant air quality impacts, including new violations of ambient air quality standards or contributions to existing violations of those standards, as required by Title 20, California Code of Regulations, section 1742 (b); and
- whether the mitigation proposed for the Sunrise project is adequate to lessen the potential impacts to a level of insignificance, as required by Title 20, California Code of Regulations, section 1744 (b).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

Under the Federal Clean Air Act (40 CFR 52.21), there are two major components of air pollution control requirements for stationary sources, New Source Review (NSR) and Prevention of Significant Deterioration (PSD). NSR is a regulatory process for evaluation of those pollutants that violate federal ambient air quality standards. Conversely, PSD is a regulatory process for evaluation of those pollutants that do not violate federal ambient air quality standards. The NSR analysis has been delegated by the Environmental Protection Agency (EPA) to the San Joaquin Valley Unified Air Pollution Control District (District). The EPA determines the conformance with the PSD regulations. The PSD requirements apply only to those projects (known as major sources) that emit more than 100 tons per year for any pollutant.

STATE

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

LOCAL

The proposed project is subject to the following San Joaquin Valley Unified Air Pollution Control District (District) rules and regulations:

RULE 2201 - NEW AND MODIFIED STATIONARY SOURCE REVIEW RULE

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

SECTION 4.1 - BEST AVAILABLE CONTROL TECHNOLOGY

Best Available Control Technology is defined as: a) has been contained in any State Implementation Plan and approved by EPA; b) the most stringent emission limitation or control technique that has been achieved in practice for a class of source, or c) any other emission limitation or control technique which the District’s Air Pollution Control Officer (APCO) finds is technologically feasible and is cost effective. BACT will apply to any air pollutant that results in an emissions increase of 2 pounds per day. In the case of the Sunrise project, BACT will apply for NO_x, SO₂, PM₁₀, VOC and CO emissions from all point sources of the project.

SECTION 4.2 - OFFSETS

Emissions offsets for new sources are required when those sources exceed the following emissions levels:

- Sulfur oxides - 150 lbs/day
- PM₁₀ - 80 lb./day
- Oxides of nitrogen - 10 tons/year
- Volatile organic compounds - 10 tons/year

The Sunrise project exceeds all of the above emission levels; therefore offsets are required for all four of these pollutants. The emission offsets provided shall be adjusted according to the distance of the offsets from the project proposed site. The ratios are:

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

Section 4.2.5.3 allows for the use of interpollutant offsets (including PM10 precursors for PM10) on a case-by-case basis, provided that the Sunrise Cogeneration and Power Company (SCPC) demonstrates that the emissions increase will not cause a violation of any ambient air quality standard. The ratio for interpollutant trading shall be based on an air quality analysis and shall be equal to or greater than the minimum offsetting requirements (the distance ratios) of this rule.

SECTION 4.3 - ADDITIONAL SOURCE REQUIREMENTS

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

RULE 2520 – FEDERALLY MANDATED OPERATING PERMITS

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

RULE 2540 – ACID RAIN PROGRAM

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

RULE 4001 - NEW SOURCE PERFORMANCE STANDARDS

Specifies that a project must meet the requirements of the Federal New Source Performance Standards (NSPS) specified in Title 40, Code of Federal Regulations, Part 60, Chapter 1. Subpart GG, which pertains to Stationary Gas Turbines, requires that NO_x concentrations are a function of the heat rate of the combustion, which in this case would be approximately 116 ppmv at 15% O₂. In addition, the SO₂ concentration shall be less than 150 ppmv and the sulfur content of the fuel shall no greater than 0.8 percent by weight.

RULE 4101 - VISIBLE EMISSIONS

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

RULE 4201 - PARTICULATE MATTER CONCENTRATION

Limits particulate emissions from sources such as the gas turbines, cooling towers and emergency fire water pumps to less than 0.1 grain per cubic foot of exhaust gas at dry conditions.

RULE 4703 - STATIONARY GAS TURBINES

Limits NO_x concentrations to 12.2 ppm for the SCR controlled turbines. In addition there is a limit in CO concentrations of less than 200 ppm.

RULE 4801 - SO₂ CONCENTRATION

Limits the SO₂ concentration emitted into the atmosphere to no greater than 0.2 percent by volume.

RULE 8010 - FUGITIVE DUST ADMINISTRATIVE REQUIREMENTS FOR CONTROL OF FINE PARTICULATE MATTER (PM-10)

Specifies the types of chemical stabilizing agents and dust suppressant materials that can (and cannot) be used to minimize fugitive dust.

RULE 8020 - FUGITIVE DUST REQUIREMENTS FOR CONTROL OF FINE PARTICULATE MATTER (PM-10) FROM CONSTRUCTION, DEMOLITION, EXCAVATION, AND EXTRACTION ACTIVITIES

Requires that fugitive dust emissions during construction activities be limited to no greater than 40 percent opacity by means of water application or chemical dust suppressants. The rule also encourages the use of paved access aprons, gravel strips, wheel washers or other measures to limit mud or dirt carry-out onto paved public roads.

RULE 8030 - CONTROL OF PM₁₀ FROM HANDLING AND STORAGE OF BULK MATERIALS

Limits the fugitive dust emissions from the handling and storage of materials. It specifies that bulk materials be transported using wetting agents, allow appropriate freeboard space in the vehicles, or be covered. It also requires that stored materials be covered or stabilized.

RULE 8060 - CONTROL OF PM₁₀ FROM PAVED AND UNPAVED ROADS

Specifies the width of paved shoulders on paved roads or the use of chemical dust suppressants on unpaved roadways, shoulders and medians.

RULE 8070 - CONTROL OF PM10 FROM VEHICLE/EQUIPMENT PARKING, SHIPPING, RECEIVING, TRANSFER, FUELING AND SERVICE AREAS

This rule is intended to limit fugitive dust from unpaved parking areas by means of using water or chemical dust suppressants or the use of gravel. It also requires that the affected owners/operators shall remove tracked out mud and dirt onto public roadways once a day.

ENVIRONMENTAL SETTING

METEOROLOGICAL CONDITIONS

The climate of the southern San Joaquin Valley is typically dominated by hot dry summers and mild winters with relatively small amounts of precipitation. The semi-permanent Pacific High over the eastern Pacific Ocean dominates the weather during the summer months, blocking low pressure systems from passing through the area. The Pacific High, along with the Temblor Range to the west that blocks the marine air influence from the Pacific Ocean, results in summers that are usually quite warm, with average daily maximum temperatures during July of over 98°F.

During the winter months, the Pacific High weakens and migrates to the south allowing Pacific storms into California. The annual rainfall in the Bakersfield area is only 5.7 inches. In between storms, high pressure from the Great Basin High can block storms and result in persistent tule fog caused by temperature inversions. Daily maximums during the December-January months are a relatively mild 57°F, with lows averaging 38°F. At the Maricopa weather station, a record high of 115°F and record low of 15°F was measured. These temperatures are used in determining the maximum possible emissions from the project and the maximum emission impacts in the air dispersion modeling analysis.

Winds in the area are strongly influenced by the Temblor Range to the west and the marine air that enters the Central Valley through the Carquinez Strait and Altamont Pass in the Bay Area to the north. During the summer, marine air entering the Central Valley results in northeasterly winds in the daytime hours. In the nighttime hours downslope drainage of air from the hills and mountains to the south and west results in winds from the southwest. This windflow pattern is fairly consistent throughout the year, although there is more variability to wind directions during the winter with the passage of storms through the area. Winds are usually of higher speeds during the summer because during the winter, calm and stagnant atmospheric conditions can occur between storms and the influence of the marine air from the coast is significantly diminished.

Along with the winds, another climatic factor affecting emission impacts is atmospheric stability and mixing height. Atmospheric stability is an indicator of the air turbulence and mixing. During the daylight hours of the summer when the earth is heated and air rises, there is more turbulence, more mixing and thus less stability. During these conditions there is more air pollutant dispersion and therefore usually fewer air quality impacts from a single air pollution source like the Sunrise project.

During the winter months between storms, very stable atmospheric conditions occur, resulting in very little mixing. Under these conditions, little air pollutant dispersion occurs, and consequently higher air quality impacts result from stationary source emissions. Mixing heights are generally lower during the winter, along with lower mean wind speeds and less vertical mixing.

EXISTING AIR QUALITY

The Federal Clean Air Act and the California Air Resources Board (CARB) both require the establishment of allowable maximum ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by CARB, are typically lower (more protective) than the federal AAQS, which are established by the EPA. The state and federal air quality standards are listed in AIR QUALITY Table 1. As indicated in AIR QUALITY Table 1, the averaging times for the various air quality standards (the duration over which they are measured) range from one-hour to one year. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 and $\mu\text{g}/\text{m}^3$).

In July 1997, the EPA promulgated new ozone and PM_{2.5} (particulate matter less than 2.5 microns in diameter) ambient air quality standards, which are shown in AIR QUALITY Table 1. The new 8-hour ozone standard will replace the existing 1-hour standard. The PM_{2.5} standards will be in addition to the existing PM₁₀ standards. Although the standards may be set, the EPA will first have to designate areas which violate these new standards, and then air districts that violate these standards will have to prepare implementation plans to reach attainment of those standards. Additionally, these standards have been contested and overturned in court.

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

**AIR QUALITY Table 1
Federal and State Ambient Air Quality Standards**

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O ₃)	1 Hour	0.12 ppm (235 µg/m ³)	0.09 ppm (180 µg/m ³)
	8 Hour	0.08 ppm (157 µg/m ³)	---
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)
	1 Hour	35 ppm (40 mg/m ³)	20 ppm (23 mg/m ³)
Nitrogen Dioxide (NO ₂)	Annual Average	0.053 ppm (100 µg/m ³)	---
	1 Hour	---	0.25 ppm (470 µg/m ³)
Sulfur Dioxide (SO ₂)	Annual Average	80 µg/m ³ (0.03 ppm)	---
	24 Hour	365 µg/m ³ (0.14 ppm)	0.04 ppm (105 µg/m ³)
	3 Hour	1300 µg/m ³ (0.5 ppm)	---
	1 Hour	---	0.25 ppm (655 µg/m ³)
Respirable Particulate Matter (PM ₁₀)	Annual Geometric Mean	---	30 µg/m ³
	24 Hour	150 µg/m ³	50 µg/m ³
	Annual Arithmetic Mean	50 µg/m ³	---
Fine Particulate Matter (PM _{2.5})	24 Hour	65 µg/m ³	---
	Annual Arithmetic Mean	15 µg/m ³	---
Sulfates (SO ₄)	24 Hour	---	25 µg/m ³
Lead	30 Day Average	---	1.5 µg/m ³
	Calendar Quarter	1.5 µg/m ³	---
Hydrogen Sulfide (H ₂ S)	1 Hour	---	0.03 ppm (42µg/m ³)
Vinyl Chloride (chloroethene)	24 Hour	---	0.010 ppm (26 µg/m ³)
Visibility Reducing Particulates	1 Observation	---	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

The Sunrise project is located in the Kern County portion of the San Joaquin Valley Air Basin and, as stated above, is under the jurisdiction of the San Joaquin Valley Unified Air Pollution Control District. This area is designated as non-attainment for both the state and the federal ozone and PM₁₀ standards, attainment for the state's CO, NO₂, SO₂, SO₄ and Lead standards, attainment for the federal SO₂ standard, and unclassified/attainment for the federal CO and NO₂ standards (ARB 1998).

Ambient air quality data has been collected by the oil companies, known as the Westside Operators, in western Kern County for a number of years. Ambient air quality data collected between 1992 and 1995 at the Westside Operators Fellows site, located approximately 4 miles south-southeast of the project site is presented

in AIR QUALITY Table 2. That data shows there have been no violations during that period of the NO₂, SO₂ or CO ambient air quality standards.

Additional ambient air quality data from the Air Resources Board's ozone monitor in Maricopa (18 miles south-southeast of the project site) and Taft College PM₁₀ monitor (10 miles south-southeast of the project site) are shown in AIR QUALITY Table 3. This data shows that frequent violations of the state 1-hour ozone and 24-hour PM₁₀ standard have occurred between 1992 and 1997. There appears to be no clear trend of significant improvement in the ambient concentrations of these two pollutants.

OZONE

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between directly emitted air pollutants. Nitrogen oxides (NO_x) and hydrocarbons (Volatile Organic Compounds [VOCs]) interact in the presence of sunlight to form ozone. The collected air quality data indicate that the ozone violations occurred primarily during the period of May through October.

In the most recent ARB report on the contribution of various districts to ozone violations in other districts (ARB 1996), ARB concluded that the San Joaquin Valley Air Basin contributes measurably to ambient ozone levels in other districts, and that other districts contribute measurably to the San Joaquin Valley's ozone problems. The report concludes that sources within the San Joaquin Valley Air Basin contribute to ozone levels in Mountain County districts to the northeast, the South Central Air Basin to the south, to the Mojave Desert to the east, the Sacramento area to the north, the Great Basin Valleys to the east, and to the North Central Coast Air Basin to the west. Conversely, emissions from districts such as the Bay Area Air Quality Management District and the Sacramento Air Quality Management District contribute to San Joaquin Valley's ozone problems. This widespread contribution from one geographic area to another demonstrates the regional nature of the ozone problem and ozone formation.

AIR QUALITY Table 2
PM10, NO2, CO and SO2 Ambient
Air Quality Data Collected at Fellows

Pollutant	Averaging Time	1995	1994	1993	1992	Most Restrictive Ambient Air Quality Standard
PM10	24 hours	80	85	109	104	50
	Annual	24.6	25.9	31.0	35.7	30
NO2	1 hour	62	94	92	84	470
	Annual	12.6	14.4	16.6	20.6	100
CO	1 hour	2440	2303	2941	2713	23,000
	8 hour	1869	1985	2222	1783	10,000
SO2	1 hour	65	94	36	78	655
	3 hours	36	57	27	52	1300
	24 hours	13	20	14	14	130
	Annual	1.5	1.8	1.8	1.7	80

AIR QUALITY Table 3
Ozone and PM10 Ambient Air Quality Data

Pollutant & Location		1997	1996	1995	1994	1993	1992
Ozone Maricopa	Max. conc.(ppm)	.12	.12	.13	.13	.12	0.11
	# days exceed standard	24	63	57	11	17	25
PM10 Taft College	Max. conc. ($\mu\text{g}/\text{m}^3$)	78	94	93	64	118	110
	# days exceed standard	6	12	15	6	13	15
	% of samples above 24-hour standard	10%	20%	25%	11%	23%	25%
California Ozone Ambient Air Quality Standard: 0.09 ppm (1-hour average) National Ozone Ambient Air Quality Standard: 0.12 ppm (1-hour average) California PM10 Ambient Air Quality Standard: 50 $\mu\text{g}/\text{m}^3$ (24-hour average)							

AMBIENT PM10

As Table 3 indicates, the project area also annually experiences a number of violations of the state 24-hour PM10 standard, although violations of the federal 24-hour standard are not occurring. The violations of the state 24-hour standard occur predominately between the months of August and February, with the highest number of violations occurring from September through November.

PM10 can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. Gaseous emissions of pollutants like NO_x, SO_x and VOC from turbines, and ammonia from NO_x control equipment can, given the right meteorological conditions, form particulate matter known as nitrates (NO₃), sulfates (SO₄), and organics. These pollutants are known as secondary particulates, because they are not directly emitted but are formed through complex chemical reactions in the atmosphere.

A number of studies have been undertaken to understand the particulate phenomenon, both PM10 and the smaller PM2.5, in the San Joaquin Valley. Major sources of information on the subject are available from the District and CARB. Staff has concluded the following about the NO_x/PM10 relationship:

- NO_x emissions contribute significantly to the formation of particulate nitrate in the region where the Sunrise project is located, and
- ammonium nitrate is the largest contributor to PM10 levels during the winter when ambient PM10 levels are at their highest.

Staff's assessment of the NO_x contribution to particulate nitrate formation is that emissions of gaseous NO_x emissions can contribute a substantial portion of the ambient particulate nitrate in the southern San Joaquin Valley, especially during the winter season when the PM10 levels are the highest.

PROJECT DESCRIPTION AND EMISSIONS

CONSTRUCTION

The Sunrise project will include not only the power plant, but the following ancillary facilities as well:

- a 230 kilovolt (kV) substation on the east end of the Sunrise project site,
- a 22 mile-long, 230 kV transmission line (several routes are being considered at this time, however staff will present only the preferred route which is route B),
- a 60 foot-long, 12 inch diameter natural gas pipe line that will tie into the Texaco California Inc. (TCI) Main Utility Corridor,
- three separate 600 foot-long lines for steam, boiler feed water and waste water that will tie into the TCI Main Utility Corridor,
- and a 40 foot-long fresh water line that will tie into the TCI Main Utility Corridor.

The construction of these facilities will generate air emissions, primarily fugitive dust from earth moving activities and combustion emissions generated from the construction equipment and vehicles. The projected highest daily emissions, based on the highest monthly emissions over the 15 months of construction activity are shown in AIR QUALITY Table 4. It should be noted that the emissions shown in Table 4 would likely not occur on one single day.

AIR QUALITY Table 4
Maximum Daily Construction Emissions (lbs./day)

	NOx	VOC	CO	PM10	SOx	Fugitive PM10
Project Site & 230kV substation	221	37	314	24	21	154 ^a
Transmission line	132	15	55	15	12	Negligible
Natural gas pipeline	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Steam, boiler water and waste water lines	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Fresh water line	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Emission estimates assume an 8-hour workday.						
a – Fugitive dust emission estimate assumes no controls.						

PROJECT SITE

The power plant itself will take approximately 15 months to construct. The power plant project construction consists of three major areas of activity: 1) the civil/structural construction 2) the mechanical construction, and 3) the electrical construction. The greatest level of air emissions are generated during the civil/structural activity, where work such as grading, site preparation, foundations, utility installation and building erection occur. These types of activities require the use of large earth moving equipment, which generates considerable combustion emissions, along with creating fugitive dust emissions. The mechanical construction includes the installation of the heavy equipment, such as the combustion turbines, the heat recovery steam generators, pumps, piping and valves. Although not a large fugitive dust generation activity, the use of large cranes to install such equipment generates significantly more emissions than other construction equipment onsite. Finally, the electrical equipment installation occurs involving such items as transformers, switching gear, instrumentation and wiring. This is a relatively small emissions generating activity in comparison to the early construction activities.

TRANSMISSION LINE

The construction of the transmission line is planned to take approximately 8 months between the 1st and 8th month of the project construction schedule. The significant

emissions generating vehicles are the trucks used to deliver the transmission tower structural materials, boom trucks and mobile cranes (Radian 1999c). Maximum emissions from the transmission line construction are shown in AIR QUALITY Table 4. The SCPC has discussed several different options for the transmission line route; however, all the options should result in very similar emissions and impacts. Therefore staff will analyze only the currently preferred route (route B in the AFC) and assume that all alternative routes have similar emissions or less. Route B (also routes D, E and F) is approximately 22 miles long and generally heads towards the north through the Midway-Sunset and La Paloma power plants ending in the Midway Substation. There might be some minor expansion construction performed at the Midway substation. It is staff's opinion that whichever route is chosen (B, D, E, F or G) the air emissions and impacts will be very similar.

OPERATIONAL PHASE

EQUIPMENT DESCRIPTION

- The major components of the Sunrise project consist of the following: two combustion turbine generators (CTG), using the General Electric (GE) Frame 7 FA each with a generating capacity of 165 MW (gross). Each of the CTGs would be equipped with evaporative inlet air coolers;
- Two unfired heat recovery steam generators (HRSG) and ancillary equipment;

EQUIPMENT OPERATION

The CTGs will burn only natural gas, and there are no provisions for an alternative back-up fuel.

SCPC is requesting that the project be analyzed with the assumption of 20 startups per turbine each year. The duration of a startup is relatively short, approximately 20 minutes. However, in order to allow for failed startup attempts staff recommends that the SCPC be allowed 1 hour for each startup.

EMISSION CONTROLS

The exclusive use of an inherently clean fuel, natural gas, will limit the formation of SO₂ and PM₁₀ emissions. Natural gas contains very small amounts of a sulfur compound known as mercaptan, which when combusted, results in sulfur dioxide emissions in the flue gas. However, in comparison to other fuels used in power plants, such as fuel oil or coal, the sulfur dioxide emissions from the combustion of natural gas are very low.

Like SO₂, the emissions of PM₁₀ from natural gas combustion are very low compared to the combustion of fuel oil or coal. Natural gas contains very little noncombustible gas or solid residue; therefore it is a relatively clean-burning fuel. A sulfur content of 0.75 grains of sulfur per 100 standard cubic feet of natural gas was assumed for the SO₂ emission calculations.

To minimize NOx, CO and VOC emissions during the combustion process, the GE 7FA turbine is equipped with dry low-NOx combustor design developed by General Electric (GE). A more detailed discussion of this combustion technology is presented in the Mitigation section of this analysis.

After combustion, the flue gases pass through the heat recovery steam generator (HRSG), where catalyst systems are placed to further reduce NOx emissions. SCPC is proposing to use a Selective Catalytic Reduction (SCR) system to reduce NOx emissions. A more complete discussion of this catalyst is included in the Mitigation section.

PROJECT OPERATING EMISSIONS

The proposed project’s criteria air pollutant emissions during startup, shutdown and full load conditions, are shown in AIR QUALITY Table 6. This table presents the combustion turbine emissions only. As this table shows, the highest emissions will occur during startup and shutdown, and are significantly higher than those during steady state, full load operation. This is particularly true for NOx, VOC and CO emissions. These higher emissions occur because the turbine combustor technology is designed for maximum efficiency during full load steady state operation.

**AIR QUALITY Table 6
Project (Per CTG) Hourly Emissions
(pounds per hour [lb/hr] except where noted)**

Operational Profile	NOx	SO2	PM10	VOC	CO
CTG Startup (assuming three 20-minute events)	96	6.9	21.0	51.0	489
CTG Shutdown (lbs per 20-minute event)	32	2.3	7.0	17.0	163
CTG 100% load at 15°F	16.5	3.5	18.0	2.8	29.1
CTG 100% load at 65°F	15.4	3.3	18.0	2.6	26.8
CTG 100% load at 115°F	14.4	3.1	18.0	2.5	25.2
2 CTGs 100% load at 65° F	30.8	6.6	36.0	5.2	53.6

During startup and shutdown, combustion temperatures and pressures are rapidly changing, which results in less efficient combustion and higher emissions. Also, the flue gas controls, the SCR discussed above, operate most efficiently when the turbine operates near or at full load. Those flue gas controls are not as effective during the transitory temperature changes that occur during startup and shutdown.

The startup emission estimates reflect information provided by GE to the SCPC, which is included in the AFC. Each startup attempt should last approximately 20 minutes and is assumed to have equivalent emissions as if the turbine were operating at 60% load for an hour. That is, the mass of pollutants that would be emitted in one hour of operation at 60% load are the same as the mass of pollutants that would be emitted during one 20-minute startup. The SCPC makes the

conservative assumption that the shutdown emissions will be similar to the startup emissions, which will not be the case. Shutdown emissions, although higher than steady state emissions, are typically significantly less than the startup emissions because the system is operating at maximum efficiency and the post-combustion control systems are functioning.

Starting up a simple-cycle cogeneration power plant is a fairly short duration event (20 minutes in most cases). However, from time to time the turbine fails to startup and the operators must attempt another startup. Therefore, to be conservative, staff assumes that the operators will attempt no more than three consecutive startups. In reality, it is very unlikely that any operator would go this far before determining and rectifying the cause of a failed startup attempt. AIR QUALITY Table 6 shows that the highest one-hour emission rate is for the assumed startup scenario of three consecutive 20-minute startup attempts.

The daily emissions from the project are shown in AIR QUALITY Table 7 for CTG startup and steady state operation.

**AIR QUALITY Table 7
Project Daily Emissions
(pounds per day [lb/day])**

Operational Profile	NOx	SO2	PM10	VOC	CO
2 turbine sequential startup and steady state operation	900.4	165.6	870.0	110.8	1,105.4
Typical daily operation - 2 turbines operate full load, with no startups.	739.2	158.4	864.0	124.8	1,286.4

Annual emissions are summarized in AIR QUALITY Table 8. SCPC has requested that the project be analyzed assuming 20 startups per turbine per year, and 20 shutdowns per turbine per year. The balance of the year's operation assumes full load operation of the CTGs. This type of operational scenario is actually not possible, since by definition, the startups must be preceded with no turbine operation and thus no emissions. In most the cases the turbines would likely be down for many days before a start would be initiated. Therefore, the assumption of 8732 hours of steady state operation could not happen.

For comparison, staff has presented the scenario of both turbines operating non-stop throughout the year. Typically the highest annual emissions of SO2 and PM10 would occur with this scenario. However, in this case the emissions of SO2 and PM10 are more equal because of staff's startup assumptions. The annual emissions of NOx, VOC and CO are higher because they include startup emissions.

**AIR QUALITY Table 8
Project Annual Emissions
(tons per year [ton/yr])**

Operational Profile	NOx	SO2	PM10	VOC	CO
20 startups, 20 shutdowns, steady state operation ^a	137	29	158	24	247
Steady state operation entire year ^b	135	29	158	23	235
Initial Commission Phase	These emissions will be addressed in the Final Staff Assessment				
Notes: a- Assumes 20 1-hr startups, 20 20-minute shutdowns and 8732 hours normal full load operation per turbine. Includes both turbines. b- Assumes 8760 hr normal full load operation, both turbines.					

AMMONIA EMISSIONS

Due to the large combustion turbines used in this project and the need to control NOx emissions, significant amounts of ammonia will be injected into the flue gas stream as part of the SCR system. Not all of this ammonia mixes in the flue gases to reduce NOx; a portion of the ammonia passes through the SCR and is emitted unaltered, out the stack. These ammonia emissions are known as ammonia slip. SCPC has committed to an ammonia slip no greater than 10 ppm, which is the current ammonia slip level being permitted throughout California. On a daily basis, the ammonia slip of 10 ppm is equivalent to approximately 1,166 lb/day of ammonia emitted into the atmosphere.

It should be noted that an ammonia slip of 10 ppm is usually associated with the degradation of the SCR catalyst, usually in a time frame of five years or more after initial operation. At that point, the SCR catalysts are removed and replaced with new catalysts. During most of the operation of the SCR system, ammonia slip emissions are usually in the range of 1 to 2 ppm, corresponding to a mass emissions in the Sunrise project case to approximately 100 to 250 pounds per day. The implications of these ammonia emissions are discussed later in this analysis.

INITIAL COMMISSIONING PHASE OPERATION AND EMISSIONS

To boil out the combustion turbines prior to their first firing, the temporary HRSG chemical cleaning boiler will be used. The combustion turbines will then undergo the initial firing and commissioning phase of the project schedule. During this period, emissions may exceed permitted levels, due to startups, shutdowns, extended periods of low load operation and periods of time when the low-NOx burners and SCR systems will need to be fine tuned for optimum performance. Staff is investigating the expected duration of these activities and their associated emissions.

FACILITY CLOSURE

Eventually the Sunrise project will close, either as a result of the end of its useful life, or through some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease and thus all impacts associated with those emissions would no longer occur.

A Permit to Operate, issued by the District under Rule 2010, is required for operation of the facility once it is constructed, and is usually renewed on a five year schedule. However, during those five years, the SCPC must still pay permit fees annually. If the SCPC chooses to close the facility and not pay the permit fees, then the Permit to Operate would be cancelled. In that event, the project could not restart and operate unless the fees are paid to renew the Permit to Operate.

If SCPC were to decide to dismantle the project, there would likely be fugitive dust emissions associated with this dismantling effort. District Rule 8020 requires that during demolition fugitive dust emissions be limited to no greater than 40% opacity by means of water application or chemical suppressants. The Facility Closure Plan, to be submitted to the Energy Commission Compliance Project Manager, should include the specific details regarding how SCPC plans to demonstrate compliance with the District Rule 8020 in the event of a closure.

PROJECT INCREMENTAL IMPACTS

The SCPC is proposing to produce steam for use in the nearby Texaco Western Kern County Oil Production fields. Additionally, the Sunrise project will make significant use of the partially constructed TCI Main Utility Corridor. This utility corridor will supply the Sunrise project with natural gas, as well as process, boiler and drinking water. It will also accept and deliver to the oil field, all available steam from the Sunrise project and take away all wastewater from the project. The Sunrise project and the TCI Main Utility Corridor are very closely linked, but are being considered separate projects for this analysis. Therefore, the TCI Utility Corridor will be discussed in more detail in the Cumulative Impacts section. The oil field expansion impacts will be discussed in the Indirect Impacts section, as will a proposed expansion to the nearby wastewater treatment facility. Project Direct Impacts section will focus on direct emissions from the proposed project during both construction and operation.

MODELING APPROACH

SCPC performed an air dispersion modeling analysis to evaluate the Sunrise project's potential impacts on the existing ambient air pollutant levels, both during construction and operation. An air dispersion modeling analysis usually starts with a screening level analysis. Screening models use very conservative assumptions, including meteorological conditions which may or may not actually occur in the area. The impacts calculated by screening models, therefore, can be more than double the actual or expected impacts. If the screening level impacts are significant, refined modeling analysis is performed. A major difference in the refined modeling is that hour-by-hour meteorological data collected in the vicinity of the project site is used. The Industrial Source Complex Short-Term model, Version 3, known as the ISCST3 model, was used for the refined modeling.

PROJECT DIRECT IMPACTS

CONSTRUCTION IMPACTS

SPCP performed air dispersion modeling analyses of the potential construction impacts at the project site. The analyses included fugitive dust generated from the construction activity (modeled as an area source) and combustion emissions from the equipment (modeled as point sources). The emissions used in the analysis were the highest emissions of a particular pollutant during a one month period, converted to a gram per second emission rate for the model. Most of the highest emissions occurred in the initial months of the 15-month construction period. The results of this modeling effort are shown in AIR QUALITY Table 9. They show that the construction activities would cause a violation of the state 24-hour and annual average PM10 standards. In reviewing the modeling output files, staff determined that the project's construction impacts are not occasional or isolated events, and occur over an area within a few hundred meters of the project site. These predicted impacts are of a high magnitude for a number of reasons.

**AIR QUALITY Table 9
Maximum Construction Impacts**

Pollutant	Averaging Time	Impact ($\mu\text{g}/\text{m}^3$)	Background ($\mu\text{g}/\text{m}^3$)	Total Impact ($\mu\text{g}/\text{m}^3$)	Limiting Standard ($\mu\text{g}/\text{m}^3$)	Percent of Standard
NO ₂	1-hour	298 ^a	97	395	470	84%
	Annual	9.6 ^b	20.6	30.2	100	30%
CO	1-hour	1,486	2,941	4,427	23,000	19%
	8-hour	680	2,222	2,902	10,000	29%
SO ₂	1-hour	99	104	203	655	31%
	3-hour	67.9	68	135.9	1300	10%
	24-hour	23.3	38	61.3	130	47%
	Annual	1.2	1.8	3	80	3.75%
PM ₁₀	24-hour	137	118	255	50	510%
	Annual	9.3	42.6	51.9	30	173%
<p>a – Results obtained using the Ozone Limiting Method (OLM).</p> <p>b – Results obtained using the Ambient Ratio Method (ARM) default value 0.75.</p>						

First, the model itself calculates impacts that are conservative, usually exceeding actual impact levels. Second, some of the sources of combustion emissions (the bulldozers and trucks) are mobile sources, not stationary sources, as assumed in the input to the model. As mobile sources, the air quality impacts would not always be at the same locations. Third, it was assumed that all the equipment identified for the modeling evaluation would be running simultaneously. It is doubtful that all the major equipment would all be operating at one time. Finally, the emissions inputs to the model were from the highest monthly emissions assumed during the 15-month construction period. The levels of emissions used reflect a period of activity of approximately 4 months, not the entire 15-month construction. During the other months of construction work, considerably fewer pieces of emission generating equipment will be used and thus the impacts will be lower.

Therefore, even though the modeling results for the construction of the Sunrise project predict an impact on the PM₁₀ ambient air quality standards, it is doubtful that the general public would be exposed to these impacts. However, it is not possible to determine to what extent the modeling results are over estimating the Sunrise project construction emission impacts. Therefore, staff concludes that the emissions from the construction of the Sunrise project have the potential to cause unavoidable short-term significant impacts on the PM₁₀ ambient air quality standards if left unmitigated.

PROJECT OPERATION IMPACTS

The potential air quality impacts of the Sunrise project operation are discussed in the following sections for fumigation meteorological conditions, combustion turbine startup and combustion turbine steady-state operations.

FUMIGATION

During the early morning hours before sunrise, the air is usually very stable. During such stable meteorological conditions, emissions from elevated stacks rise through this stable layer and are dispersed. When the sun first rises, the air at ground level is heated, resulting in a vertical (both rising and sinking air) mixing of air for a few hundred feet or so. Emissions from a stack that enter this vertically mixed layer of air will also be vertically mixed, bringing some of those emissions down to ground level. Later in the day, as the sun continues to heat the ground, this vertical mixing layer becomes higher and higher, and the emissions plume becomes better dispersed. The early morning air pollution event, called fumigation, usually lasts approximately 30 to 90 minutes. Since fumigation impacts will not typically occur much beyond a 1-hour period, only impacts on 1-hour standards are addressed. AIR QUALITY Table 10 shows the results of the fumigation modeling that the SCPC performed. These results demonstrate that the 1-hour standards for NO₂, SO₂ and CO are not exceeded under fumigation conditions for the Sunrise Project. Therefore, staff concludes that under fumigation conditions, the Sunrise project emissions have no potential to cause a significant impact on the ambient air quality standards.

AIR QUALITY Table 10
1-hour Fumigation Modeling Results

Pollutant	Averaging Time	Impact (µg/m ³)	Background (µg/m ³)	Total Impact (µg/m ³)	Limiting Standard (µg/m ³)	Percent of Standard
NO ₂	1-hour	23.8	97	121	470	26%
CO	1-hour	107.49	2,941	3,048	23,000	13%
SO ₂	1-hour	1.60	104	106	655	16%
(reference for response to CURE data request, July 6, 1999)						

STARTUP, SHUTDOWN AND STEADY STATE OPERATIONS

SCPC provided a refined modeling analysis, using the ISCST3 model to quantify the potential impacts of the Sunrise project both during normal steady state operation and during startup or shutdown conditions. The startup circumstances of the project are such that the combustion turbines will be started sequentially. That is, there will be no simultaneous startup of the two turbines. A startup sequence of a turbine will only occur when the other turbine is operating at steady state or is not operating at all. Startup conditions can cause short-term build ups in local ambient air pollution levels for the following reasons. First, emissions (particularly of NO_x and CO) can be high and often uncontrolled, because emission control equipment is

not operating at optimum temperature ranges. Second, low volumetric flow rates and exhaust gas temperatures can result in low exhaust plume rise and consequently higher ground level impacts.

The modeling analysis provided by the SCPC does not reflect the 1-hour startup that staff has assumed. The SCPC modeling analysis assumes that the turbine would startup for 20 minutes and then operate at full (100%) capacity for 40 minutes. As previously discussed, staff assumes that the turbine startup will require 1 hour (three consecutive 20-minute attempts). Further, staff assumes that while one turbine is attempting startup, the other turbine is operating at full load. Staff feels that this scenario represents the highest emissions that can be reasonably expected in a 1-hour operating scenario.

Any ISCST3 model impact prediction is directly proportional to the assumed emission rate at the modeled source. If all other factors are held constant and the source emission rate is changed, then the impact at the same location changes proportionally. Staff has determined the proportional increase for each pollutant in the original 1-hour modeling analysis and has shown them in AIR QUALITY Table 11. Staff multiplied the ratios in the last column of AIR QUALITY Table 11 by the modeling results supplied by the SCPC, see AIR QUALITY Table 12.

**AIR QUALITY Table 11
Proportional Increase Factors for Modeled Impact Results**

Pollutant	Original Emission Rate^a (g/s)	Turbine 1 Starting up^b (lbs/hr)	Turbine 2 Operating Full Load^b (lbs/hr)	Total Emissions (lbs/hr)	New Emission Rate^c (g/s)	Ratio of Emission Rates (New/Old)
NO2	5.24	96	16.5	112.5	14.17	2.70
CO	22.65	489	29.1	518.1	65.27	2.88
SO2	0.39	6.9	3.5	10.4	1.31	3.36

a – (SC&PP 1998a)
b – AIR QUALITY Table 6
c – unit conversion from lbs/hr to g/s is 0.12598
NOTE: g/s means grams per second, a typical unit of measure for modeling purposes.

**AIR QUALITY Table 12
Combustion Turbine Refined Modeling Maximum Impacts**

Pollutant	Average Time	SCPC's Modeled Impacts (µg/m ³)	Staff's Startup Impact (µg/m ³)	Background (µg/m ³)	Total Impact (µg/m ³)	Limiting Standard (µg/m ³)	Percent of Standard
NO ₂	1-hour	97	262 ^{a,c}	97	359	470	76%
	Annual	0.2 ^{b,d}	na	20.6	20.8	100	21%
CO	1-hour	418	1,204 ^c	2,941	4,145	23,000	18%
	8-hour	17.2 ^g	na	2,222	2,239	10,000	22%
SO ₂	1-hour	7.3	9.6 ^c	104	114	655	17%
	3-hour	3.3 ^e	na	68	71.3	1300	5%
	24-hour	0.5 ^d	na	38	38.5	130	30%
	Annual	0.1 ^d	na	1.8	2	80	2.5%
PM ₁₀	24-hour	3.1 ^f	na	118	121	50	242%
	Annual	0.3 ^d	na	42.6	43	30	143%

a – Results obtained using the Ozone Limiting Method (OLM).

b – Results obtained using the Ambient Ratio Method (ARM) default value 0.75.

c – Results based on three consecutive 20-minute startup attempts for one turbine while the other turbine is operating at full capacity.

d – Results based on two turbines operating at 100% load at 65°F.

e – Results base on two turbines operating at 100% load at 15°F.

f – Results based on two turbines operating at 60% load at 65°F.

g – Results base on two turbines operating at 80% load at 65°F.

AIR QUALITY Table 12 indicates that during a project startup scenario, the impacts from that startup, plus background NO₂ ambient levels would result in the highest contribution of the project to the 1-hour state NO₂ standard. This modeling analysis reflected the use of the Ozone Limiting Method (OLM) to provide a more refined estimate of NO₂ impacts. The highest SO₂ contribution to the 1-hour standard occurs during the startup scenario, that is one turbine running at full load while the other attempts 3 consecutive 20-minute startups. The highest SO₂ contribution to the 3-hour, 24-hour and annual standards occur when both turbines are running at full load. The highest PM₁₀ contribution to the annual standard also occur when both turbines are running at full load. Startup impacts on long term standards for SO₂ and PM₁₀ are significantly less because these emission estimates are based on fuel consumption. Since there is significantly less fuel burned during startup than at full load, there are fewer impacts. However, because of the conservative estimate for the PM₁₀ emission rate (18 lbs/hr under all operating circumstances) the model determined that the highest PM₁₀ impact for the 24-hour standard occurs

when both turbines are operating at 60% load and the air temperature is 65°F. Staff believes that this is simply a result of the conservative nature of the model and the original emission estimate.

AIR QUALITY Table 12 shows that the air pollution impacts would not cause a violation of any NO₂, CO or SO₂ ambient air quality standards. The project's PM₁₀ impacts could contribute to existing violations of the state 24-hour and annual average PM₁₀ standards. However, because of the conservatism of the air dispersion model itself, staff believes that the actual impacts from the project would be significantly less than the projected modeled impacts shown in AIR QUALITY Table 12. However, it is not possible to determine to what extent, if at all, the model may be over-predicting the PM₁₀ impacts. Therefore, staff concludes that the emissions from the expected operation of the Sunrise project have the potential to cause significant impacts on the PM₁₀ ambient air quality standards if left unmitigated.

VISIBILITY IMPACTS

A visibility analysis of the Sunrise project's gaseous emissions is required under the Federal Prevention of Significant Deterioration (PSD) permitting program. The analysis addresses the contributions of gaseous emissions (primarily NO_x) and particulate (PM₁₀) emissions to visibility impairment on the nearest Class 1 PSD areas, which are national parks and national wildlife refuges. The nearest Class 1 areas to the Sunrise project are the Domeland Wilderness Area 90 miles to the northeast and the San Rafael Wilderness Area 35 miles to the south. SCPC used the EPA approved model VISCREEN to assess the project's visibility impacts. The results from the VISCREEN modeling analysis indicate that the project's visibility impacts would be below the significance criteria for contrast and perception. Therefore, the project's visibility impacts on these Class 1 areas are considered insignificant.

INDIRECT IMPACTS

The indirect impacts associated with the proposed Sunrise project are those impacts that are not directly caused by the project itself, but are a result of other activities which will occur as a result of the project. These include Texaco's expansion of the Western Kern County Oil Production fields and the proposed expansion of the associated wastewater treatment facility.

THE OIL FIELD EXPANSION

Texaco has estimated that approximately 700 new injection wells will be created as a result of the Sunrise project. The emissions associated with the construction and operation of these wells are estimated below.

WELL CONSTRUCTION

In general, the following equipment is used for the construction of most types of oil wells. For grading: 220 HP Front End Loader, 165 HP Motor Grader and a 220 HP 4000-gallon Water Truck. For Drilling: Several diesel fired engines totaling approximately 1,500 HP.

Construction of a typical injection well takes approximately one week; 2 days grading, 3 days drilling and 2 days to install the flowline, pumping unit and motor (SC&PP 1999f). AIR QUALITY Table 13 shows the vehicular emission estimates for the construction and drilling of a typical well. Emissions from fugitive dust are negligible because of the small amount of earth typically being moved.

**Air Quality Table 13
Construction Vehicular Emission Estimates**

	NOx	VOC	PM	SOx	CO
Lbs/Day	434.81	35.28	86.96	0.08	140.1
Lbs/Hr	18.12	1.47	3.62	0.01	5.83

As discussed in the project emissions modeling section above, ISCST3 modeling results are directly proportional to the modeled emission rate at the source. If all other variables are held constant, then any change in the emission rate causes a proportional change in the modeled impact results. The SCPC has provided modeling for the construction emissions at the project site (see section under Construction Impacts). This modeling analysis assumes four point sources for all the heavy equipment used, which is a reasonable and accepted practice. That modeling analysis can be used to estimate the impacts from emissions of construction equipment for well construction by substituting the well construction emission rates for the site construction emission rates and adjusting the impact result proportionally. Staff made these calculations, the results of which are reported the results in AIR QUALITY Table 14.

**AIR QUALITY Table 14
Maximum Well Construction Impacts**

Pollutant	Averaging Time	Impact ($\mu\text{g}/\text{m}^3$)	Background ($\mu\text{g}/\text{m}^3$)	Total Impact ($\mu\text{g}/\text{m}^3$)	Limiting Standard ($\mu\text{g}/\text{m}^3$)	Percent of Standard
NO2	1-hour	147 ^a	97	244	470	52%
CO	1-hour	165	2,941	3,106	23,000	14%
SO2	1-hour	99	104	203	655	31%

a – Results obtained using the Ozone Limiting Method (OLM).

The data in AIR QUALITY Table 14 show that the impacts from the construction of one well will not exceed the ambient air quality standards. However, it also shows that concurrent construction of multiply wells in close proximity might exceed the ambient air quality standards. Before carrying out further modeling efforts to determine the possible impacts of several concurrent well construction projects, staff plans to consult with Texaco to determine whether concurrent well drilling is expected.

WELL OPERATION

The operation of a new well results in VOC emissions, which are known to contribute to ozone formation. Texaco estimates that the total uncontrolled fugitive VOC emissions associated with new wells are 0.4530 lbs per well per day (SC&PP 1999f). If all 700 wells were constructed and running, that would mean 317 lbs of VOC per day or 579 tons per year. The current and forecasted total VOC emissions for the San Joaquin Valley are 490 tons/day for 1996 and 420 tons/day for 2010. The VOC emissions related to oil and gas production are 52 tons/day and 41 tons/day for 1996 and 2010 respectively (ARB 1999). The VOC emissions from the 700 new wells represent approximately 0.39% of the 2010 VOC emission inventory for oil and gas production. Therefore, staff believes that these potential emissions do not represent a significant air quality impact.

WASTEWATER TREATMENT FACILITY EXPANSION

Staff is awaiting supplementary information on the wastewater treatment plant expansion.

CUMULATIVE IMPACTS

Staff's assessment of the cumulative impacts associated with the Sunrise project considers several elements in or near the proposed project site. Specifically, these elements will include the TCI Main Utility Corridor, the two other power plant projects in the western Kern County area (La Paloma Power Project and Elk Hills Power Project) and the formation of secondary pollutants (ozone and PM10).

TCI MAIN UTILITY CORRIDOR

The TCI Main Utility Corridor (TMUC) will provide the Sunrise project with natural gas, boiler water, feed water, and fresh water. TMUC will also accept steam and wastewater from the Sunrise project. The TMUC is intended to serve not only Sunrise, but also a significant number of field steam generators in the Texaco oil fields.

TMUC will tap the nearby Kern River Gas Transmission Company/Mojave Pipeline Company (KRGTC/MJP) gas transmission line. The project will replace an existing 12-inch diameter tap line with a 20-inch tap line. This line is 10,550 feet long and is buried 6 feet deep, necessitating the disturbance of 4,900 cubic yards of soil. The rest of the TMUC will be built on racks above ground. Therefore, very little soil disturbance will occur from the rest of the TMUC construction. As noted above, the TMUC will carry lines for fresh water, feed water, boiler water, steam, wastewater and natural gas. Additionally, the TMUC will carry along a small portion of its length the pumped oil/water line from the oil fields to the first stage of separation.

CONSTRUCTION

The construction of the TMUC has already begun, and is expected to be completed and fully operational by the time that this analysis is published. The majority of the construction emissions have already occurred and are therefore not addressed in this analysis. The only major construction element of the project yet to be completed is the replacement of the main tap to the KRGTC/MJP gas transmission

pipeline. That element has been partially completed, but will be fully completed prior to any construction beginning on the Sunrise project. Therefore, staff does not include construction emissions associated with the TMUC in the cumulative impact analysis.

OPERATION

There are only minimal operational emissions from the TMUC. The project does not use any internal combustion engines or generators for any purpose. There are only small amounts of mobile emissions associated with standard operational and maintenance vehicles. Therefore, operational emissions associated with the TMUC are not considered in the cumulative impact analysis.

KERN COUNTY POWER PLANT PROJECTS

To evaluate reasonably foreseeable future projects as part of a cumulative impact analysis, staff needs specific information about the projects. The time in which a probable future project is well enough defined to have the information necessary to perform a modeling analysis is usually when the project owner has submitted an application to the District for a permit. Therefore, we evaluate those probable future projects in our cumulative impacts analysis that are currently under construction, or are currently under District review. Projects located up to six miles from the proposed facility site usually need to be included in the analysis.

Staff used the ISCST3 air dispersion model in its cumulative impacts analysis, along with the 1993 meteorological file provided by the La Paloma Power Project applicant. The results of this modeling analysis are shown in AIR QUALITY Table 15.

**AIR QUALITY Table 15
Maximum Cumulative Impacts**

Pollutant	Averaging Time	Impact ($\mu\text{g}/\text{m}^3$)	Background ($\mu\text{g}/\text{m}^3$)	Total Impact ($\mu\text{g}/\text{m}^3$)	Limiting Standard ($\mu\text{g}/\text{m}^3$)	Percent of Standard
NO ₂	1-hour	25.31	94	119.3	470	25
	Annual	0.34	16.6	16.9	100	17
CO	1-hour	30.46	2941	2971.5	23,000	13
	8-hour	7.72	2222	2229.7	10,000	22
SO ₂	24-hour	0.12	20	20.1	130	15
	Annual	0.02	1.8	1.8	80	2
PM ₁₀	24-hour	1.12	118	119.1	50	238
	Annual	0.17	31.7	31.9	30	106

As the data in AIR QUALITY Table 15 show, the cumulative air quality effects of the three projects, La Paloma, Elk Hills and Sunrise, do not cause a new violation of any NO₂, CO or SO₂ ambient air quality standards. The three projects would contribute to already existing violations of the state PM₁₀ ambient air quality standards. However, all three of these projects will be required to provide PM₁₀ emission offsets to mitigate their PM₁₀ impacts.

SECONDARY POLLUTANT IMPACTS

The project's gaseous emissions, NO_x, SO₂, VOC and ammonia can contribute to the formation of ozone and secondary PM₁₀.

OZONE

There are air dispersion models that can be used to quantify ozone impacts, but they are used for state implementation planning efforts (typically at the air district level) where hundreds or even thousands of sources are input into the model to determine ozone impacts. There are no regulatory models approved for assessing single source emissions for ozone impacts. However, because of the known relationship of NO_x and VOC emissions to ozone formation, it can be said that the these emissions from the Sunrise project do have the potential to contribute to higher ozone levels in the region. While this potential can not be quantified, it can be conservatively characterized as significant if left unmitigated.

SECONDARY PM₁₀

Concerning secondary PM₁₀ (primarily ammonium nitrate but also ammonium sulfate) formation, the applicant for the La Paloma Project (LPPP 1999a) submitted a conclusion from a study by Sonoma Technology, Inc. which states that the San Joaquin Valley is generally ammonia rich during the winter season when ambient PM₁₀ levels are highest. This means that under such conditions, adding more ammonia to the ambient air will not automatically result in more ammonium nitrate formation.

SCPC has committed to an ammonia slip no greater than 10 ppm, which is the current ammonia slip level being permitted throughout California. On a daily basis, the ammonia slip of 10 ppm is equivalent to approximately 1,166 lb./day of ammonia emitted into the atmosphere. However, the assumption that the ammonia slip is routinely at 10 ppm is incorrect. That level of ammonia emission is usually associated with the degradation of the SCR catalyst, usually in a time frame of five years or more after initial operation. At that point, the SCR catalysts are removed and replaced with new catalysts. Through most of the operation of the SCR system, ammonia slip emissions are usually in the range of 1 to 2 ppm, corresponding to a mass emissions of approximately 100 to 250 pounds per day. There is currently no accepted model to predict the impact on ammonium nitrate formation from a single ammonia emission source. Given this information, staff concludes that there is very little potential for any ambient air impacts from the Sunrise project ammonia emissions.

However, the NO_x and SO_x emissions from the Sunrise project could add to ammonium nitrate and ammonium sulfate (PM₁₀) formation, since there is more than sufficient ambient ammonia available for the NO_x or SO_x to react with and form PM₁₀. The process of gas-to-particulate conversion is complex and depends on many factors, including local humidity and the presence of other compounds. Currently, there are no agency (EPA or CARB) recommended models or procedures for estimating nitrate or sulfate formation from single source emissions. Nevertheless, studies during the past two decades have provided data on the oxidation rates of SO₂ and NO_x. The data from these studies can be used to approximate the conversion of SO₂ and NO_x to particulate. This can be done by using an aggregate conversion factor (typically about 0.01 to 1 percent per hour) with Gaussian dispersion models such as ISCST3. The model is run with and without chemical conversion (decay factor) and the difference corresponds to the amount of SO₂ and NO₂ that is converted to particulate. This approach is an over simplification of a complex process; nevertheless, given the stringency of the PM₁₀ and the new potential PM_{2.5} standards, staff believes this issue needs to be addressed.

Staff, as part of their cumulative modeling analysis, quantified the potential secondary PM₁₀ impacts from the three power projects in the area currently before the Commission for licensing: La Paloma, Sunrise and Elk Hills. For NO_x to nitrate formation, staff assumed a conversion rate of 33% over a time span of 18 to 24 hours. For oxides of sulfur to sulfate formation, staff assumed a conversion rate of 50% over 8 hours. These conversion rates can be input into the ISCST3 model to predict possible nitrate and sulfate PM₁₀ impacts. The combined three-project nitrate impact was predicted to be approximately 1 μg/m³, located about 50 miles to the northeast of the projects' sites. The combined sulfate impacts would be approximately 0.1 μg/m³, located about 30 miles to the northeast. For a more complete discussion of the cumulative modeling analysis, please refer to Appendix A. Based on these results Staff concludes that the Sunrise project NO_x and SO_x emissions do have the potential to contribute to secondary PM₁₀ levels in the region if left unmitigated.

MITIGATION

SCPC'S PROPOSED MITIGATION

CONSTRUCTION MITIGATION

As discussed earlier in the applicable LORS section, there are a series of District rules under Regulation 8 that limit fugitive dust during the construction phase of a project. Those rules require the use of chemical stabilizing agents and dust suppressants or gravel areas on site, and the wetting or covering of stored earth materials on site. They also encourage, although do not require, the use of paved access aprons, gravel strips, wheel washing or other means to limit mud or dirt carryout onto paved public roads. Because they are required by District rules, SCPC will employ appropriate fugitive dust mitigation measures to limit their construction related PM10 emissions.

OPERATIONS MITIGATION

The Sunrise project's air pollutant emissions impacts will be reduced by using emission control equipment on the project and by providing emission offsets. To reduce NOx emissions, SCPC proposes to use dry-low NOx combustors in the CTGs. In addition, an ammonia injection grid will be used in conjunction with a Selective Catalytic Reduction system.

To reduce CO and VOC emissions, SCPC proposes to use good combustion and maintenance practices. PM10 emissions will be limited by the use of a clean burning fuel (natural gas) and the efficient combustion process of the CTGs. The use of natural gas as the only fuel will limit SO2 emissions.

COMBUSTION TURBINE

Dry Low-NOx Combustors

Over the last 20 years, combustion turbine manufacturers have focused their attention on limiting the NOx formed during combustion. Because of the expense and efficiency losses due to steam or water injection in the combustor cans to reduce combustion temperatures and the formation of NOx, CTG manufacturers are presently choosing to limit NOx formation through the use of dry low-NOx technologies. The GE version of the dry low-NOx combustor is a four-stage ignition system. Initially the fuel/air mixture is ignited in two independent combustors (0% to 35% load). Then the startup sequence moves to a lean-lean operation (35% to 70% load) where the center burner is engaged as well. Then second stage burning is begun and all the fuel is directed to the center burner. The second stage burning is a transient event while proceeding to the premixed phase. Premixed operation (70% and 100% load) has fuel being pumped to all burners, but ignition only in the center burner.

In this process, firing temperatures remain somewhat low, thus minimizing NO_x formation, while thermal efficiencies remain high. At steady state CTG loads greater than 40 percent, NO_x concentrations entering the HRSG are 25 ppm corrected to 15 percent O₂. CO concentrations are more variable, with concentrations greater than 100 ppm at 50 percent load, dropping to 5 ppm at 100 percent load.

Selective Catalytic Reduction (SCR)

SCPC is proposing to use selective catalytic reduction to control NO_x emissions from the HRSG. Selective catalytic reduction refers to a process that chemically reduces NO_x by injecting ammonia into the flue gas stream over a catalyst in the presence of oxygen. The process is termed selective because the ammonia reducing agent preferentially reacts with NO_x rather than oxygen, producing inert nitrogen and water vapor. The performance and effectiveness of SCR systems are related to operating temperatures, which may vary with catalyst designs.

Flue gas temperatures from a combustion turbine typically range from 950 to 1100°F. Catalysts generally operate between 600 to 750°F (ARB 1992), and are normally placed inside the HRSG where the flue gas temperature has cooled. At temperatures lower than 600°F, the ammonia reaction rate may start to decline, resulting in increasing ammonia emissions, called ammonia slip. At temperatures above about 800°F, depending on the type of material used in the catalyst, damage to some catalysts can occur. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or a noble metal are also used. These newer catalysts (versus the older alumina-based catalysts) are resistant to fuel sulfur fouling at temperatures below 770°F (EPRI 1990).

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

EMISSION OFFSETS

District Rule 2102, Section 4.2, requires that SCPC provide emission offsets, in the form of banked Emission Reduction Credits (ERC), for the project's emissions increases of NO_x, SO₂, VOC and PM₁₀. Offsets for the project's CO emissions are not required since the project will not cause any violations of any CO standard and the area currently does not experience any violations of any CO standard.

SCPC has submitted numerous ERCs to the District to be used to offset the Sunrise project emissions. However, the SCPC has not yet specified how they intend to distribute these ERCs to satisfy the Sunrise project's emission offset liabilities. Staff has summarized the ERCs submitted by the SCPC in AIR QUALITY Table 16. SCPC needs to inform both the District and CEC staff as to how they intend to distribute the ERCs submitted, and how they intend to address the additional ERCs needed, as shown in AIR QUALITY Table 16. Staff expects that the preliminary DOC, when issued by the District, will include a discussion of how the SCPC intends to allocate their ERCs.

**AIR QUALITY Table 16
Comparison of Proposed ERCs and Project Emissions**

	Nox (tons/year)	SOx (tons/year)	PM10 (tons/year)	VOC (tons/year)
ERCs to be used as Offsets ^a	293.5	57.0	89.7	23.6
Project Emissions to be offset ^b	137	29	158	24
Excess ERCs	156.5	28.0		
Additional ERCs Needed			68.3	0.4
a – These values incorporate the distance ratios required by the District b – These figures are from AIR QUALITY Table 8				

ADEQUACY OF PROPOSED MITIGATION

CONSTRUCTION MITIGATION

SCPC is required to comply with District Regulation 8 for limiting fugitive dust emissions during project construction. Staff believes that additional measures are necessary to adequately mitigate potential construction impacts (refer to staff proposed mitigation below).

OPERATIONS MITIGATION

EMISSION CONTROLS

SCPC has proposed, in their opinion, all practical and technically feasible mitigation measures to limit NOx emissions from the GE combustion turbines to 2.5 ppm over a 1-hour average. This level of control is defined as Best Available Control Technology by the District and is consistent with USEPA recommendations for BACT. Staff finds that this level of control is adequate for the proposed project.

OFFSETS

The District has not yet released their preliminary Determination of Compliance (DOC). Therefore it is not possible to comment on whether SCPC's offset proposal satisfies District regulatory requirements.

STAFF PROPOSED MITIGATION

CONSTRUCTION MITIGATION

As stated above, there are a number of rules in the District's Regulation 8 that will minimize fugitive dust emissions. Those rules allow for some latitude and flexibility as to how they will demonstrate compliance. SCPC is obligated to meet the requirements of these rules, and staff believes that they should demonstrate specifically how they intend to meet the requirements of these rules to minimize

fugitive dust emissions during construction. Staff proposes that prior to the commencement of construction, that SCPC provide a fugitive dust control plan that specifically spells out the mitigation measures that SCPC will employ to limit fugitive dust during construction.

The modeling assessment discussed earlier shows that the emissions from the combustion sources used for heavy construction have the potential for causing significant air quality impacts. The most feasible mitigation measure to limit these emissions is to have well maintained and properly tuned internal combustion engines. Staff proposes that SCPC require that the contractors maintain records of proper engine maintenance and tune-ups for the major combustion equipment, such as the bulldozers, backhoes, compactors, loaders, motor graders, trenchers, cranes, dump trucks and other heavy duty construction related trucks; and have the appropriate maintenance records available on-site for inspection. Staff proposes that as a part of a contractor's bid, the contractor provide records that his equipment has been properly maintained according to the engine manufacturers' specifications.

With the inclusion of the staff's proposed mitigation measures (as Conditions of Certification AQ-1 and AQ-2), staff would conclude that the short-term construction impacts would be mitigated to a level of insignificance.

OPERATIONS MITIGATION

The District has not yet released their preliminary DOC. Therefore, it is not possible for staff to evaluate the adequacy of the proposed offset mitigation package to mitigate the operational impacts. However, it is staff's current position that the SCPC be required to fully offset the project's annual emissions (see AIR QUALITY Table 8), including 20 1-hour startups, 20 20-minute shutdowns and 8732 hours of steady state operation for both turbines. The District typically balances ERCs and project emissions on a quarterly basis. Staff intends to compare the ERCs and project emissions on a daily basis to ascertain whether the ERCs fully mitigate the project's impacts on the short-term ambient air quality standards of most significant concern, i.e. 1-hour ozone and 24-hour PM10 standards.

INDIRECT PROJECT IMPACT MITIGATION

Staff makes no proposals at this time.

COMPLIANCE WITH LORS

FEDERAL

The SCPC is currently under review by EPA on the Prevention of Significant Deterioration (PSD) permit.

STATE

The project, with the anticipated full mitigation (offsets) that will be necessary for the project to secure a Determination of Compliance from the SJVUAPCD, should comply with Section 41700 of the California State Health and Safety Code.

LOCAL

The District is continuing its review and analysis of the project. Since the District has not completed their review of the application, a finding of compliance with the District's rules and regulations cannot be made at this time. We will include the permit conditions from the DOC in the Final Staff Assessment.

CONCLUSIONS AND RECOMMENDATIONS

The District has not yet submitted a preliminary DOC. Therefore, no conclusion can be drawn concerning the Sunrise project's compliance with all applicable District rules and regulations, including mitigation measures.

Staff suggests the following Conditions of Certification regarding project construction mitigation measures for preliminary consideration.

CONDITIONS OF CERTIFICATION

AQ-1 Prior to the commencement of project construction, the project owner shall prepare a Construction Fugitive Dust Mitigation Plan that will specifically identify fugitive dust mitigation measures that will be employed for the construction of the Sunrise project and related facilities.

- a) The Construction Fugitive Dust Mitigation Plan shall specifically identify measures to limit fugitive dust emissions from construction of the project site, the raw water pipeline, pump station and tank sites. Measures that should be addressed include the following:
- the identification of the employee parking area(s) and surface of the parking area(s);
 - the frequency of watering of unpaved roads and disturbed areas;
 - the application of chemical dust suppressants;
 - the stabilization of storage piles and disturbed areas;
 - the use of gravel in high traffic areas;
 - the use of paved access aprons;
 - the use of posted speed limit signs;
 - the use of wheel washing areas prior to large trucks leaving the project site; and,
 - the methods that will be used to clean tracked-out mud and dirt from the project site onto public roads.

- b) The following measures should be addressed for the transportation of the borrow fill material to the Sunrise project site and the raw water pumping station: the use of covers on the vehicles, the wetting of the material and insuring appropriate freeboard of material in the vehicles.

Verification: At least sixty (60) days prior to the start of construction, the project owner shall provide the CPM with a copy of the Construction Fugitive Dust Mitigation Plan for approval.

AQ-2 The project owner shall ensure that all heavy earthmoving equipment, that includes bulldozers, backhoes, compactors, loaders, motor graders and trenchers, and cranes, dump trucks and other heavy duty construction related trucks, have been properly maintained and the engines tuned to the engine manufacturer's specifications.

Verification: The project owner shall submit to the CPM, via the Monthly Compliance Report, documentation, which demonstrates that the contractor's heavy earthmoving equipment is properly maintained and the engines are tuned to the manufacturer's specifications. The project owner shall maintain all records on the site for six months following the start of commercial operation.

Staff will recommend further Conditions of Certification after the District has issued the final DOC.

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- CEC (California Energy Commission) 1998f. Confidential Designation, Dated December 21, 1998, for 5 Subject Areas for the Sunrise Cogeneration and Power Project. Submitted to Jeff Harris, Ellison & Schneider on December 30, 1998.
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APPENDIX A

CUMULATIVE AIR QUALITY IMPACT ANALYSIS

Technical Note

Cumulative Air Quality Impact
Analysis

La Paloma Generating Station
Kern County, California

May 12, 1999

Prepared for:

Siting and Environment Division
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

1. INTRODUCTION

The objective of this modeling analysis is to quantify cumulative air quality impacts associated with the operation of La Paloma generating station with two other planned generating stations: Sunrise and Elk Hills. All three generating stations are to be located in Western Kern County, California.

In the present analysis, “cumulative” air quality impact means the sum total of air quality impacts from the three generating stations (GS) plus background concentration. The focus of this study is on the following pollutants:

- Carbon Monoxide (CO)
- Oxides of Nitrogen (NO_x)
- Sulfur Dioxide (SO₂)
- Fine Particulate (PM-10)
- Sulfate (SO₄)

2. CRITERIA FOR SIGNIFICANT IMPACT

In order for the cumulative impacts to be considered significant, two criteria would have to be met:

1. The maximum ground level concentration of any air pollutant emitted by the La Paloma GS would increase as a result of contribution from other existing or proposed sources. For the purposes of this analysis, there are no existing sources near the La Paloma GS and the only proposed emission sources are the Elk Hills and Sunrise generating stations.
2. Cumulative maximum ground level concentration would exceed California or Federal ambient air quality standards.

Cumulative air quality impact is considered insignificant unless both criteria are satisfied.

3. MODELING METHODOLOGY

The basic modeling methodology consisted of the following steps:

1. Run ISCST3 with emissions from La Paloma alone.
2. Re-run ISCST3 with emissions from all three plants. (La Paloma, Sunrise and Elk Hills).
3. If there is an increase in the ground level concentration (GLC) at the point of max as determined in Step 1, assess if the increased concentration is likely to violate applicable ambient air quality standard.
4. If there is no increase in max GLC at the point of max concentration, conclude that emissions from Sunrise and Elk Hills would not contribute to the max GLC associated with operation of La Paloma

3.1 SELECTION OF EMISSIONS/OPERATIONAL SCENARIO

Emissions from the three generating stations vary depending on ambient temperature and whether the plants are operating in 'normal' or 'startup' modes. For the purposes of this analysis it was assumed that La Paloma and Sunrise were operating normally at an ambient temperature of 65 F; it was assumed that Elk Hills was in a startup mode. These emissions scenarios were selected in consultation with CEC staff. A summary of emissions and other input data used in the modeling analysis are summarized below. The data were obtained from data files provided by the applicants.

Parameter	Units	La Paloma	Elk Hills	Sunrise
CO	lbs/hr	18.8	37.0	26.8
NOx	lbs/hr	15.7	46.6	15.4
SO2	lbs/hr	0.87	2.1	3.3
PM-10	lbs/hr	7.86	18.	18.
No. of Stacks		4	2	2
Stack Height	meters	30	36.6	30.5
Stack Diameter	meters	5.3	5.49	5.79
Exhaust Temp.	K	362	345.	368.
Exit Velocity	meters/ sec	18.5	12.5	13.0
<i>Note: Emissions (lb/hr) are per stack.</i>				

3.2 MODELING OF SOX AND NOX CONVERSION TO PARTICULATE MATTER

For NOx emissions, the results of a recent modeling study by Desert Research Institute (DRI 1999) were used. This study concluded that approximately 33% of the NOx, emissions were converted to particulate matter. The time scale involved in this conversion is between 18 to 24 hours. Using these results, the maximum predicted ground level concentration was adjusted to allow for conversion from oxides of nitrogen (NO and NO₂) to nitrate. An estimate of particulate concentration due to secondary formation of nitrate would equal:

$$\text{Max. Particulate concentration} = \text{Max. NO}_2 \text{ Conc.} \times (100-66)/100$$

This approach yields only an order of magnitude estimate of nitrate concentration. A more refined approach that takes into account detailed atmospheric chemistry and the time variation of various chemical species affecting nitrate formation is beyond the scope of this evaluation.

For oxides of sulfur conversion to sulfate, it was assumed that emissions consisted entirely of SO₂ and that the conversion could be modeled as a first order chemical reaction. Under this assumption, one can model the SO₂ to sulfate conversion using a simple decay coefficient or a half-life for SO₂. The half-life of SO₂ varies between 1 to 4 days (Stern, et al, 1984). For the present analysis, a half-life of 8 hours was assumed. That is, 50% of the SO₂ is converted to sulfate in 8 hours. This half-life can be used in ISCST3 to account for the SO₂ to sulfate conversion.

3.3 CHOICE OF AIR DISPERSION MODEL

EPA's ISCST3 air dispersion model was employed for this analysis. This model is recommended by the EPA's Guidelines of Air Quality Models for use in simple and complex terrain. Version 98356 was used to perform the model runs.

3.4 CHOICE OF METEOROLOGICAL DATA

One year (1993) of hourly meteorological data were used to conduct the analysis. The surface data from McKittrick (Station 99991) were supplemented by upper air data from Bakersfield (99992). These data were taken from the input files provided by the applicant for the La Paloma project.

Since the focus of this study was on the cumulative air quality impacts associated with emissions from all three GS, the use of additional years of meteorological data would not change the results or conclusions reached in this study. In other words, the *relative contributions* of the Elk Hills and Sunrise GS emissions to the maximum GLC associated with the operation of La Paloma would remain the same.

3.5 SELECTION OF MODELING GRID

A 2 kilometer grid (100 meter x 100 meter) was used to determine the location of GLC for each source. A second larger grid was used to enclose all three sources. This grid extended 20 km x 20km and was centered at the La Paloma GS. A rectangular coordinate system was used employing the UTM coordinate system.

RESULTS

The results of the analysis show that there would be minimal cumulative impact associated with operation of all three generating stations. For example, the maximum 1-hour NO₂ concentration due solely to emissions from La Paloma would not increase as a result of all three generating stations operating concurrently. For annual NO₂ concentration, there would be a minor increase. Specifically, the results were as follows:

Pollutant	Averaging Time	La Paloma GS	All 3 Stations
NO ₂	1-hour	25.31	25.31
	Annual	0.300	0.343
PM-10	24-hour	1.10	1.12
	Annual	0.150	0.172
SO ₂	24-hour	0.123	0.124

	Annual	0.0167	0.0202
CO	1-hour	30.45	30.46
	8-hour	7.72	7.72

Overall, the analysis showed that inclusion of emissions from the proposed Sunrise and Elk Hills generating stations leads to a new point of maximum ground level concentration. This shown in the attached contour plots of concentration for emissions from (a) La Paloma; (2) La Paloma, Elk Hills and Sunrise, and (3) Elk Hills and Sunrise. A comparison of Figures 1 and 2 (1-hour NO₂, La Paloma and All 3 Stations), shows negligible contribution in the vicinity of La Paloma from the other two plants.

Figure 2 shows that a new point of maximum concentration near Elk Hills and Sunrise generating stations. This is due entirely from emissions from these two plants as can be confirmed in Figure 3 (Sunrise and Elk Hills). The same pattern was identified for annual NO₂ concentrations as shown in Figures 4-6.

Particulate impacts associated with the conversion of NO₂/NO to nitrate are estimated to be 1 ug/cubic meter. This is based on 33% conversion of the maximum 24-hour averaged NO₂ concentration associated with operation of La Paloma GS. The latter range between 0 to 0.3 ug/cu/meter on a 24 hour basis. The impact of secondary nitrate formation on the PM-10 concentration is not considered significant.

It was noted in Section 3.2 that the time scale for the conversion of NO₂/NO to nitrate is between 18 to 24 hours. This means that areas that are located 175 to 200 miles to the southeast would be impacted with higher nitrate particulate. This would transport the plume out of Kern County to adjacent counties located to the East or Southeast. This estimate is based on the fact that on an annual basis, the predominant winds in Kern County are from the NE with an average annual speed of 8.9 mph (Ref: California Surface Wind Climatology, CARB, June 1984).

Use of the ISCST3 model with a half-life of 8 hours indicates that the maximum 24-hour ground level concentration of SO₂ would decrease from 2.5 ug/cu meter to 2.4 ug/cu meter. This means that about 4% of the SO₂ (0.1 ug/cu meter) would be converted to sulfate. Since the state standard for sulfate is 25 ug/cu meter, the secondary formation of sulfate is not considered significant.

As with NO₂/NO conversion to nitrate, the SO₂ to sulfate conversion takes place over a period of 1-4 days. On this time-scale the emissions would be transported several hundred miles to the East or Southeast. Therefore the highest concentration of sulfate would not occur near the power plants but several hundred miles to the East or Southeast. For example, in 2 days the plume would travel approximately 400 miles from the source. This would transport the sulfate (and nitrate particulates) out of Kern County and possibly, out of state.

PUBLIC HEALTH

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INTRODUCTION

Operating the proposed Sunrise Cogeneration and Power Project (SCPP) would create combustion products and possibly expose workers and the general public to these pollutants as well as the toxic chemicals associated with other aspects of facility operations. The issue of possible worker exposure is addressed in the **Worker Health and Safety** section of this Preliminary Staff Assessment (PSA). Exposure to electric and magnetic fields (EMF) is addressed in the **Transmission Line Safety and Nuisance** section. The purpose of this public health analysis is to determine whether a significant health risk would result from public exposure to these chemicals and combustion by-products routinely emitted during project operations.

The exposure of primary concern in this section is to pollutants for which no air quality standards have been established. These are known as the noncriteria pollutants, or toxic air pollutants. Those for which ambient air quality standards have been established are known as criteria pollutants. These criteria pollutants are identified in this section (along with regulations for their control) because of their usually significant contribution to the total pollutant exposure in any given area. Furthermore, the same control technologies may be effective for controlling both types of pollutants when emitted from the same source. Compliance with the required control technologies is discussed in the **Air Quality** section of this PSA.

LAWS ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

The Clean Air Act of 1970 (42 U.S.C., section 7401 et seq.) required establishment of ambient air quality standards to protect the public from the effects of air pollutants. These standards have been established by the United States Environmental Protection Agency (EPA) for the major air pollutants, nitrogen dioxide, ozone, sulfur dioxide, carbon monoxide, sulfates, particulate matter with a diameter of 10 micron or less (PM10) and lead. The Act required states to adopt plans to ensure compliance by 1982. These plans are known as the State Implementation Plans (SIPs). The EPA considers it appropriate to differentiate between PM10 and particulate matter with a diameter of 2.5 micron or less (PM2.5). Such particulate matter may serve as a source of exposure to both criteria and noncriteria pollutants.

STATE

California Health and Safety Code section 39606 requires the California Air Resources Board (CARB) to establish California's ambient air quality standards to reflect the California-specific conditions that influence its air quality. Such standards have been established by the CARB for ozone, carbon monoxide, and sulfur

dioxide, PM10, lead, hydrogen sulfide, vinyl chloride and nitrogen dioxide. The same biological mechanisms underlie some of the health effects of most of these and the noncriteria pollutants. The California standards are listed together with the corresponding federal standards in the **Air Quality** section.

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

The California Health and Safety Code section 39650 et seq. mandates the California Environmental Protection Agency (Cal-EPA) to establish safe exposure limits for toxic, noncriteria air pollutants and identify the best available methods for their control. These laws also require that the new source review rules for each air district include regulations establishing procedures to control the emission of these pollutants. The toxic emissions from natural gas combustion are listed in CARB’s April 11, 1996 California Toxic Emissions Factors (CATEF) database for natural gas-fired combustion turbines. Cal-EPA has developed specific cancer potency estimates for assessing their related cancer risks at specific exposure levels. For noncancer-causing toxic air pollutants, Cal-EPA established specific no-effects levels (known as reference exposure levels) for assessing the likelihood of producing health effects at specific exposure levels. Such health effects would be considered likely only when exposure exceeds these reference levels. Staff uses these Cal-EPA potency estimates and reference exposure values in its health risk assessments.

California Health and Safety Code section 44300 et seq. requires facilities which emit large quantities of criteria pollutants and any amount of noncriteria pollutants to provide the local air district an inventory of toxic emissions. Such facilities may also be required to prepare a quantitative health risk assessment to address the potential health risks involved. The CARB and the San Joaquin Valley Air Quality Management District will ensure implementation of these requirements for the proposed project.

LOCAL

The San Joaquin Valley Air Quality Management District has no specific rules implementing Health and Safety Code section 44300. It does, however, require the results of a health risk assessment as part of the application for the Authority to Construct (ATC). SCPP has complied with this requirement.

SETTING

According to information from Sunrise Cogeneration and Power Company, SCPC, (SCPP 1998 pages 1-1, 1-4, and 8.6-1 through 8.6-3), the toxic air contaminants from the project will be emitted into a sparsely populated, mostly agricultural area with oil and gas production fields. The nearest residence to the 20-acre project site

is approximately 1.3 miles to the east. The nearest communities of any significant size are Fellows and Derby Acres, located in an area with a population density of 19 persons per square mile according to the 1990 U.S census figures.

The only facility with sensitive receptors within the normal 6-mile radius of potentially significant impacts is the Midway school, six miles away. Another school, McKittrick School, is approximately 6.5 miles to the north. Such sensitive receptors (which are children in this case) are usually more susceptible than the general population to the effects of environmental pollutants. Extra consideration is given to possible effects in such individuals in establishing exposure limits for environmental pollutants. The individuals potentially exposed around the project site include residents in two houses less than a mile away (along Highway 33), and workers around the site (SCPP page 8.6-3)

METHOD OF ANALYSIS

Any impacts from this type of project would be mainly associated with the toxic pollutants originating from the combustion turbines, ammonia from the selective catalytic reduction (SCR) system, and toxic chemicals from the cooling towers. Potential public exposure to the surrounding population is estimated through air dispersion modeling. After estimating the exposure levels, staff assesses whether these exposure estimates are below the applicable reference exposure levels in the case of noncancer effects, or below levels at which any possible cancer risks are considered significant by regulatory agencies in the case of cancer-causing (or carcinogenic) pollutants. The procedure for evaluating the potential for these cancer and noncancer health effects is known as a health risk assessment process and consists of the following steps:

- A hazard identification step in which each pollutant of concern is identified along with the types of health effects it can cause;
- A dose-response assessment step in which the relation between the magnitude of exposure and the probability of effects is established;
- An exposure assessment step in which the possible extent of pollutant exposures from a project is established for all possible pathways by dispersion modeling;
- A risk characterization step in which the nature and often the magnitude of the possible human health risk is assessed and presented.

HEALTH EFFECTS ASSESSED

Health risks associated with a project can result from high-level exposure, which creates immediate-onset (acute) effects, or from prolonged low-level exposure, which creates chronic effects. Since noncancer effects are assumed to result after exposure above specific thresholds, an analysis of the potential for these effects will include, where possible, consideration of background or ambient levels of toxic pollutants in the area. Unfortunately, such background measurements are usually

not available for noncriteria pollutants, which are generally emitted at relatively low levels. For facilities which burn natural gas, such as the proposed SCPP, high-level exposure to toxic pollutants (which could cause acute effects), could occur only during major accidents and are not expected from routine operations when emissions are much lower. Long-term, chronic exposures are, therefore, of greater concern than such potential short-term effects in assessing possible public health impacts. Chronic effects from exposure to toxic emissions from natural gas combustion may be related to cancer or health effects other than cancer.

The method used by regulatory agencies to assess the significance of noncancer health effects is known as the hazard index method and is used to assess both acute and chronic effects. In this method, a hazard index is calculated for the individual pollutants by dividing projected exposure by the reference level for that pollutant. A hazard index of less than 1.0 suggests that acute or chronic effects would be unlikely. A value of more than 1.0 would suggest a likelihood of effects. The indices for all pollutants are then added together to obtain an aggregate hazard index value for the project in question. A total index of less than 1.0 would suggest a potential lack of effects from all pollutant exposures considered together. A value of more than 1.0 would suggest a potential for significant effects.

POTENTIAL CANCER RISK

Cancer from carcinogenic exposure usually results from biological effects at the molecular level. Since such effects are currently assumed possible from every exposure to a carcinogen, the risk of cancer is generally considered by staff and other regulatory agencies as more sensitive than the risk of noncancer health effects, for assessing the environmental acceptability of a source of both carcinogens and noncarcinogens. This accounts for the prominence of theoretical cancer risk estimates in the environmental risk assessment process. For any source of concern, the potential risk of cancer is obtained by multiplying the exposure estimate by the potency values for the individual carcinogens involved. The total project-related cancer risk is then obtained by adding together the risk values obtained for each of the individual carcinogens.

STAFF'S SIGNIFICANCE CRITERIA

Staff considers a potential cancer risk of one in a million as the threshold of significance for sources of environmental carcinogens. Above this threshold, further mitigation would be recommended. For noncarcinogenic pollutants, staff will consider significant health impacts unlikely (as do other regulatory agencies) when the hazard index estimate is less than 1.0. If more than 1.0, staff would consider such impacts to be likely.

PROJECT SPECIFIC IMPACTS

CONSTRUCTION PHASE IMPACTS

Potential risks to public health during construction may be associated with toxic substances disturbed during site preparation, and emissions from heavy equipment. Potential impacts from emission of criteria pollutants from heavy equipment

operation and particulate from site preparation are assessed in staff's **Air Quality** analysis. With no evidence of toxic contamination at the proposed site, no significant public health impacts are anticipated from construction-related earth moving activities.

OPERATIONAL PHASE IMPACTS

SCPP conducted the health risk assessment for the project-related emissions of potential significance according to procedures specified in the 1993 California Air Pollution Control Officer's Association (CAPCOA) guidelines for sources of this type. Results of this assessment have been provided to staff, along with documentation of the assumptions used (SCPP 1998 pages 8.6-6 through 8.6-16). Such documentation was provided with regard to the following:

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

Staff has found these assumptions to be accurate and concurs with SCPP's findings with regard to the numerical health risk estimates expressed, either in terms of the hazard index for each noncarcinogenic pollutant, or a cancer risk for estimated levels of the carcinogenic pollutants. Background noncriteria pollutants would not be measurable for the type of area involved. As a result, only the project-related emissions were considered in calculating the hazard index values involved. These analyses were conducted to determine the potential for acute and chronic effects on body systems such as the liver, central nervous system, the immune system, kidneys, the reproductive system, the skin and the respiratory system.

The following pollutants were considered for potential to produce noncancer effects: ammonia, acetaldehyde, acrolein, benzene, 1,3 butadiene; formaldehyde, naphthalene, toluene, xylenes, propylene oxide and polycyclic aromatic hydrocarbons (PAHs). The following were considered with regard to a possible cancer risk: acetaldehyde, benzene, 1,3 butadiene, formaldehyde, PAHs and propylene oxide.

A hazard index value of 0.034 was calculated for combined chronic health effects for the individual at a location approximately 0.5 kilometers (km) southwest of the project site. A value of 0.068 was calculated for combined acute health effects for an individual at a location approximately 2.0 km from the site. These values are significantly below the 1.0 significance level suggesting that significant noncancer health effects would be unlikely during operations.

The highest combined cancer risk was estimated to be 0.3 in a million for an individual at the same location identified for the total hazard index for chronic

effects. This risk was calculated using existing procedures, which assume that the individual will be exposed at the highest possible levels to all the carcinogenic pollutants from the project for 70 years. This risk value is much below the one in a million level considered significant by staff with regard to the possibility of cancer from sources of environmental carcinogens.

CUMULATIVE IMPACTS

In addition to the Sunrise project, the Commission is reviewing the Elk Hills and La Paloma power plant projects, which are proposed for the same western Kern County area. The three projects, all of which will burn natural gas, intend to use the same state-of-the art pollution controls as currently available. They are to be located about 8 miles apart. Staff has reviewed the potential public health impacts from each of these projects to determine the potential cumulative impacts that could result from their combined operation.

When toxic pollutants are emitted from multiple sources within a given area, the cumulative, or additive, impacts of such emissions could, in concept, lead to significant health impacts within the population, even when such pollutants are emitted at insignificant levels from the individual sources involved. Experience has shown, however, that the peak impacts of such toxic pollutants are normally localized within relatively short distances from the source. Toxic pollutant emission levels beyond the point of maximum impact normally fall within existing ambient background levels. Potentially significant cumulative impacts are only expected in situations where new sources are located adjacent to one other. The highest impact levels, from each of the three projects being evaluated, are approximately one mile or less from the emissions source. Therefore, given the approximate 8-mile distance between each of the projects, their combined operation will not cause or contribute significantly to a public health impact from toxic pollutant emissions.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Staff has determined that the project will not pose a significant public health risk to the surrounding population with regard to the pollutants considered.

RECOMMENDATIONS

Since no significant public health impacts are considered likely by staff, no Public Health Conditions of Certification are proposed.

REFERENCES

California Air Resources Board (CARB) 1996. California Toxic Emissions Factors (CATEF) Database for Natural Gas-Fired Combustion Turbine Cogeneration.

California Air Pollution Control Officers Association (CAPCOA) 1993. Air Toxics
“Hot Spots” Program, Revised 1992 Risk Assessment Guidelines. Prepared
by the Toxics Committee, October 1993.

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

WORKER SAFETY AND FIRE PROTECTION

Ellen Townsend-Smith

INTRODUCTION

Industrial workers use process equipment and hazardous materials on a daily basis. Accidents involving relatively small amounts of material can result in serious injuries to workers. Worker protection measures can include special training, protective equipment and procedural controls. The employer must also comply with applicable laws, ordinances, regulations, and standards (LORS) to protect workers. This Worker Safety and Fire Protection analysis assesses the completeness and adequacy of the measures proposed by the Sunrise Cogeneration and Power Company (SCPC) to comply with applicable health and safety standards and other reasonable requirements (Title 20, California Code Regulations, section 1743), and draws conclusions about the compliance of the proposed project with applicable LORS (Title 20, California Code Regulations, section 1744). These standards are designed to protect the health and safety of workers during construction and operation of the facility, and to establish adequate fire protection and emergency response procedures.

Staff has reviewed the Sunrise project's Application for Certification (AFC) to determine whether SCPC has proposed adequate measures to:

- comply with all applicable (LORS);
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

Unless features of the project present unusual industrial safety or fire protection problems, staff believes that compliance with applicable LORS will be sufficient to ensure worker safety and fire protection, and provide adequate emergency response procedures.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

Occupational Safety and Health Act of 1970 (29 United States Code sections (USC) (§) 651 et seq.).

Occupational Safety and Health Administration Safety and Health regulations (29 Code of Federal Regulations (CFR) §§ 1910.1 - 1910.1500)

29 U.S.C. §651 et seq. (Occupational Safety and Health Act of 1970)

Occupational Safety and Health Act of 1970 (29 United States Code section (USC) (§) 651 et seq.).

29 C.F.R. §1910.120 (HAZWOPER Standard) Defines the regulations for Hazardous Waste Operations and Emergency Response. This section covers the clean-up operations, hazardous materials removal work, corrective actions, voluntary clean-up operations, monitoring, and emergency response required by federal, state, and local agencies of hazardous substances that are present at controlled and uncontrolled hazardous waste sites.

29 C.F.R. §§1910.1 - 1910.1500 (Occupational Safety and Health Administration Safety and Health regulations)

29 C.F.R. §§1952.170 - 1952.175 (Approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the federal requirements found in 1910.1 - 1910.1500)

STATE

California's plan for enforcement of its own Safety and Health requirements is in lieu of most of the federal requirements found in 29 CFR §§ 1952.170 - 1952.175.

- Title 8, California Code of Regulations (CCR), section 450 et seq. (Applicable requirements of the Division of Industrial Safety, including Unfired Pressure Vessel Safety Orders, Construction Safety Orders, Electrical Safety Orders, and General Industry Safety Orders).
- California Building Code, Title 24, CCR, § 501 et seq. The California Building Code is designed to provide minimum standards to safeguard human life, health, property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, etc. of buildings and structures.
- Title 8, CCR, § 5192 (HAZWOPER Standard). Defines the regulations for Hazardous Waste Operations and Emergency Response. This section covers the clean-up operations, hazardous removal work, corrective actions, voluntary clean-up operations, monitoring, and emergency response required by federal, state, local agencies of hazardous substances that are present at controlled and uncontrolled hazardous waste sites.

LOCAL

1998 Edition of California Fire Code (CFC) and all applicable (National Fire Protection Association (NFPA) standards. The fire code contains provisions necessary for fire prevention and information about fire safety, special occupancy

uses, special processes, and explosive, flammable, combustible and hazardous materials.

Uniform Fire Code Standards. This is a companion publication to the CFC and contains standards of the American Society for Testing and Materials and of the National Fire Protection Association.

California Building Code. (Cal. Code Regs., Tit. 24, § 501 et seq.) The California Building Code is designed to provide minimum standards to safeguard human life, health, property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, etc. of buildings and structures.

SETTING

The Sunrise project is located on a site previously used for oil production in western Kern County. Offsite fire protection is provided by the Kern County Fire Department (KCFD). **WORKER SAFETY AND FIRE PROTECTION Table 1** lists the fire stations located closest to the SCPP site and their response time capabilities, equipment and staffing levels (Dickson 1999).

**WORKER SAFETY AND FIRE PROTECTION Table 1
Fire Station/Fire Protection Capabilities**

Station	Response Time	Equipment	No. of Firefighters
Station 23 100 Broadway Fellows, CA	10 minutes	1997 Pierce Saber Engine	2
Station 24 2 nd Street McKittrick, CA	12 minutes	1997 Pierce Saber Engine	2
Station 21 303 10 th Street Taft, CA	25 minutes	1990 Beck Engine	3
Station 22 801 Stanislaus Mariposa, CA (HAZMAT TEAM)	23 minutes	1997 Pierce Saber Engine	2
Landco Station 3000 Landco Drive Bakersfield, CA (HAZMAT TEAM)	45-50 minutes	Engine Hazmat response Vehicle Technical rescue Vehicle	3

IMPACTS

DIRECT IMPACTS

FIRE PROTECTION

To determine the project's impacts on fire protection, staff reviewed the information provided in the AFC regarding available fire protection services and equipment (SC&PP 1998A, Section 8.7.3.2). The project will include the following fire protection equipment: yard hydrants, hose stations, water spray and sprinkler systems, a carbon dioxide fire protection system, deluge spray system, smoke detectors, combustible gas detectors, and fire extinguishers. SCPC will be required to provide final diagrams and plans to staff and the KCFPD, prior to construction and operation of the project, to confirm the adequacy of these fire protection measures. The Sunrise facility will also be supported by local fire protection services, as described in **Worker Safety and Fire Protection Table 1**. The KCFD has evaluated the potential impacts of the proposed project on their service capabilities, as described below under CULMULATIVE IMPACTS.

WORKER SAFETY

Industrial environments are dangerous. Workers may be exposed to chemical spills, hazardous wastes, fires, moving equipment, and confined space and entry/egress problems. It is important for SCPC to have well-defined policies, procedures, training, hazard recognition and control at their facility to minimize such hazards and to protect workers. SCPC provided an outline that will be expanded prior to construction and operation, as required by conditions of certification SAFETY-1 and SAFETY-2.

CUMULATIVE IMPACTS

There could potentially be five power plants built in western Kern County, including the La Paloma, Sunrise, Elk Hills, Midway Sunset, and Pastoria projects. Staff has completed a visual inspection of the proposed project sites and the KCFD responding fire stations. Staff has confirmed that some of the structures proposed to be located on the proposed project sites can average more than 50 feet taller than the largest buildings in the communities of Buttonwillow, Elk Hills, and Taft. The KCFD has adequate resources to respond to emergencies that consist of structures that are approximately one story high only. Because of the height of some of the power plant equipment and structures, the KCFD has identified a need for additional resources, such as a ladder truck for elevated hose streams, and high-angle and confined space rescue capabilities, to adequately serve the proposed projects.

Staff held a meeting with the KCFD on March 3, 1999 to discuss potential impacts of the proposed projects on the KCFD's service capabilities. Staff subsequently received a letter from the KCFD, dated March 18, 1999, which identifies the potential service impacts of the proposed projects. The letter also identifies

additional equipment and staffing required for the KCFD to provide fire protection and emergency response services to the power plant projects.

The letter states:

“Both of the County’s two ladder trucks are located in the metropolitan Bakersfield area; the ladder truck closest to the power plants is located about 40 miles away. The operations and structures associated with the thermal electric power plants result in increased incident complexity and access problems which our typical fire engine is not equipped to handle (both in terms of number of personnel and specialized equipment) without the back up of a ladder truck. The distance between the power plant locations and the metropolitan Bakersfield area is such that it is not acceptable to dispatch an existing ladder truck for emergency response to Western Kern County because of excessive time delay. The potential needs for elevated hose streams, and high-angle and confined space rescue capability can only be addressed through the addition of a ladder truck; it will provide the appropriate fire apparatus to get the specialized personnel and equipment to the scene of incidents in a timely manner and provide the elevated platform for hose streams and rescue access as needed.” (Dickson 1999)

MITIGATION

As mitigation for the impacts to fire protection services, the KCFD is proposing that the applicant or applicants purchase a ladder truck that will be located at Station 21 in Taft. One ladder truck will be required as mitigation for all of the proposed projects. High Angle and Confined Space Specialist Technicians would be trained to operate the ladder truck, and staffing for three work shifts would need to be provided, including a captain, an engineer and a firefighter. Refer to the Socioeconomics Final Staff Assessment Cumulative Impacts and Socioeconomics Proposed Condition of Certification 2 for a discussion of funding requirements.

CONSTRUCTION SAFETY AND HEALTH PROGRAM

The Construction Safety Orders found in Title 8, California Code of Regulations contain health and safety requirements promulgated by California Occupational Safety and Health Administration (Cal/OSHA) that are applicable to the construction phase of the project (CCR, tit. 8, § 1500 et seq.). The various plans required by the regulations are incorporated in the project Construction Safety and Health Program, the major elements of which include:

Construction Injury and Illness Prevention Program (IIPP) (CCR, tit. 8, § 1509);
Construction Fire Protection and Prevention Plan (CCR, tit. 8, § 1920);
Personal Protective Equipment Program (CCR, tit. 8, §§ 1514 - 1522; and §§ 3401 - 3411).

In addition, the requirements of the Electrical Safety Orders (CCR, tit. 8, and §§- 2299 - 2974) and Unfired Pressure Vessel Safety Orders (CCR, tit. 8, §§ 450 - 544) may be applicable to the project.

SCPC provided adequate outlines in the AFC for each of the above programs and plans, and prior to construction of the facility will provide detailed programs and plans in accordance with condition of certification SAFETY-1.

OPERATION SAFETY AND HEALTH PROGRAM

During the operation phase of the project, many Electrical Safety Orders (CCR, tit. 8, and §§-2299 - 2974) and Unfired Pressure Vessel Safety Orders (CCR, tit. 8, §§ 450 - 544) will be applicable. In addition, the Division of Industrial Safety has promulgated regulations applicable solely to operations. These are contained in the General Industry Safety Orders (CCR, tit. 8, § 3200 et seq.). SCPC will incorporate these requirements into its Operation Safety and Health Program, the major elements of which include:

Injury and Illness Prevention Program (CCR, tit. 8, § 3203)
Emergency Action Plan (CCR, tit. 8, § 3220)
Fire Prevention Plan (CCR, tit. 8, § 3221)
Personal Protective Equipment Program (CCR, tit. 8, §§ 3401 - 3411)

SCPC provided adequate outlines for each of the programs and plans in the AFC and will provide detailed programs and plans in accordance with condition of certification SAFETY-2.

SAFETY AND HEALTH PROGRAM ELEMENTS

SCPC has provided proposed outlines for both a Construction Safety and Health Program and an Operation Safety and Health Program. Both programs will cover the Sunrise project, including any aspect of the transmission lines and pipelines under the applicant's control. The measures in these plans are derived from applicable sections of state and federal law. The major items required in both Safety and Health Programs are as follows:

INJURY AND ILLNESS PREVENTION PROGRAM

SCPC has provided an adequate draft outline for an Injury and Illness Prevention Program (IIPP) (SC&PP 1998a). SCPC will need to submit an expanded Operations Illness and Injury Prevention Program to Cal/OSHA for review and comment 30 days prior to both construction and operation of the project.

Cal/OSHA will review and provide comments on the IIPP as the result of an onsite consultation at the request of SCPC, during which a Cal/OSHA representative will complete a physical survey of the site, analyze the work practices, and point out those practices that are likely to result in illness or injury. The on-site consultation will give Cal/OSHA an opportunity to evaluate Sunrise's IIPP and apply it directly to activities taking place on-site (Cunningham 1998).

EMERGENCY ACTION PLAN

Title 8, California Code of Regulations, section 3220 requires an Emergency Action Plan. The AFC contains a satisfactory outline for an emergency action plan (SC&PP 1998a, pg. 87-18). The outline lists the following features: fire and emergency reporting procedures, evacuation procedures, and a Spill Prevention/Control and Countermeasures Plan. Staff proposes condition of certification SAFETY-2, which requires SCPC to submit a final Operation's Emergency Action Plan to Cal/OSHA, for review and comment, after an on-site consultation.

FIRE PROTECTION PLAN

Title 8, California Code of Regulations, section 3221 requires a Fire Protection Plan. The AFC contains a draft proposed fire prevention and prevention plan which is adequate for staff's analysis. The plan discusses the following topics:

on-site Fire Protection Systems, including carbon dioxide extinguishing systems, preaction sprinkler systems, a dry pipe deluge system, hand-held fire extinguishers, and fire detection and alarm systems; and

local Fire Protection Services.

Staff proposes that SCPC submits a Construction Fire Protection and Prevention Plan and an Operation Fire Protection Plan to the California Energy Commission Compliance Project Manager (CPM) and the KCFD for review and approval to satisfy proposed conditions of certification SAFETY-1 and 2.

PERSONAL PROTECTIVE EQUIPMENT PROGRAM

The purpose of the Personal Protective Equipment Program is to ensure that employers comply with applicable requirements for the provision and use of Personal Protective Equipment (PPE), and to provide employees with the information and training necessary to carry out the program. SCPC has provided a satisfactory outline that identifies minimum requirements of a proposed PPE program (SC&PP 1998a, pg. 8.7-19).

Under Title 8, California Code Regulations, sections 3380 - 3400, personal protective equipment will be required whenever hazards are encountered which, due to process, environment, chemicals, or mechanical irritants, can cause injury or impairment of body function as a result of absorption, inhalation, or physical contact. The project's operational environment will create potential situations where personal protective equipment is required.

Sunrise's PPE Program should include a written policy on the use of protective equipment (and methods of communicating the information to the employees), selection of the proper type of equipment, training of employees on the correct use and maintenance of the equipment, enforcement of personal protective equipment

use, and the use of devices that provide respiratory protection, hearing conservation, eye protection and head protection.

Staff believes that if SCPC develops and carries out a PPE Program similar to the format and elements listed above, the program will meet applicable regulations and will significantly reduce the potential for adverse impacts to workers.

GENERAL SAFETY

Besides the specific plans listed above, there are other requirements, some of which are called "safe work practices," imposed by various worker safety LORS applicable to this project. For the sake of clarity, staff has grouped these requirements as follows:

LIGHTING

American National Standards Practice for Industrial Lighting, ANSI/IES-RP-7, contains requirements to protect workers from inadequate lighting. Insufficient light leads to errors and sometimes accidents. An error may result from not seeing a situation that is dangerous and not being able to react quickly enough. The Visual Resources section of this Preliminary Staff Assessment provides further detail concerning off-site consequences and performance requirements for exterior lighting.

HAZARDOUS MATERIALS RELEASES

Staff's analysis considered the system design and administrative procedures proposed to reduce the likelihood of an accidental release of acutely hazardous materials that could affect workers. See the Hazardous Materials Section for more detail.

SMOKING

Sunrise shall not allow smoking in areas designated in the National Electrical Code (NEC) as Class I, Divisions 1 and 2. These locations are areas where ignitable concentrations of flammable gases or vapors exist or where volatile flammable liquids or flammable gases are handled, processed, or used. Signs restricting smoking in these areas of the project site will be posted to protect the facility and workers.

LOCK-OUT/TAG-OUT

Title 8, California Code of Regulations, sections 2320.4, 2320.5, 2320.6, 2530.43, 2530.86, 3314, and 6003 identify required lock-out and tag-out safety practices and programs which reduce employee exposure to moving equipment, electrical shock, and hazardous and toxic materials. Lock-out is the placement of a padlock, blank flange, or similar device on equipment to ensure that it will not be operated until the lock-out device is removed. Tag-out is the use of warning signs that caution personnel that equipment cannot be energized until the lock-out device is removed. Warning signs can also be used to alert employees about the presence of hazardous and toxic materials. SCPC's lock-out/tag-out program should include

steps for applying locks and tags, steps for removing locks and tags, and employee training on lock-out/tag-out procedures.

CONFINED SPACES ENTRY PROGRAM

Title 8, California Code of Regulations, sections 5156 - 5159 identifies the minimal standards for preventing employee exposure to dangerous air contaminants and/or oxygen deficiency in confined spaces. A confined space is any space that limits the means of egress, is subject to toxic or flammable contaminants, or has an oxygen-deficient atmosphere. Examples of confined spaces are silos, tanks, vats, vessels, boilers, compartments, ducts, sewers, pipelines, vaults, bins and pits. SCPC shall take the following steps to ensure worker safety during work in confined spaces.

Before entering a confined space, site personnel will evacuate or purge the space and will shut off lines that provide access for substances into the space. The air in the vessels will be tested for oxygen deficiency, and the presence of both toxic and explosive gases and vapors will be evaluated before entry into the confined space is allowed. Lifelines or safety harnesses will be worn by anyone entering the confined space, and a person will be stationed outside in a position to handle the line and to summon assistance in case of emergency. Appropriate respirators will be available whenever hazardous conditions may occur.

HOT WORK

Hot work is any type of work that causes a spark and can ignite a fuel source. Examples include welding, cutting and brazing. Before proceeding with hot work, workers will need to get a work authorization from the project's assigned Safety Officer. The control operator, together with the shift supervisor, will decide whether hot work is required on a job and if a work authorization will be required. Before hot work is undertaken, the area will be inspected, the job shall be posted and, depending on what is located in the area, additional safeguards may be implemented.

FACILITY CLOSURE

The project owner/operator is responsible for maintaining an operational fire protection system during closure activities. The project must also stay in compliance with all applicable health and safety LORS during that time.

CONCLUSION AND RECOMMENDATIONS

CONCLUSIONS

If SCPC provides a Construction Safety and Health Plan, and an Operation Safety and Health Plan, as required by conditions of certification SAFETY-1 and 2; and provides the funding required by Conditions of Certification SOCIO-2, staff believes that the project will incorporate sufficient measures to ensure adequate levels of industrial safety and fire protection, and comply with applicable LORS.

RECOMMENDATIONS

If the Energy Commission certifies the project, staff recommends that the Energy Commission adopt the following proposed conditions of certification. The proposed conditions of certification provide assurance that the Project Construction and Operation Safety and Health Programs proposed by SCPC will be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable LORS.

PROPOSED CONDITIONS OF CERTIFICATION

SAFETY-1 The project owner shall submit to the CPM a Project Construction Safety and Health Program, which shall include:

- A Construction Injury and Illness Prevention Program
- A Construction Fire Protection and Prevention Plan
- A Personal Protective Equipment Program

Protocol: The Construction Injury and Illness Prevention Program and the Personal Protective Equipment Program shall be submitted to the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) Consultation Service, for review and comment concerning compliance of the program with all applicable Safety Orders.

The Construction Fire Protection and Prevention Plan shall be submitted to the KCFD for review and acceptance.

Verification: At least 30 days prior to the start of construction, or a date agreed to by the CPM, the project owner shall submit to the CPM a copy of the Project Construction Safety and Health Program and the Personal Protective Equipment Program, incorporating Cal/OSHA's Consultation Service comments. The project owner shall provide a letter from the KCFD stating that they have reviewed and accept the Construction Fire Protection and Prevention Plan.

SAFETY-2 The project owner shall submit to the CPM a Project Operation Safety and Health Program containing the following:

An Operation Injury and Illness Prevention Plan
An Emergency Action Plan
An Operation Fire Protection Plan
A Personal Protective Equipment Program

Protocol: The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the Cal/OSHA Consultation Service, for review and comment concerning compliance of the program with all applicable Safety Orders.

The Operation Fire Protection Plan and the Emergency Action Plan shall be submitted to the KCFD for review and acceptance.

Verification: At least 30 days prior to the start of operation, the project owner shall submit to the CPM a copy of the final version of the Project Operation Safety & Health Program. It shall incorporate Cal/OSHA's Consultation Service comments, stating that they have reviewed and accepted the specified elements of the proposed Operation Safety and Health Plan.

The project owner shall notify the CPM that the Project Operation Safety and Health Program (Injury and Illness Prevention Plan, Fire Protection Plan, the Emergency Action Plan, and Personal Protective Equipment requirements), including all records and files on accidents and incidents, is present on-site and available for inspection.

SAFETY-3 The project owner shall design and install all exterior lighting to meet the requirements contained in the Visual Resources conditions of certification and in accordance with the American National Standards Practice for Industrial Lighting, ANSI/IES-RP-7.

Verification: Within 60 days after construction is completed, the project owner shall submit a statement to the CPM that the illuminance levels contained in ANSI/IES RP-7 were used as a basis for the design and installation of the exterior lighting.

REFERENCES

- (SC&PP 1998a)SC&PP (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.
- Brauer, Roger L. 1990. Safety and Health for Engineers. 1990.
- Cal/OSHA Consultation. 1990. Cal/OSHA Consultation Pamphlet.
- Clark, Daniel, Fire Chief, Kern County Fire District, Letter discussing Impact of Proposed Power Plant Construction on Fire Protection Services. March 18, 1999.
- Cunningham, Don. Safety Engineer at Cal/OSHA Consultation, Sacramento office. Personnel communication with Ellen Townsend-Smith regarding review of applicant's Health & Safety Plan. November 16, 1998.

Dickson, Chuck, Assistant Fire Marshall Kern County Fire District, Letter discussing fire stations for La Paloma and Sunrise Cogeneration Plants, January 29, 1999.

McElroy, Joe, Engineer with Kern County Fire District. Personnel communication with Ellen Townsend-Smith regarding location of local fire departments. November 16, 1998.

TRANSMISSION LINE SAFETY AND NUISANCE

Obed Odoemelam

INTRODUCTION

According to the applicant, (the Sunrise Cogeneration Power Company, SCPC), the energy produced at the proposed Sunrise Cogeneration and Power Project (SCPP) 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 (SC&PC 1999a pages 1-1, and 2-1. SCPP 1999b page 1-1). Operating the proposed line could create several health and safety hazards as described by SCPC (SCPC 1998a pages 6-26 through 6-38, SC&PP 1999a 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 applicable LORS. 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. The assessment will evaluate the following issues, which relate primarily to the physical presence of the line, or secondarily to the physical interactions of line electric and magnetic fields, as will be discussed later.

- 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 power facility.

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 hazards to area aviation.
- FAA Advisory Circular (AC) No. 70/460-2H, "Proposed Construction and or Alteration of Objects that may Affect the Navigation Space". This circular informs each proponent of a project that could pose an aviation hazard of the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA.
- FAA AC No. 70/460-1G, "Obstruction Marking and Lighting". This circular describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.

INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION

Transmission line-related radio-frequency interference is one of the indirect effects of line operation as 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 could 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.

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.

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.
- 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.

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. 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. There are no design-specific regulations to limit the audible noise from transmission lines. As with radio noise, such noise is limited instead through design and maintenance standards established from industry research and experience as effective without significant impacts on line safety, efficiency maintainability and reliability.

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 that are 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.
- 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 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 1999b 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 area. The interactive effects of such nearby lines have therefore been considered in estimating the levels of electric and magnetic to be encountered along the route.

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 is intended to minimize location around residences or public-use areas. The closest residences will be a cluster of five houses approximately 500 ft away, and another house 400 ft away. The nearest residences along the rest of the route will be at least one-quarter mile away (SCPP 1999b 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 1998 pages 6-3, and 6-20, SCPP 1999a 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 1999a 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 1999a 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 to 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 be at least 30 ft from the ground in keeping with PUC's requirements and will be placed approximately 1000 ft apart.

The main section of the line, from the power plant to the PG&E power grid, (which will be solely owned by the applicant), 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 for this initial phase. Normal double-circuit operation will begin with interconnection to the other proposed projects. The conductor configuration and current flow pattern (phasing) were chosen to facilitate 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 1999a pages 2-11 and 2-13).

IMPACTS

As noted in the LORS section, GO-95, GO- 128 and Title 8, CCR 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 above. 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 the 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

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 shocks mostly result from direct contact with metal objects in which electric charges are induced by fields from the energized line. 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 1998 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 to some degree, 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 beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It required the previously noted 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 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

AVIATION SAFETY

As noted by SCPC (SCPP 1998 page 6-29, SCPP 1999a pages 2-13 and 2-14) the only major aviation center in the vicinity of the proposed facility is Meadows Field Airport in Bakersfield, approximately 23 miles away. Two smaller local airports are within 11.5 miles of the proposed line. These include the Taft-Kern County Airport, approximately 2.5 miles south of the line, and the Elk Hills Buttonwillow Airport, more than 11.5 miles north of the line. 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 line and FAA safety requirements, staff is in agreement with SCPC 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. 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 1998 page 6-33, SCPP 1999a 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 1998 page 6-33, SCPP 1999a page 2-17). The applicant 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 ensure mitigation of any interference-related complaints on a case-specific basis, as required by the FCC. **TLSN-1** is also proposed by staff to ensure compliance with GO-52, also intended to prevent radio interference.

AUDIBLE NOISE

According to information from SCPC (SCPP 1998 pages 6-29 and 6-30) SCPP 1999a pages 2-14 and 2-15, 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 all phases of the proposed power plant and related facilities, 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 1998 page 6-38, SCPP 1999a, page 2-22). Compliance the requirements of GO-90, and Title 14 Section 1250 CCR 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., as intended to prevent hazardous shocks 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 1999a 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. Additional calculations were made to reflect the interactive effects of fields from this and other proposed or existing lines in the area. 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.

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. Calculations on interactive effects show that the line will not add significantly to the magnetic fields from either existing or other lines proposed for the area.

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 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 1999a 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.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Since electric or magnetic field health effects have neither been established nor ruled out for lines such as proposed for this 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 1999a 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 route 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, the project owner shall submit to the Commission's Compliance Project Manager (CPM) a letter signed by a California registered electrical 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. The areas to be measured should include the facility switchyard and any residences near 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 energization.

TLSN-4 The project owner shall ensure that the transmission line right-of-way is kept free of combustible material, as required under the provisions of section 4292 of the Public Resources Code and 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 the annual compliance report.

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

Protocol: Protocol: The letter shall consist of the following:
Protocol: _____

- 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 within the right-of-way regardless of ownership.

- A discussion of the property owner's responsibility to notify the project whenever the property owner adds or installs a metallic object which would require 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 within the right-of-way, regardless of ownership. Such objects shall include fences, gates, and other large 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.

HAZARDOUS MATERIAL MANAGEMENT

Rick Tyler

INTRODUCTION

The purpose of this analysis is to determine if the proposed Sunrise Cogeneration and Power Project (SCPP, 1998a) will result in potential for 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 are identified, Energy Commission staff must also evaluate the potential for facility design alternatives or additional mitigation measures to reduce impacts to the extent feasible, as required pursuant to Title 20, California Code of Regulations, section 1748.5.

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 (a) (P), is anhydrous ammonia. The use of anhydrous ammonia 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 minimal 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 below.

The SCPP will also require the transportation of anhydrous ammonia to the facility. Analysis of the risk associated with such deliveries is addressed in staff's *Traffic and Transportation* analysis.

LAWS, ORDINANCES, REGULATIONS, STANDARDS AND POLICIES

The following federal, state, and local laws and policies generally apply to the protection of public health and hazardous materials management. Their provisions have established the basis for staff's determination regarding the significance and acceptability of project-related impacts on public health due to accidental releases of hazardous materials.

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 Acts (codified in 40 C.F.R., section 68.115, part F) require 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, storing or handling acutely hazardous materials in reportable quantities, to develop a Risk Management Plan (RMP) and submit it to appropriate local authorities, the United States Environmental Protection Agency (EPA), and the designated local Administering Agency for review and approval. The plan must include an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any preexisting evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This new, recently developed program supersedes the California Risk Management and Prevention Plan (RMPP).

The California Code of Regulations, Title 8, 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 a certificate of 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 out door 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 AFC (SCPP1998a, AFC Chapter 8.1). This data indicates that wind speeds below 1 meter per second and temperatures exceeding 100°F are not uncommon for the project area. Therefore, staff suggested that the applicant use F stability (stagnated air, very little mixing), one meter/second wind speed and an ambient temperature of 100°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 (NO_x) 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) 2 level 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 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 AFC also provides an analysis of an alternative accidental release during the transfer of ammonia from a delivery vehicle to the storage tank. In conducting this worst case 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 was designed to predict the

maximum possible impacts based on distance from the storage tank without regard to specific direction of transport. The analysis indicates that a worst-case accidental release in conjunction with pessimistic meteorological conditions could result in exposures exceeding 300 PPM at the nearest residence and on State Highway 33. However, the probability of this scenario occurring is very low. Additional analysis of the alternative scenario assuming a more probable release was also provided and did not suggest potential for significant impact (SCPP 1998a). As a result of concerns regarding exposure at the nearest residence and on Highway 33, staff requested that 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 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 the worst case scenario using data on spontaneous tank failure from the Canvey Study (Lees, 1992). This study suggested a spontaneous failure rate of 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 SCPP 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 F stability and 1 meter per second wind speeds and assumes winds directly toward a specific receptor. From data presented in Air Quality Appendix A of the AFC (SCPP1998a, Appendix A, Meteorological Data For Fellows 1992) staff determined that the probability of occurrence of F stability, winds below 1 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 the life of the project. 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. The results of the alternative scenario and the other more realistic scenarios do not suggest the potential for significant impacts.

In addition to spontaneous tank failure, 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 PSM for the facility. These plans will be reviewed by Cal OSHA, the local Administering Agency, 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.

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 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. This facility will also require the installation of a natural gas pipeline that could result in accidental release of natural gas. The natural gas pipeline is discussed in staff's **Facility Design** analysis. It is staff's belief that these mitigation measures will reduce to insignificant levels the potential for impacts associated with the use of natural gas.

CUMULATIVE IMPACTS

With the mitigation proposed, the facility will cause a very small risk of any off-site impacts. There are no other hazardous materials handling facilities in the project area that now pose risk at locations affected by the SC&PP. 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 necessary emergency action can be obtained through DTSC's RAPID Program until the cost can be recovered from the responsible parties.

MITIGATION

The typical methods used for mitigating accidental releases of hazardous materials are as follows:

- use of non-hazardous or less hazardous materials,
- use of engineered controls,
- use of administrative controls, and
- emergency response planning.

With the exception of using anhydrous ammonia instead of aqueous ammonia, the proposed project reflects the use of all these methods to the extent feasible in reducing the potential for impacts associated with hazardous materials use and handling. It is staff's conclusion that the proposed mitigation will be effective in reducing the potential for impacts associated with an accidental release of hazardous materials to insignificant levels. The only potentially significant risk associated with the proposed project is associated with the use of anhydrous ammonia. 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. However if this risk is determined to be unacceptable, use of aqueous ammonia is a feasible mitigation that could be imposed.

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 a RMP. The EPA, Kern County Environmental Health Department and 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, 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 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 staff's proposed conditions of certification, the project will also comply with Health and Safety Code, section 41700, as 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, Code Of Federal Regulations, Part 355, Subpart J, section 355.50, unless approved in advance by the Compliance Project Manager (CPM).

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

HAZ-2 The project owner shall provide a Risk Management Plan and Process Safety Management Plan to Kern County Environmental Health Department and the CPM for review and approval 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 document. 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 any hazardous materials to the facility, the project owner shall provide the final approved plans listed above to the CPM.

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HAZARDOUS MATERIAL MANAGEMENT Appendix A

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 to 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

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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

WASTE MANAGEMENT

Michael Ringer

INTRODUCTION

This section analyzes potential issues associated with managing wastes generated from constructing and operating the Sunrise Cogeneration and Power Project. 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:

- Wastes generated during constructing and operating the proposed project will be managed in an environmentally safe manner;
- Disposal of project wastes will not result in significant adverse impacts to existing waste disposal facilities; and
- The management of the wastes will be in compliance with all applicable laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

RESOURCE CONSERVATION AND RECOVERY ACT (42 U.S.C. SEC. 6921 ET SEQ.)

The Resource Conservation and Recovery Act establishes requirements for the management of hazardous wastes from the time of generation to the point of ultimate treatment or disposal. Section 6922 requires generators of hazardous waste to comply with requirements regarding:

- record keeping practices which identify quantities of hazardous wastes generated and their disposition,
- labeling practices and use of appropriate containers,
- use of a manifest system for transportation, and

- submission of periodic reports to the EPA or authorized state.

TITLE 40, CODE OF FEDERAL REGULATIONS, PART 260

These sections contain regulations promulgated by the EPA to implement the requirements of RCRA as described above. Characteristics of hazardous waste are described in terms of ignitability, corrosivity, reactivity, and toxicity, and specific types of wastes are listed.

STATE

CALIFORNIA HEALTH AND SAFETY CODE, 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 in the central portion of the project site. Near 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 at 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. Also, 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 (SC&PC) 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). AFC Table 8.13-1 lists construction-related hazardous wastes and the quantity that SC&PC 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.

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).

IMPACT ON EXISTING WASTE DISPOSAL FACILITIES

Nonhazardous waste, which is not 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 Sunrise project. 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, SC&PC 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 disposal capacity for both hazardous and nonhazardous wastes. 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 Sunrise project. As noted above, SC&PP 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 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 which are associated with construction and operation of projects of similar size, nature, and impacts, including La Paloma and Elk Hills, in addition to Midway-Sunset. 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, Sunrise 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 (Sunrise 1998, 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, the project owner 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 wastes will not be stored on-site for periods longer than 90 days and will be stored in appropriate containers (SCPP 1998a, AFC p. 8.13-4).
- Hazardous wastes will be collected by licensed hazardous waste haulers using manifests and managed only at authorized facilities (SCPP 1998a, AFC p. 8.13-4).
- 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 below, 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 shall notify the CPM 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 the project owner contracts.

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, 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. 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) on site during soil excavation activities. 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.

LAND USE

Amanda Stennick

INTRODUCTION

This assessment of land use impacts for the Sunrise Project 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. In general, an electric generation project and its related facilities can be incompatible with existing or planned land uses when it creates unmitigated noise, odor, dust, public health hazard or nuisance, traffic, or visual impacts or when it significantly restricts existing or future uses. Any project-related impact to noise, traffic, visual resources, air quality, biology, transmission line safety and nuisance, or public health will be discussed and mitigation proposed 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 corridors.

GENERAL PLAN LAND USE DESIGNATIONS WITHIN THE STUDY AREA

Location or Linear Facility	Land Use Designation
Sunrise Cogen and Power Plant	Extensive Agricultural
The transmission line corridor	Extensive Agriculture/ Mineral and Petroleum
Alternative Transmission Line Route A	Extensive Agriculture/Solid Waste Facilities/Flood Hazard/ Mineral and Petroleum/Seismic Hazard/Intensive Agriculture/Resource Management

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
The transmission line corridor	BLM lands/ Lokern Natural Area/California Aqueduct/West Side Canal/ Kern County Flood Levee/Agricultural lands/Oil Production/Undeveloped/Residential/ PG&E Midway Substation
Transmission Line Route A	BLM lands/Undeveloped/Morgan PG&E Substation/ARCO Western Energy lease/Oil Wells/Community of Fellows/Midway Oil Camp/Aboveground Tank Farm/TCI/Historic Oil Derrick/Highway 119 Intersection/Telephone Line Intersection/Gas Line

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 PSA 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 PSA 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.

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 corridors and alternative.

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
AlternativeTransmission Line Route A	A, A1, NR
Valley Acres Substation	A

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 PSA 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 B,D,E,F, hereafter referred to as the transmission line corridor, 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 PSA 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 PSA 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. Sunrise has submitted a Notice of Intention, which serves as a permit application to the Division Office in Bakersfield. Please refer to the **Transmission Line Safety and Nuisance** section of the PSA 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 PSA 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 PSA 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 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 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. 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 PSA, 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 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. 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 19.12, 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 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 flows, 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.
7. All vehicle parking and maneuvering areas around the four power islands shall be surfaced with a minimum of two inches of Asphalt Composite paving or material of higher quality.
8. All vehicle parking and maneuvering areas around the switchyard and cooling towers 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.

At least 30 days prior to the start of construction, the project owner shall submit to the CPM a copy of the site plan, and a copy of the letter of comment from the Kern County Planning Director.

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.
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- 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.
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- SCPP (Sunrise Cogeneration & Power Project/King) 1999e. Data Responses – SET ONE. Submitted to the California Energy Commission on March 31, 1999.
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SCPP (Sunrise Cogeneration and Power) 1999j. Transmission Alternatives, Supplement One. Submitted to California Energy Commission on May 5, 1999.

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TRAFFIC AND TRANSPORTATION

David Flores

INTRODUCTION

The Traffic and Transportation section of the Preliminary Staff Assessment addresses the extent to which the project may impact the transportation system within the vicinity of its proposed location. This section summarizes the separate analyses by both the Sunrise Cogeneration and Power Company (SCPC) in the Application for Certification (AFC) and the Energy Commission staff of the potential traffic and transportation impacts associated with construction and operation of the Sunrise Cogeneration and Power Project (SCPP). These analyses included the identification of: 1) the roads and routings which are proposed to be used; 2) potential traffic related problems associated with those routes; 3) the anticipated number of trips to deliver oversize/overweight equipment; 4) the anticipated encroachment upon public right-of-ways during the construction of the proposed project and associated appurtenant facilities; 5) the frequency of trips and probable routes associated with the delivery of hazardous materials; and 6) the availability of alternative transportation methods such as rail.

Staff has used this information to determine the potential for the project to have significant traffic and transportation impacts, as well as to assess the availability of mitigation measures which could reduce or eliminate the significance of those impacts. Conditions of certification are included to implement the appropriate mitigation measures and to insure that the project complies with the applicable Laws, Ordinances, Regulations and Standards (LORS).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

The federal government addresses transportation of goods and materials in Title 49, Code of Federal Regulations:

- Title 49, Code of Federal Regulations, Section 171-177, governs the transportation of hazardous materials, the type of materials defined as hazardous, and the marking of the transportation vehicles.
- Title 49, Code of Federal Regulations, Section 350-399, and Appendices A-G, Federal Motor Carrier Regulations, addresses safety considerations for the transport of goods, materials and substances over public highways.

STATE

The California Vehicle Code and the Streets and Highways Code contain requirements applicable to the licensing of drivers and vehicles, the transportation of hazardous materials and right-of-way. In addition, the California Health and Safety Code addresses the transportation of hazardous materials. Specifically, these codes include:

- California Vehicle Code, section 353 defines hazardous materials.
- California Vehicle Code, sections 31303-31309 regulate the highway transportation of hazardous materials, the routes used, and restrictions thereon.
- California Vehicle Code, sections 31600-31620 regulate the transportation of explosive materials.
- California Vehicle Code, sections 32000-32053, regulate the licensing of carriers of hazardous materials and include noticing requirements.
- California Vehicle Code, sections 32100-32109, establish special requirements for the transportation of inhalation hazards and poisonous gases.
- California Vehicle Code, sections 34000-34121, establish special requirements for the transportation of flammable and combustible liquids over public roads and highways.
- California Vehicle Code, sections 34500 et seq., regulate the safe operation of vehicles, including those that are used for the transportation of hazardous materials.
- California Vehicle Code, sections 2500-2505, authorize the issuance of licenses by the Commissioner of the California Highway Patrol for the transportation of hazardous materials including explosives.
- California Vehicle Code, sections 13369, 15275, and 15278, address the licensing of drivers and the classifications of licenses required for the operation of particular types of vehicles. In addition, these sections require the possession of certificates permitting the operation of vehicles transporting hazardous materials.
- California Streets and Highways Code, sections 117 and 660-72, and California Vehicle Code 35780 et seq., require permits for the transportation of oversized loads on county roads.

- California Streets and Highways Code, sections 660, 670, 1450, 1460 et seq., and 1480 et seq., regulate right-of-way encroachment and the granting of permits for encroachment on state and county roads.
- California Health and Safety Code, section 25160 et seq., address the safe transport of hazardous materials.

LOCAL

KERN COUNTY

The Circulation Element of the Kern County General Plan sets up local goals and guidance policies about building and transportation improvements. It introduces planning tools essential for achieving the local transportation goals and policies (County of Kern, 1972). Relevant goals and policies include, in part, the following:

PRIVATE DEVELOPMENT ACCESS TO EXISTING ROADWAY NETWORK

As a condition of private development approval, developers shall build roads needed to access the existing road network (Policy No. 1).

GROWTH BEYOND 2010

The County should monitor traffic volumes and patterns on County major highways (Policy No. 1).

Development applications must demonstrate that sufficient transportation capacity is available to serve the proposed project at Level of Service "D" (LOS D) or better.

TRUCKS ON HIGHWAYS

Make California Department of Transportation (Caltrans) aware of heavy truck activity on Kern County's roads (Policy No. 1).

Start a program that monitors truck traffic operations (Policy 2).

Promote a monitoring program of truck traffic operations (Policy 2).

TRUCKS ROUTES

The Transportation Management Department should oversee truck travel patterns and be aware of locations where heavy trucks traverse residential areas (Policy No. 1).

TRANSPORTATION OF HAZARDOUS MATERIALS

State maintained highways are acceptable as commercial hazardous waste transportation routes (Policy No. 1).

Kern County and affected cities should reduce use of county maintained roads and city maintained streets for transportation of hazardous materials (Policy No. 3).

Restrict commercial transportation of hazardous materials in accordance with Vehicle Code, section 31303 (Policy No. 4). This circulation element recommends charting routes where hazardous material shipments can be transported.

ROAD PAVEMENT DAMAGE

The County shall continue to maintain pavement conditions and check operating conditions by collection and review of traffic flow and accident data to rate the circulation system (Policy No. 1).

SETTING

REGIONAL DESCRIPTION

ROADWAYS AND HIGHWAYS

The project site is located in the western portion of Kern County. The power plant is located about 35 miles southwest of Bakersfield, California. The Sunrise Project is 16 acres in size and within the Midway-Sunset Oilfield, approximately 3 miles northwest of Fellows, California and 2.5 miles south of Derby Acres. The project site is reached from State Route (SR) 33 west on Midway Road to Mocal Road and north on Shale Road to the project site. An asphalt-paved access road will be constructed from Shale Road to the proposed site. The plant's administration building parking lot and the road encircling the power plant's outer perimeter will also be asphalt paved.

Two primary highways provide access to the plant site, State Route 99 and Interstate 5. Each have the following weight and load limitations; when these are exceeded, a permit is required:

- 80,000 lb. gross vehicle weight;
- 8 feet in height;
- 6 feet in width; and
- 65 feet in length.

Additional access to the Sunrise project area is provided by State Route 33, 43, 58, 119, and 166, which are predominately two-lane roads.

TRAFFIC AND TRANSPORTATION Table 1 identifies the annual average daily traffic (AADT), annual average peak-hour traffic, annual average daily truck traffic, percent of truck traffic highway capacity, and Level of Service (LOS) for highways in the vicinity of the project. These traffic estimates are presented for various mileposts or junctions on each highway. The criteria for LOS on highways are established by Caltrans. These criteria take into account numerous variables

TRAFFIC AND TRANSPORTATION TABLE 1 Current Traffic Characteristics of Highways in the Project Area

Highway/Mile post	Location	Annual Average Daily Traffic	Annual Average Peak Hour Traffic	Annual Average Daily Truck Traffic	Percent of Truck Traffic	Highway Capacity	LOS
Interstate 5							
13.52	Wheeler Ridge Rd.	51,000	6,200	16,830	33	3,560	B
15.86	Jct. Rte. 99 North	51,000	6,200	16,830	33	3,560	B
19.61	Jct. Rte. 166	25,000	2,650	4,750	19	3,510	B
38.79	Jct. Rte. 119	23,000	2,450	4,370	19	3,510	B
State Route 33							
11.56	Jct. Rte. 166 East	4,400	450	836	19	1,890	C
17.89	Jct. Rte. 119 East	8,600	840	2,236	26	1,860	D
23.41	Midway Road	10,600	1,250	2,544	24	1,390	C
State Route 43							
0.11	Jct. Rte. 119	3,550	320	1,030	29	1,700	B
1.90	Jct. Rte. I-5	3,550	320	1,030	29	1,720	B
8.11	Jct. Rte. 58 East	3,300	300	957	29	1,700	B
9.16	Jct. Rte. 58 West	9,600	940	2,688	28	1,680	B
16.86	Shafter, Central Ave.	7,600	670	2,128	28	3,720	B
25.13	Jct. Rte. 46	7,200	650	2,016	28	1,710	D
State Route 58							
39.96	Jct. Rte. 43 North	6,100	510	1,891	31	1,740	B
46.10	Allen Road	13,700	1,350	4,100	30	1,740	B
State Route 99							
17.50	Jct. Rte. 119 West	33,000	3,100	8,250	25	3,560	B
23.51	Jct. Rte. 58 East	100,000	7,800	26,000	26	3,520	B
Highway/Mile post	Location	Annual Average Daily Traffic	Annual Average Peak Hour Traffic	Annual Average Daily Truck Traffic	Percent of Truck Traffic	Highway Capacity	LOS

State Route 99 (Cont.)							
26.65	Jct. Rte. 58 West	114,000	8,900	26,220	23	3,520	B
State Route 119							
0.00	Jct. Rte. 33	4,250	360	808	19	3,800	D
18.17	Jct. Rte. 43 North	8,400	800	1,848	22	1,860	B
19.77	Jct. I-5	5,900	560	1,121	19	1,700	B
31.28	Jct. Rte. 99	10,400	870	2,288	22	1,850	D
State Route 166							
0.01	Jct. Rte. 33 North	3,150	280	725	23	1,250	B
22.80	Jct. I-5	2,200	200	638	29	1,800	B

such as Annual Average Daily Traffic (AADT), capacity, grade, environment, and other relevant information. As indicated in the AFC, according to Caltrans policy, LOS D is acceptable for planning purposes, whereas LOS E and F are considered unacceptable. As provided in **TRAFFIC AND TRANSPORTATION Table 1**, all of the state routes potentially affected by the proposed Sunrise Project are operating at or above LOS D.

TRAFFIC AND TRANSPORTATION Table 2 represents data pertaining to the existing traffic characteristics on local roadways potentially affected by the proposed project, including: roadway classification, annual average daily traffic, roadway capacity, and LOS of each roadway affected by the Sunrise Project. Overall, the rated LOS on these local roadways is comprised of free-flowing operating conditions (LOS A). The following data is not available from the County for these roads: peak hour LOS, annual average daily truck traffic, and truck traffic counts.

Although traffic counts specifically for trucks are not available for local roads, a large ratio of trucks to cars, due to the number and proximity of the oil fields, generally characterize traffic in the project vicinity.

According to the AFC (AFC pg.8.10-15), Kern County Public Works Department does not have weight and load limits or capacity levels for county roadways (Norton, 1999). Caltrans has indicated that the weight and load limitations for state highways apply to county roadways if the County specifies no limitations (California Street and Highway Code 35700 et seq.). Therefore, all the local roadways to be used during the construction and operational phase of the Sunrise Project are subject to a load limit of 80,000 pounds per truck. Trucks used during project construction that are oversized, overweight, over width, or over length will require a transportation permit from Caltrans. Staff has addressed the permit requirement under the Conditions of Certification section of this report.

TRAFFIC AND TRANSPORTATION TABLE 2
1997 Traffic Characteristics of Local Roadways in the Project Area

Roadway	Location	Classification ¹	Annual Average ² Daily Traffic	Capacity ²	LOS ²
Airport Road	City of Taft-Honolulu Road	N/A	900	9,000	A
Midway Road	Entire Road	Secondary 2-lane	800	15,000	A
Mocal Road	Entire Road	Secondary 2-lane	1,600	9,000	A
Shale Road	Entire Road	Secondary 2-lane	340	9,000	A

SOURCE: Sunrise AFC Table 8.10-3

¹Castro, personnel communication

²Nienken, personal communication

N/A = Not available

IMPACTS

POWER PLANT

CONSTRUCTION PHASE

COMMUTE TRAFFIC

Construction of the generating plant facility will occur over an estimated 15-month period and will require a total construction workforce of 160 workers on average, assuming a single shift and a 40-hour five day work week. Of the 160 workers, approximately 23 will be contractor-staff. During the peak construction period (in the 9th month after the notice to proceed) an estimated 255 workers will be required for the power plant. Of the 255 workers, 225 are assumed to be local workers and the remaining 30 will make up the non-local workforce. Workforce vehicle trips were calculated based on this data.

Staff agrees with the AFC's assumptions, that of the 160 workers, 32 workers (20%) will carpool. The remaining 128 will drive a separate vehicle to the project site, making two trips per day (one round trip from home to the site and back).

Therefore, construction of the project could result in a total of approximately 320 vehicle trips per day on average, and about 408 vehicle trips per day during the peak construction period (based on 204 workers during peak construction/AFC pg.8.10-18)). Parking for construction personnel and visitors will be provided in an area on or adjacent to the project site. Construction workforce traffic would

generally occur between 6:00 a.m. and 7:00 a.m. in the morning, and again between 4:00 p.m. and 5:00 p.m. in the evening.

Workers originating in Shafter or Wasco will use SR 43 south to SR 119 then southwest on SR 119. The workers would continue west on Midway Road to Mocal Road, then take Shale Road north to the project site. From Taft, Ford or Maricopa, workers will use SR 33 to the plant site or travel along local roads (e.g., Midway, Mocal, Shale, or Airport Roads). This will be dependent on which part of the proposed project is being constructed (e.g., plant site or transmission corridor). Construction related workers coming from other cities or towns in Kern County or from Southern California will likely use I-5 north to SR 166 west, then take SR 33 north to Shale, Midway, or Airport Roads. Again, this would be dependent on which part of the proposed Sunrise Project is being constructed.

Using the traffic pattern assumptions described above, construction related vehicle traffic would affect SR 166 most heavily, resulting in traffic increases of 6% along portions of the route. However, this traffic impact is not considered significant because along this state route the project will not reduce the LOS to the Caltrans significance criteria of LOS E or F. Also, these increases would be short term, occurring only during the peak period.

Local roads providing access from the state routes to the project site will be most affected by construction workforce traffic commuting to and from the project sites. During peak construction period, traffic on these roads is estimated to increase between 26 percent to 102 percent. Shale Road would receive the most vehicle trips/day, resulting in a traffic increase of 408 trips or 102 percent from current levels. As indicated in the AFC, on average, construction-related traffic generated by the workforce will result in an additional 180 to 256 vehicles per day (an increase of 16 percent to 75 percent over present conditions) on local roads. The AFC further indicates traffic increases would generally occur between 6:00 a.m. and 7:00 a.m. in the morning and again between 4:00 p.m. and 5:00 p.m. in the evening. These increases would be short-term, occurring only during the peak construction period.

Local county roads in the vicinity of the Sunrise project site have a capacity of 9,000 vehicles per day. Because existing average daily traffic on these local roads is minimal (AFC Table 8.10-3, pg.8.10-15), these roads are able to accommodate large, short-term increases in traffic without reducing their LOS to a significant adverse level (i.e., LOS E or F). The AFC indicates to reduce the potential for local residents to perceive peak period traffic as significant, construction related traffic related increases would be mitigated to the extent feasible through implementation of a construction traffic control plan (see proposed condition of certification **TRANS-4**).

TRUCK TRAFFIC

Construction of the generating plant will require the use and installation of heavy equipment and associated systems and structures. Heavy equipment will be used

throughout the construction period, including trenching and earthmoving equipment, forklifts, cranes, cement mixers and drilling equipment.

In addition to deliveries of heavy equipment, construction materials such as concrete, wire, pipe, cable, fuels and reinforcing steel will be delivered to the site by truck. An estimated 3,014 truck deliveries will be made to the plant site over the course of the 15 month construction period (on average approximately 400 truck deliveries per month). Assuming 20 average workdays per month and two trips for each truck delivery (one to and one from the site), the project will generate approximately 40 truck trips per day, on average. Deliveries will also include hazardous materials to be used during project construction. Sunrise has assumed that the majority of these materials will be transported from either Bakersfield or Los Angeles.

Sunrise has assumed that about 70 percent of the truck deliveries (14 trucks) would originate in Bakersfield and drivers would use SR 58 west to SR 43 south and then southwest on SR 119 to the project site. The remaining 30 percent of truck deliveries (6 trucks) will originate from southern California; drivers would travel via I-5 north to SR 166 west to SR 33 to the project site.

Transportation of equipment that will exceed the load size and limits of certain roadways will require special permits. The procedures and processes for obtaining such permits are fairly straightforward. Conditions of certification that ensure compliance with these requirements are discussed later in this section.

Construction debris and small quantities of hazardous wastes will be generated during project construction as described in the Waste Management Section of this report. During construction, no more than several trucks per month will be required to haul waste for disposal. Transportation of hazardous materials to and from the project will be conducted in accordance with California Vehicle Code Section 31300 et seq. because Kern County does not have local ordinances regulating the transportation of hazardous materials. Since the transport of hazardous wastes will be conducted in accordance with transportation regulations governing such transport, no significant impact is expected.

On January 14, 1999 and additionally on March 10, 1999, Ms. M. Frausto representing Caltrans submitted letters pertaining to its review of the AFC for the Sunrise Project. Upon review of the traffic analysis in the AFC and their review of potential environmental impacts and hazardous waste concerns, Caltrans recommended that an additional traffic analysis be conducted at the intersection of SR 119 and Midway Road for possible mitigation measures that could be required during the construction phase of the project.

Staff has prepared a condition under the "Conditions of Certification" section of this report that will require a traffic analysis to be completed prior to project construction. Further, the project owner will be required to meet with Caltrans to determine scheduling of either temporary or permanent roadway improvements, based on the traffic analysis. Caltrans also indicated that encroachment permits will be required for any construction work within state right-of-way. Due to the size, weight and

additional truck traffic during construction of the Sunrise Project, this will contribute to additional wear on the local roads, subsequently increasing the need for regular roadway maintenance. Project-related roadway wear and tear is not considered significant and implementation of the construction traffic control plan (**TRANS-5**) and repairs to all roadways (**TRANS-6**) would address these roadway impacts.

RAILWAYS

During construction of the Sunrise Project, a number of major equipment components will be delivered to a railroad staging area located approximately 13 to 18 miles south of the community of Taft. The rail delivered equipment list will include the following:

- Combustion turbines (2);
- Generators (2);
- Generators step-up transformers (2); and
- Heat recovery steam generator modules (approximately 18).

The listed components will be unloaded at the rail staging area and hauled via truck on local roadways to the job site, a distance of approximately 25 to 30 miles. Based on the limited number of rail deliveries, no impacts to existing rail service or local roadways will occur.

ACCIDENT ANALYSIS

Traffic accident records from a 1998 Caltrans report in the AFC were reviewed and compared with statewide average accident rates to determine if any of the primary access roads experience unusually high numbers of accidents. The data provided by Sunrise's consultant reflect the primary access routes to the power plant site have accident rates typically from .26 to 5.03 accidents per million vehicle miles traveled. Statewide average accident rates for similar facilities ranged from a low of .71 for freeways to a high of 2.27 for conventional multilane facilities. Roadway segments with accident rates higher than statewide averages included SR 119 junction with SR 33 (5.03), SR 119 junction with SR 99 (4.11) and SR 43 junction with SR 58 (2.90). However, this level of accident history does not indicate any unusual hazard or improperly designed facilities along these roads. (SCPP 1999, AFC page 8.10-13). Following a telephone conversation with the officer in charge at the California Highway Patrol in (Buttonwillow headquarters) Kern County, he also concurred that there are no unusual hazards or improperly designed facilities along the state highway routes with unusually higher accident rates.

OPERATIONAL PHASE

COMMUTE TRAFFIC

Potential long-term traffic impacts are associated with the facility's operational workforce. Operation of the generating plant will require a labor force of approximately 24 full-time employees. Assuming that each employee will drive a separate vehicle to work and that they will make one round trip from home to work per day, operation of the plant will generate approximately 48 vehicle trips per day.

Adequate parking will be made available for employees on a paved lot adjacent to the administration building. SCPC has assumed that the majority of the permanent workforce will reside in Bakersfield and their preferred route to work will be west along SR 119 to Midway Road, then west to SR 33 to the project site. Operations-related traffic impacts are considered minimal, representing less than 1 percent of existing AADT on SR 119, 1 percent of existing AADT on SR 33, and an estimated 6 percent of existing AADT on Midway Road. Therefore staff's conclusion is that the state highways and local roadways LOS will not be reduced to a significant adverse level (i.e., LOS E or F).

TRUCK TRAFFIC

The transportation and handling of hazardous substances associated with the project can increase road hazard potential. The handling and disposal of hazardous substances is addressed in the Waste Management Section, and the Hazardous Materials Section.

During project operation, approximately 3 truck deliveries per month of anhydrous ammonia will be made to the plant site. Other hazardous and non-hazardous materials, as described in the Waste Management and Hazardous Materials Sections, will be delivered by truck to the plant site on an incidental basis (e.g., 1 truck per month of hydrogen; 1 truck delivery every three months of corrosion inhibitor, and detergent; and 1 truck delivery per year of lubricating oil, and carbon dioxide). The anticipated travel routes for materials delivery from the Bakersfield area will be along SR 58, SR 48, SR 119 and Midway, Mocal, and Shale Roads.

Hazardous material deliveries from the southern California will primarily occur along I-5, SR 166, SR 33, and Shale Road. Some of the hazardous material generated at the site during plant operation will be transported for disposal at a Class I landfill or transported offsite for recycling as described in the Waste Management Section. SCPC has estimated that hazardous waste generated onsite will be transported offsite for disposal about every 90 days by licensed hazardous waste transporters.

Potential impacts of the transportation of hazardous materials can be mitigated to a level of insignificance by compliance with federal and state standards established to regulate the transportation of hazardous substances. In addition, due to the limited amount of truck traffic associated with the operational phase of the project, hazards with other local truck traffic in the area is considered minimal. Mitigation measures and conditions of certification that ensure compliance with state, federal and local permit and safety requirements are discussed later in this section.

LINEAR FACILITIES

Potential impacts associated with the transmission line route include both construction and operation related impacts. Construction related impacts will result from the movement of heavy equipment, trucks, and worker vehicles along access routes during construction of transmission line towers and installation of conductors.

While this work will not directly impact traffic operations, several aspects of transmission line tower construction and conductor installation could potentially result in impacts. These include: 1) workforce related traffic; 2) access to proposed tower structure locations; 3) transmission line roadway crossings; and 4) construction equipment and materials deliveries. These issues are discussed below.

On June 4, 1999, SCPC submitted a Transmission Supplement 2 document which discussed the environmental effects of the proposed Route B corridor transmission route (including all subset routes B, D, E, and F). Routes A,C and G are no longer considered viable by SCPC, therefore they are not requesting certification or environmental review of these routes.

Subset routes D, E, and F would follow the Route B corridor and would involve the joint participation of SCPC with one or more other projects in the construction and operation of a single transmission line.

The County maintained roadways that would provide access to the proposed transmission line B corridor are described in **TRAFFIC AND TRANSPORTATION Table 3** which includes the roadway classification, AADT, roadway capacity, and existing LOS of each roadway affected by the transmission line. Overall, the rated LOS on these local roadways comprises of free-flowing operating conditions (LOS A).

Construction of the transmission line along Route B corridor is anticipated to take 7 months and require up to 7 workers per month during the surveying, site clearing, and grading. During installation of the conductors, the workforce will peak at 19 workers during the 4th month following the issuance of the CEC license. This peak construction period will coincide with the peak construction associated with the power plant. It is further assumed that construction will be completed by several crews working simultaneously along the route to minimize the construction period.

**TRAFFIC AND TRANSPORTATION TABLE 3
1997 Traffic Characteristics of Local Roadways
Providing Access to the Route B Corridor**

Roadway	Location	Classification	Annual Average Daily Traffic	Capacity ²	LOS ²
Reserve Road (1)	West of Skyline Road	Secondary 2-lane	220	9,000	A
Skyline Road (1)	East of Reserve Road	Secondary 2-lane	140	9,000	A
Buerkle Road (2)	West of Mirasol	Secondary 2-lane	700	9,000	A

Mirasol Avenue (2)	South of State Route 58	Secondary 2-lane	130	9,000	A
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SOURCE: Sunrise AFC Table 8.10-3

Notes and Sources:

(1) Radian International, 1998

(2) Nienken, personal communication

One staging area will be established at the Sunrise Project site to store equipment and material storage and to provide a field office. Employees will report to this staging area at the beginning and the end of each workday, then distribute themselves (carpool) as needed to various work sites along the transmission line route. Most local county roads operate at LOS A and workforce related traffic would generate minimal increases to the existing traffic volumes on these roads. For tower access, a variety of travel routes will be used, including the Midway –Sunset and Diablo transmission line access roads, and other farm and spur roads. With the use of these existing access roads, local roadways roads (e.g., Buerkle Road, Mirasol Avenue) and highways will not be significantly impacted by workforce-related traffic associated with construction of the transmission line.

Where road spurs are required, they will generally require some grading to clear existing ground cover, but the roadway surface will be the natural terrain. There are no plans for abandonment of these spur roads since they will provide access for maintenance of the transmission line. The spur roads will continue to be maintained by SCPC for these purposes. Neither the construction of any potential spur roads, nor their use during transmission tower construction will adversely affect the existing county roadways. For these reasons, construction of the towers for the transmission line route will not result in any significant traffic and transportation related impacts.

The transmission line route will cross State Route 33 just west of Derby Acres and will cross SR 58 just south of the existing Midway Substation. The crossings are anticipated to take from 10-12 hours, and require an encroachment permit from Caltrans. Crossing of all local roadways will occur in accordance with permitting authority requirements. Crossings of county maintained roads will also require encroachment permits from Kern County Transportation Management Department.

Construction of the transmission line will require the use and installation of heavy equipment, including various trucks (pickups, booms, cement and digger/auger), mobile cranes, a cable puller and a tensioner. In addition to deliveries of heavy equipment, construction materials such as tubular steel pole foundation sections, tubular steel poles, and consumables will be delivered by truck to the transmission line staging sites. In some cases, vehicles used to transport heavy machinery and construction materials and equipment will require a transportation permit from Caltrans, as described above for transmission line construction.

Given the small number of truck deliveries, and their distribution among multiple staging sites and work areas, traffic impacts associated with construction equipment and materials deliveries for the transmission line are considered to be insignificant.

CUMULATIVE IMPACTS

The analysis of the available capacity of the regional highways described in this section shows that the regional transportation system serving the Kern County area (along the potentially affected highways) has ample capacity to accommodate the proposed project's construction and operation generated traffic.

The other proposed projects in the area are the La Paloma Generating Project, Elk Hills and Midway-Sunset Power Projects. During construction of the SCPP, no cumulative impacts on traffic are expected for the following reasons:

- Peak construction traffic at the Sunrise project will occur after peak construction of the La Paloma Generating Project and prior to the Elk Hills and Midway-Sunset power plant proposals.
- Traffic for the Sunrise Project will not use the same access roads used by La Paloma, Elk Hills, and Midway-Sunset Power Projects.
- After the aforementioned power plants are constructed, they will operate 7 days a week, 24 hours per day. Assuming each of the other proposed plants uses the same number of operating personnel as the Sunrise Project (approximately 24 employees) Monday through Friday of each week, this small number of commuters from each of the plants will not significantly impact current traffic patterns.

In addition, the construction of 700 new wells (some of which are steam injection and some of which are production wells), and associated dirt access roads, modification to existing facilities such as the water treatment facility have been reviewed by staff as to their indirect and direct environmental effects. Based on the current and future traffic characteristics (ie. LOS, AADT, highway capacities) of the area, traffic associated with these proposals are minimal, and regional and local roadways are considered to have adequate capacity to accommodate related traffic.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

Sunrise has stated its intention to comply with all federal LORS. A condition to ensure compliance is included below. Staff believes such compliance will not present any unusual difficulties. Therefore, the project is considered consistent with identified federal LORS.

STATE

Sunrise has stated its intention to comply with all state LORS. A condition to ensure compliance is included below. Staff believes such compliance will not present any

unusual difficulties. Therefore, the project is considered consistent with identified state LORS.

LOCAL

For operational employees, trip reduction measures could be employed. But since the maximum number of employees assigned to any one shift is approximately 24, trip reduction measures are not necessary for this project.

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 applicant will prepare a Facility Closure Plan for submittal to the Energy Commission for review and approval, at least twelve months prior to the proposed closure. At the time of closure, all then-applicable LORS will be identified and the closure plan will address with how these LORS will be complied.

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. In the event of temporary closure, the effects on traffic and transportation would be similar to those for normal operation of the power plant facility, and the applicant would have to comply with all applicable LORS section with respect to transportation permits for hazardous materials and equipment deliveries and removal.

UNEXPECTED PERMANENT CLOSURE

Unexpected permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. Staff assumes that the facility will either remain idle until such time that new ownership is established, or dismantling of the facility will occur. In any event, the owner will have to secure applicable transportation permits to satisfy the LORS requirements as stated in this report.

In the event of permanent closure, the effects would be similar to those associated with project construction. Permanent closure will involve a peak work period with commute traffic. In either instance, the roadway systems within the vicinity of the

project should be able to handle closure –related traffic without a significant impact on the current LOS of the area roads.

MITIGATION

Sunrise has indicated its intention to comply with all such LORS relating to: 1) the transport of oversized loads, 2) the transport of hazardous materials, and 3) implementation of a program which addresses lighting and traffic control measures for construction activities on or adjacent to public roads, such as linear components, in accordance with Kern County General Plan (Circulation Element) policies.

STAFF'S PROPOSED MITIGATION

Staff has proposed mitigation measures to address Caltrans concern about a detailed traffic analysis at the intersections of State Route 119/Midway Road and the repair of roadway pavement due to truck traffic impacts during construction, and implementation of a traffic control plan. With these mitigation measures, the traffic and transportation issues will be reduced to less than significant.

CONCLUSIONS AND RECOMMENDATIONS

POWER PLANT

1. The transportation of hazardous materials during the construction phase and increased roadway demand resulting from the daily movement of workers and materials, while noticeable, will not increase beyond significance thresholds established by local and regional authorities.
2. During the operational phase, increased roadway demand resulting from the daily movement of workers and materials will be minimal.
3. All transportation and handling of hazardous substances can be mitigated to insignificance by compliance with federal and state standards established to regulate hazardous substances.

LINEAR FACILITIES

4. Construction of the transmission lines will have minimal impacts on the function of area roadways. Routine construction safety measures and required encroachment permits should be sufficient to ensure no roadway impacts.
5. Because construction requires trenching within public road rights-of-way, the installation of underground facilities will impact both roadway function and levels of service. However, these impacts are expected to be short-term and not result in significant traffic and transportation impacts. Sunrise

has indicated their intent to provide appropriate traffic control measures, and these are contained within the conditions of certification. In addition, all development will take place in compliance with Caltrans and Kern County limitations for encroachment into public rights-of-way.

Therefore, staff concludes that there will be no significant adverse impacts in the area of traffic and transportation as a result of the Sunrise project.

CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall comply with Caltrans and Kern County limitation on vehicle sizes and weights. In addition, the project owner or its contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for roadway use.

Verification: In the Monthly Compliance Reports, the project owner shall submit copies of any oversize and overweight transportation permits received during that reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-2 The project owner or its contractor shall comply with Caltrans and Kern County limitations for encroachment into public rights-of-way and shall obtain necessary encroachment permits from Caltrans and all relevant jurisdictions.

Verification: In Monthly Compliance Reports, the project owner shall submit copies of any encroachment permits received during the reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-3 The project owner shall ensure that permits and/or licenses are secured from the California Highway Patrol and Caltrans for the transport of hazardous materials.

Verification: The project owner shall include in its Monthly Compliance Reports, copies of all permits/licenses acquired by the project owner and/or subcontractors concerning the transport of hazardous substances.

TRANS-4 Prior to the start of construction, the project owner shall consult with Kern County, and prepare and submit to the Compliance Project Manager (CPM) a construction traffic control plan and implementation program which addresses the following issues:

- timing of heavy equipment and building materials deliveries;

- signing, lighting, and traffic control device placement;
- establishing construction work hours outside of peak traffic periods;
- emergency access;
- temporary travel lane closures;
- maintaining access to adjacent residential and commercial property; and
- off-street employee parking in construction areas during peak construction.

Verification: At least thirty days prior to start of construction, the project owner shall provide to the CPM for review and approval, a copy of its construction traffic control plan and implementation program.

TRANS-5 The project owner or its contractor shall install crossing structures and netting across major thoroughfares as a safety precaution and to reduce the potential for damage from falling construction materials or equipment during cable-stringing activities. Prior to start of construction, the project owner shall consult with Caltrans, and prepare and submit to the CPM a safety plan and implementation program.

Verification: At least thirty days prior to start of construction, the project owner shall provide to the CPM for review and approval, a copy of its safety plan and implementation program.

TRANS-6 Following construction of the power plant and all related facilities, the project owner shall meet with the CPM and Kern County to determine the actions necessary and schedule to complete the repair of all roadways to original or as near original condition as possible.

Protocol: At least thirty days prior to start of construction, the project owner shall photograph the primary routes to be used by construction traffic (from the junction of Hwy. 33 westerly along Midway Road to Mocal Road, north along Shale Road to the project site). The property owner shall provide the CPM and Kern County with a copy of these photographs.

Verification: Within 30 days of the completion of project construction, the project owner shall meet with the CPM and Kern County. The project owner shall provide a copy of a letter from Kern County acknowledging satisfactory completion of the roadway repairs in the first Annual Compliance Report following start of operation of the Sunrise project.

TRANS-7 Prior to start of construction, the project owner shall 1) conduct a detailed traffic analysis at the Intersections of State Route 119 / Midway Road to determine if additional roadway improvements will be needed during the peak construction period, and 2) meet with Caltrans to determine scheduling of either temporary or permanent roadway improvements, based on the traffic analysis.

Verification: Traffic analysis shall be completed at least 30 days prior to start of project construction. The project owner shall provide a copy of a letter from Caltrans acknowledging acceptance of the traffic improvements in a Monthly Compliance Report within 30 days of receipt of the letter.

REFERENCES

Caltrans - Caltrans Office of System Planning - personal communication with M. Frausto.

Community of Buttonwillow - Buttonwillow Community Development Plan, 1974

Kern County - Kern County General Plan, 1992

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.

OTP (Office of Transportation and Planning/Frausto) 1999a. Thank you letter and comments on Sunrise's review of the Project. Submitted to California Energy Commission on January 22, 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) 1999k. Sunrise Cogeneration and Power Project Data Adequacy Worksheets. Submitted to Commissioners David Rohy, Jananne Sharpless, Michal Moore, William Keese and Robert Laurie on February 5, 1999.

CEC (California Energy Commission) 1999l. Request for Agency Participation in the Review of the Sunrise Cogeneration and Power Facility Project Application for Certification. Submitted to Kern County Environmental Health/Brownfield on January 29, 1999.

CEC (California Energy Commission) 1999m. Submitted to the Agency Distribution List the Sunrise Cogeneration and Power Project Supplemental Material on February 5, 1999.

NOISE

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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 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 nearest noise sensitive receptors to 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 L₅₀ (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, and 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 would be classified as Sensitive Land Uses. There are no schools, hospitals or other sensitive receptors within a 2.5-mile radius. 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**

Monitoring Location	Overall 24-Hour Noise Level A-weighted, decibels)		
	L _{eq}	L _{dn}	CNEL
Derby Acres site (Site 1)	48.8	51.2	52.3
Highway 33 site (Site 2)	61.5	--	--
Proposed facility site (Site 3)	53.9	57.6	57.7

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	101	89
	Dump truck	91	
	Rock drill	98	
Concrete pour	Truck	91	78
	Concrete mixer	85	
Steel erection	Derrick crane	88	87
	Jack hammer	88	
Mechanical	Derrick crane	88	87
	Pneumatic tools	86	
Clean-up	Truck	91	89
	Steam blow (unmuffled)	110 @ 1,000'	

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.

Construction Phase	Maximum estimated noise levels at receptors during construction (in dBA)			
	Highway 33 (Site2)		Derby Acres (Site 1)	
	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 L₅₀ 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 expects that noisy construction will be performed during the daytime hours (see **NOISE-6**, below for definition of daytime hours), 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 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 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.

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.

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.

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 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. These equipment and their 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 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	39.1	49.2	53.0
Highway 33 site (Site 2)	7,040	53.9	46.7	54.7	58.9

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. The hourly noise levels measured in Derby Acres were all above an L_{eq} of 39 dBA. Ambient noise levels may be somewhat lower in Derby Acres, since attenuation will cause the actual noise from the plant to be lower than the levels modeled here.

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 emission will be below the broadband plant noise. Therefore, any equipment tonal emission will not be distinctly audible at any off-site locations.

The cumulative impact in Derby Acres of the maximum noise levels from the project (39.1 dBA) does not exceed the Kern County limit of 40 dBA for a nighttime L_{50} . The nighttime L_{50} measured in Derby Acres was 43.2 dBA (from L_{eq} of 49.2 dBA). With the addition of the maximum L_{eq} predicted by the modeling, the nighttime L_{50} in Derby Acres would be 44.6 dBA (from L_{eq} of 54.7 dBA).

The L_{eq} impact from the project at the residences on Highway 33 is estimated to be 46.7 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 increase to as much as 52.7 dBA. Although the existing and cumulative noise at the Highway 33 residences is above the Kern County desirable maximum L_{50} , this 2.7-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 commits 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 is below the L50 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.

CUMULATIVE IMPACTS

Requisite 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 an adverse noise impact 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 two (2) occupational noise surveys, one during plant construction and the second during plant operation. 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. Both surveys 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 shall implement, at a minimum, 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.
4. Employ an acoustical specialist to participate in the design, procurement and installation phases of the Sunrise project in order to ensure that the Sunrise project will comply with Cal-OSHA.

COMMUNITY

Follow-up Evaluation of Plant Noise: Following completion of the Sunrise project, and after a suitable period of runtime operation, the applicant shall make field noise measurements at key locations (where possible use the same location as pre-

construction noise survey). The field noise measurements shall 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.

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 L₅₀ under normal operating conditions. If the results from the survey indicate that power plant noise levels are in excess of 40 dBA L₅₀ 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).

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- Edison Electric Institute. Electric Power Plant Environmental Noise Guide, 1984.
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**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		
	0		Threshold of Hearing
Source: Peterson and Gross 1974			

SUBJECTIVE RESPONSE TO NOISE

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

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

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

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

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

1. Except under special conditions, a change in sound level of one dB cannot be perceived.
2. Outside of the laboratory, a 3 dB change is considered a barely noticeable difference.
3. A change in level of at least five dB is required before any noticeable change in community response would be expected.
4. A 10 dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

COMBINATION OF SOUND LEVELS

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

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

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

$$L_{dn} = 10 \log (1/24)[15 \times 10^{(L_d/10)} + 9 \times 10^{(L_n+10)/10}]$$

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

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

NOISE ATTENUATION

$$[L_p] \text{ (at } x = r) = [L_p] \text{ (at } r = y) - 20 \log(x/y).$$

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

$$\Delta_{Loss} = 20 \log (x/y).$$

Special case where $x = 2y$

$$\Delta_{Loss} = 20 \log (2y/y). = 20 \log (2) = 6$$

∴ As we double the distance, from a point source in free space, the noise level decreases by 6 dB.

VISUAL RESOURCES

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 project 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 Sunrise project. 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 Sunrise project 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 Sunrise project 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 20 feet in diameter. The two combustion turbine inlet air filters would be approximately 56 feet tall and 50 feet across. The feedwater storage tank would be approximately 35 feet tall and 100 feet wide.

The facilities in the rest of the power train are generally less than 30 feet high. The other plant facilities include the water treatment facilities, two cooling towers, 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 be 14 feet high. Five of the six plant buildings will be 12 feet tall and single story; the control/electrical building will be 20 feet high.

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 Sunrise Project 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 Sunrise project 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, and d 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 Figures 3a, b, c, and d 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.

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

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	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 lines 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

With La Paloma Transmission Line

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.

Without La Paloma Transmission Line

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 midground. . 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

With La Paloma Transmission Line

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.

Without La Paloma Transmission Line

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 KRG/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 to submit a color plan. The plan would be submitted at an early time so that any precolored buildings, structures and linear facilities can have colors approved and included in bid specifications for such buildings or structures.

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 treatment plan for the project to the California Energy Commission Compliance Project Manager (CPM) for review and approval. The treatment plan shall include:

- specification, including color samples and 11" x 17" color simulations, of the treatment proposed for use on project structures, including structures treated during manufacture;
- a detailed schedule for completion of the treatment; and,
- a procedure to ensure proper treatment maintenance for the life of the project.

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

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

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

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

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

Verification: Not later than 60 days prior to ordering any structures that are to be color treated during manufacture, the project owner shall submit its proposed plan to the CPM for review and approval.

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

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 non-reflective.

Protocol: At least 30 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 will be non-reflective.

If the CPM notifies the project owner that revisions of the 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 non-reflective fencing, 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 outside the project boundary;
- 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, 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 Within 60 days after first electricity generation, the project owner shall implement a landscape plan that meets the requirements of the Kern County Zoning Code.

Protocol: The project owner shall submit to the CEC 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:

- 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 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 trees and shrubs shall not be planted before the plan is approved. The project owner shall notify the CPM when the trees and shrubs have been planted and are ready for inspection.

Verification: At least 90 days prior to the start of commercial operation of the project, the project owner shall submit the proposed landscape plan for the project 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 notify the CPM within seven days after completing the proposed planting that the planting is ready for inspection.

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

REFERENCES

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- 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.
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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 significant effect on the environment to mean a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance. (Cal. Code Regs., tit.14, 15382.) Appendix G, subdivision (b), of the Guidelines state that a project will 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

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CULTURAL RESOURCES

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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.

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 or construction of the project.

Three aspects of cultural resources are addressed in this analysis: prehistoric and historic archaeological resources, and ethnographic resources.

PREHISTORIC RESOURCES

Prehistoric archaeological resources are those materials relating to prehistoric human occupation and use of an area; these resources may include sites and deposits, structures, artifacts, rock art, trails and other traces of prehistoric 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 archaeological 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 state requirements, cultural resources must be greater than 100 years old to be considered historic resources, while under federal requirements, such materials are considered if they are greater than 50 years old.

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 cross 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.
- Section 106 of the federal guidelines (16 U.S.C. 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 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 archaeological 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 the lead agency determines whether a project may have a significant effect on “unique” archaeological resources; if so, an EIR shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, 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 disposal.

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

Verification: According to the Application for Certification (AFC), there are no applicable local LORS (AFC 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 (Forrest 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 western 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. The Kern River typically floods each year and these lakes formed in the low spots of the flood plain. At its highest watermark, the Buena Vista Lake covered an area of 760 square miles. The shorelines of ancient Lake Buena Vista are located less than twenty miles east and southeast of the Sunrise project area. 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; Cult 1998a; SCPP1999m).

Verification: 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 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 and then eastward to 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 heading 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.

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 Route A and G from further consideration.

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; Cult 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 prehistoric lakes were surrounded by great marshy sloughs and wetlands that were well populated by animals and waterfowl, offering a wide variety of food and material resources for prehistoric peoples. The potential cultural resource sensitivity of the region is greatest near the water resources (SCPP 1998a; Cult1998a).

Verification:

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, Cult1998a).

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 (ybp). 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; Cult1998a).

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, Cult1998a).

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, Cult1998a).

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, 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, Cult 1998a, and Grant 1978).

Thus, portions of the project area may have been influenced archaeologically 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; Cult 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 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. In 1772 an expedition led by Pedro Fages visited a Yokuts village on the shores of Lake Buena Vista. Visits by European explorers increased in the early 1800s but the southern San Joaquin Valley remained relatively sparsely settled for some time. 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, 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; Cult 1998a; LPGP1998e;).

Much of the proposed project area has been considerably disturbed by on-going oil production. Petroleum extraction began in Kern County 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 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, Cult 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;).

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 state-wide 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 world-wide markets (SCPP 1998a, LPGP 1998a).

As described in the AFC, known historic 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 (SCPP1998a).

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 re-locate previously recorded sites during their pre-AFC surveys and provided maps and information to update the records at the regional information center (SCPP 1998a; Cult 1998a).

For project construction and operation, the 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- (500) foot buffer zone around the power plant site and associated areas for parking and laydown or storage. The project site APE also included the routes for most linear facilities and access roads (SCPP 1998a, Cult 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, Cult 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; Cult 1998a; Cult 1998b; Cult 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; Cult 1998a).

The pre-AFC, pedestrian survey (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 (AFC 1998a Cult 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 1998a; Cult 1998a, Cult 1999c).

POWER PLANT SITE AND IMMEDIATE LINEAR FACILITY ROUTES

The Sunrise project site is located in the Midway-Sunset Oil Field, approximately 3 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 as part of the Texaco California Inc.(TCI) Utility Corridor which is being constructed independent of the Sunrise project (SCPP 1998a)

TCI CORRIDOR

This approximately 4-mile, multi-utility corridor has been under construction since 1998. The final updates to the 20-inch pipeline to connect to an alternative natural gas supply are expected to be completed in 2000. This utility corridor project, although it will be used by the proposed Sunrise project, was permitted by other agencies and is being constructed separately to 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 this utility corridor. The agencies did require notification if any cultural resource materials were found.

Staff compared maps of the 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 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 must include this utility corridor in its discussion of cumulative impacts on cultural resources.

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 debris 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 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 would thus not be eligible for listing on the National Register (SCPP 1998a, Cult 1998a).

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 (SC&PP 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 (SC&PP 1999e, Cult 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.

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. An additional eight sites were discovered during the

post-AFC surveys and some of these new sites incorporated previously known sites and/or isolates.

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)

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. (Cult 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 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 register, no determination of potential eligibility has yet been made for several of these sites(Cult 1999c)

At several locations within the Area of Potential Effect (APE) and elsewhere, within 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 re-located during pre-AFC surveys. While the berms and the railroad alignment are of potential historic interest, they have been considerably altered and would no longer meet the eligibility criteria for the National Register (SCPP1998a; Cult 1998a).

Additional information on D, E, and F for the now-preferred route B was expected to be filed on July 1999. The information presented in these filings was not available at the time this analysis was prepared.

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.

ARCHITECTURAL RECONNAISSANCE

Due to a long history of oil production that continues today, land in the project area and along 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, most of this material no longer has 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 registered Native American representatives for each part of the state who can assess the potential for a specific project to impact Native American sites or values.

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 June 1999, there were no responses to the applicant's letters or inquiries (Cult 1998a; Cult 1999c).

SUMMARY OF KNOWN 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 22 previously recorded isolates, 15 previously recorded sites, and 8 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 2 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.

Additional testing was recommended to assist in the determination of eligibility. These sites have both prehistoric and historic components. 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 chosen to act as a reviewing and responsible agency for this project. Staff expects BLM to review its analysis and offer comment during public workshops on the preliminary staff document.

CATEGORIZATION OF IDENTIFIED 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 impacts to the resources and the mitigation that may be required to ameliorate any such impacts.

Under federal law, only historic 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 historic 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 (or 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 represent a significant distinguishable entity whose components may lack individual distinction; or (e) that have yielded or may be likely to yield, information important to history or prehistory. Isolated finds, by definition do not meet these criteria. The state has a similar set of criteria.

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.

Finally, CEQA contains a statute addressing “unique” archeological resources. It establishes limitations on analysis and prohibits imposition of mitigation measures for impacts to archeological resources that are not unique (Public Resources Code, section 21083.2). The statute also provides a definition of unique archeological resources. The CEQA Guidelines do, however, state that this prohibition does not apply when an archeological resource has already met the definition of a historic 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.

EFFECTS

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. Project-related impacts may be categorized in several, inter-related ways. Impacts to cultural resources may either be temporary or permanent effects that could be associated with site preparation, project construction, project operation, and/or project closure. Project-related impacts may also result either directly or indirectly during the pre-construction, construction, operation, and/or closure of the project.

TEMPORARY EFFECTS

Temporary effects occur primarily during those phases of the project associated with disturbance of the ground during pre-construction vegetation removal and site preparation; during activities associated with project construction, such as cutting and filling, grading, excavation, trenching, augering, or pile driving; and during activities associated with the construction and use of parking or storage areas, conductor pulling sites or tower laydown sites. Potential temporary effects to a cultural resource may occur if sensitive resource areas are used for parking or storage because any resources present could be dislocated or damaged. Typically, once the activity is completed the potential for impacts is alleviated.

PERMANENT EFFECTS

The potential for permanent effects to occur to cultural resources would be associated with direct damage or destruction of previously unknown resources that are unexpectedly encountered during construction ground disturbance. Permanent effects may also occur with the construction and use of new access roads to an area previously inaccessible. Ongoing maintenance to pipelines and other linear facilities have the potential to effect cultural resources over an extended period of time.

DIRECT AND INDIRECT IMPACTS

Direct impacts are those which may result from the immediate disturbance of resources, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, or excavation. Indirect impacts are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource materials due to improved accessibility to sensitive resources areas.

Often the potential for project construction activities to impact previously unknown cultural resources cannot be fully evaluated until the sub-surface soils are exposed by excavation, trenching, and/or augering. A determination of the potential for discovery of cultural resources can be made, based on the results of the literature review and the field surveys. The numerous known sites of historic interest near

portions of the project site or 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.

When a potential for discovery of cultural resources has been identified through a literature search and intensive field surveys, there is a potential that project-related construction may impact cultural resources actually present. The potential for discovery of cultural resources does not measure the full significance of individual artifacts or other cultural resources discovered, 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 determined by a qualified cultural resource specialist and often can only be determined 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 1000 foot corridor surrounding the proposed power plant site area or within and adjacent to the corridors of project-related alternative transmission routes. There is a potential for construction of the transmission facilities to impact 13 known cultural sites unless final design avoids construction in the vicinity of these resources. Many of the known resources 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, Cult 1999c).

For this project, the majority of potential impacts to cultural resources would be associated with the construction phase of the project. 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 known, as well as previously unknown cultural resources. However, the day to day operation of the Sunrise power plant is not expected to have any significant impacts on the region's cultural resources. Staff has proposed mitigation that addresses the potential for impacts to both known, and unknown resources. Given the sensitivity of much the area for the presence of cultural resources, it is likely that additional cultural resources may be discovered during construction. At this time the number of sites that can't be avoided is unclear. Where a the cultural resouces specialist has determined the presence of cultural resources in sensitive areas the plan is to avoid them, if possible. Archaeological methodology will be used to determine the presence and significance of sites, in conjunction with CEC staff, as construction proceeds.

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 sea level. Soil in this area has been previously disturbed by oil and gas production. After the site is leveled, the power generation equipment will be supported by concrete mat foundations built at grade level (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 20-inch natural gas supply pipeline will run approximately 60 feet to connect with the TCI facility. Construction of the foundation footings for the above-ground 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 area is irrigated agricultural land. Most of the route is accessible from existing roads. Nearly thirty known cultural resource sites and nearly 25 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 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 *00 feet and could extend up to a maximum of **00 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 6 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 (Cult 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.

CUMULATIVE IMPACTS

Cumulative impacts to cultural resources may occur if increasing amounts of land are cleared and disturbed for the development of multiple projects in the same vicinity as the proposed project.

The 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.

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.

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. (Cult 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, 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.

In a supplement to Appendix D of the AFC (confidential), the applicant discussed several additional mitigation measures for the now preferred Transmission route B. 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 (Cult 1999c).
- 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.

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 excavations would be a 1-meter by 1 meter unit, hand-dug and using appropriate archaeological methods and techniques, or it would be a mechanical excavation using an auger or a backhoe.

- 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.

Verification:

- 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 (Cult 1999c).

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, has received a copy of the AFC and the related confidential cultural resource reports prepared by the applicant's consultants. The BLM is expected to review this staff analysis document and provide any comments and recommendations for cultural resource mitigation and data recovery.

STAFF'S PROPOSED MITIGATION MEASURES

Commission staff concurs with the mitigation measures proposed by the applicant in the AFC. Staff at the BLM office for the Caliente Area is expected to review this staff document and provide comments during staff workshops. Commission staff has suggested additional language to clarify the measures presented by the applicant in the AFC and in supplemental filings. In addition to the applicant's proposed mitigation, staff's recommendations have been incorporated into a series of conditions of certification that 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.

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 20 known recorded sites within the Sunrise project APE, 2 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.

However, two areas, located between MP 9.5 and MP 14.2 of the transmission line route, contain sites that previous cultural resource specialists have suggested as potentially eligible for the National Register. (These mile-post designations correspond roughly to Sunrise Route B MP 19 to MP 25.) Additional testing by mechanical excavation was conducted to provide further information for the eligibility determination. The AFC also notes that the 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. The applicant does recommend that any project-related excavation in the vicinity of these sites should be closely monitored (LPGP 1998e, Cult 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 "historic 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 the comments of the BLM archaeologist.

Staff has incorporated the various cultural resource mitigation measures into a proposed set of conditions of certification for the Sunrise project. These conditions are set forth 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. The cultural resource conditions of certification are presented as a means of anticipating potential impacts and they are expected to reduce any potential for adverse impacts to historic resources to a less than significant level.

Staff concludes 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 believes 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.

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, and site excavation activities), 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:

- a. The statement of qualifications for the designated cultural resource specialist shall include all information needed to demonstrate that the specialist meets the minimum qualifications specified in the US Secretary of Interior Guidelines, as published by the State Office of Historic Preservation (1983). The minimum qualifications include the following:
 - b. a graduate degree in anthropology, archaeology, California history, cultural resource management, or a comparable field;
 - c. at least three years of archaeological resource mitigation and field experience in California; and
 - d. at least one year's experience in each of the following areas:
 - e. leading archaeological resource field surveys;
 - f. leading site and artifact mapping, recording, and recovery operations;
 - g. marshalling and use of equipment necessary for cultural resource recovery and testing;
 - h. preparing recovered materials for analysis and identification;
 - i. determining the need for appropriate sampling and/or testing in the field and in the lab;
 - j. directing the analyses of mapped and recovered artifacts;
 - k. completing the identification and inventory of recovered cultural resource materials; and
 - l. Preparing appropriate reports to be filed with the receiving curation repository, the SHPO, all appropriate regional archaeological information center(s).
 - m. The statement of qualifications for the designated cultural resource specialist shall include:
 - n. a list of specific projects the specialist has previously worked on;
 - o. the role and responsibilities of the specialist for each project listed; and
 - p. 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 showing the final project design and site layout, and 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.

Protocol: 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 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, 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 and description of the mitigation team organizational structure and the inter-relationship of team roles and responsibilities. Specification of the qualifications of any professional team members.
- 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 US Secretary of Interior standards and requirements for the curation of cultural resources.

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 CEC-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 reporting and work curtailment procedures.

CUL-6 The designated cultural resource specialist 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 has 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 Throughout the project construction period, the project owner shall provide the designated cultural resource specialist and the CPM with a current schedule of anticipated monthly project activity (presented on a week-by-week basis) and a map indicating the area(s) where 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: The project owner shall provide the designated cultural resource specialist and the CPM with a week-by-week schedule of the upcoming construction activities, one month in advance, as well as maps showing where the construction activity is scheduled to take place. These advance schedules are to be provided to the CPM with the Monthly Compliance Report.

CUL-8 Throughout the pre-construction reconnaissance surveys and the construction monitoring and mitigation phases of the project, the designated

cultural resources specialist 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 report on the progress or status of cultural resource-related activities. The project owner shall provide the weekly summary reports to the CPM for review and approval.

The designated resource specialist 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 is available for periodic audit by the CPM.

Throughout the project construction period, within seven (7) days after the end of each work week, the project owner shall provide to the CPM the weekly summary report.

CUL-9 The designated cultural resource specialist 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 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-11 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-12 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-13 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-14 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-15 Prior to beginning earth-disturbing activities for transmission line construction along Route B, MP 5 to MP 6 and MP19 to MP 25, the project owner shall:

1. Design the transmission line, in the area between MP 5 to MP 6, to span the sensitive cultural resource site area or enter the existing Midway-Sunset facility without the installation of transmission line poles.
2. In the area between MP 5 to MP 6 and MP 19 to MP 25, if it is not possible to span potential cultural resources, at each area of ground disturbance, the cultural resource specialist will survey the area. 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 weekly to the CPM.

REFERENCES

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- Cult (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.
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- 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.
- 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.
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- CEC (California Energy Commission) 1999ff Summary of the April 22, 1999, Data response Workshop. Submitted to the Meeting Attendees on May 18, 1999.
- 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.
- 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.

SOCIOECONOMICS

Joseph Diamond¹

INTRODUCTION

Socioeconomics deals with the relationship of economics to other academic disciplines such as psychology, sociology, politics etc. Generally, a California Energy Commission (Energy Commission) staff socioeconomic impact analysis evaluates the project induced changes on community services and/or infrastructure and related community issues such as environmental justice and facility closure. Cumulative impacts are also included. This analysis discusses the potential impacts of the proposed Sunrise project on local communities, community resources, and public services, pursuant to Title 14 California Code of Regulations, Section 15131.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The following LORS are applicable to the Sunrise Cogeneration and Power Company (SCPC) project:

FEDERAL

Executive Order 12898, "Federal Actions to address Environmental Justice (EJ) in Minority Populations and Low-Income Populations." The order focuses federal attention on the environment and human health conditions of minority communities and directs agencies to achieve environmental justice as part of this mission. The Executive Order requires the US Environmental Protection Agency (EPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this problem. Agencies are required to identify and address any disproportionately high and/or adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations. The Energy Commission receives federal funds and is thus subject to this Executive Order.

STATE

CALIFORNIA GOVERNMENT CODE, SECTION 65996-65997

As amended by SB 50 (Stats. 1998, ch. 407, sec. 23), states that public agencies may not impose fees, charges or other financial requirements to offset the cost for school facilities.

LOCAL

Kern County General Plan - Public facilities component pertinent to socioeconomics.

¹ The cumulative impacts section is a joint product of Dale Edwards and Joseph Diamond.

(Policy No. 8) In evaluating a development application, Kern County will consider impacts on the local school districts.

(Implementation E) Determine the local cost of facility and infrastructure improvements and expansion which are necessitated by new development of any type and prepare a schedule of charges to be levied on the developer at the time of approval of the Final Map.

SETTING

Sunrise is located in the rural oil fields of western Kern County. For a full description of the socioeconomic setting, please refer to the Project Description section of this document and the project description and location (8.8.2) in the Sunrise AFC, Vol. I., December 1998 (SCPP 1998a). The study area (affected area), defined by Sunrise Cogeneration and Power Company (SCPC) in the socioeconomics section of the AFC, includes: western Kern County, Arvin, Bakersfield, Buttonwillow, Maricopa, McFarland, McKittrick, Taft, Shafter, Wasco, and the unincorporated areas of Fellows, Ford City, and Derby Acres. These communities are within a one-way commute distance of the power plant site where construction and operations workers may live.

IMPACTS

Staff reviewed the Sunrise AFC, Vol. I, December 1998, socioeconomic section (SCPP 1998a & 1999a1) regarding potential impacts to community services and infrastructure (i.e., employment, housing, schools, utilities, emergency and other services), and environmental justice. Based on its independent review and the SCPP socioeconomic data provided and referenced from governmental agencies and trade associations, staff finds the AFC's socioeconomic analysis acceptable and agrees with its conclusions with the exception of the cumulative impacts on schools and the fire department which are described herein.

Staff criteria for assessing socioeconomic impacts or possible impacts is evolving. Fixed limits are used for housing (a 5 percent or less of permanent available housing) and EJ which has a threshold of 50 percent for minority/low-income population. Criteria for subject areas such as fire protection, water supply and wastewater disposal are handled by other staff. Educational impacts are subjectively determined but are moot as described later in the testimony. And finally, impacts such as medical services, law enforcement, community cohesion etc. are based on subjective judgements or input from local agencies.

EMPLOYMENT

SCPC states in the AFC that 66 percent of the non-local construction workers (approximately 20 workers at peak construction) are expected to live in Bakersfield. These are results that staff would expect because more amenities are available in Bakersfield when compared to the communities closer to the project site. Furthermore, the results indicate that approximately 22 percent or 6 workers will likely live in Taft or Maricopa, 11 percent or about 3 workers will likely live in Shafter

or Wasco, and about one worker will live in other areas of Kern County and Southern California.

The Impact Analysis For Planning (IMPLAN) model (an input-output model), used in the AFC by SCPC to estimate employment impacts from the Sunrise project on the affected area, is widely used and acceptable to staff. The University of California at Berkeley uses the IMPLAN model and it has been used to assess other generating projects in the area. It is a common regional economic tool. In general, most multipliers are estimated by showing the total change divided by the initial change. Employment multipliers refer to the total additional employment stimulated by the new economic activity. IMPLAN is a disaggregated type of model which divides the (regional) economy into sectors and provides a multiplier for each sector (Lewis et al. 1979). The employment multipliers used by La Paloma (3.23 for construction e.g., each new construction job supports approximately 2.2 indirect and induced jobs in the regional economy (La Paloma 1998) and 2.88 for operations) are within an acceptable range of 2 often cited by many economists. The 2.88 multiplier for operations is based on a large electrical facility, the Midway-Sunset power plant, in Kern County (Smith 1999).

Project construction is expected to occur over a 15 month period. The peak construction, when the highest number of workers will be needed, is expected to occur in the 7th through 11th months of construction. The greatest number of construction workers, estimated to be 255 workers, will be needed in the 9th month of construction. Approximately 225 of these workers are expected to come from the communities in the affected area (within a two-hour commute radius), and approximately 30 are expected to relocate from communities outside of the two-hour commute radius.

The number of construction workers needed outside of the peak construction period will range from fewer than 100 in the first three months of construction to approximately 78 workers in the 15th month of construction. The average number of non-local workers needed for power plant construction will be 23. During operation of the project, about 24 workers will be needed to maintain and operate the project. Approximately 12 (50 percent) of these operations workers may be non-local in a worst-case scenario estimate according to SCPC.

The total employment, estimated by SCPC using an IMPLAN multiplier of 3.23 for construction, is the equivalent of 517 jobs (which includes 357 secondary jobs), based on an average of 160 project-related construction jobs. For project operations, an average of 24 jobs with an IMPLAN multiplier of 2.88 for operations results in an equivalent of 69 total jobs (which includes 45 secondary jobs).

HOUSING

Permanent housing is considered to be in short supply if the vacancy rate is less than five percent (Cleary 1989). As of January 1998, approximately 81,932 housing units existed in Bakersfield, 3,364 in Shafter, 4,114 in Wasco, 2,405 in Taft, 2,076 in McFarland, and 455 in Maricopa. There are approximately 94,346 total housing units in these communities which are within a two-hour commute. The

vacancy rate for this housing averages approximately five percent. Therefore, approximately 5,148 single-family, multi-family and mobile homes are available. In addition, as of May 1998, there are approximately 5,469 total motel/hotel rooms in four of the six communities, with the availability being about 30 percent on average or 1,641 rooms. The combination of housing and motel/hotel rooms probably available to non-local construction and operations workers for this project is more than sufficient for worker needs.

SCHOOLS

Based on an average of 23 non-local construction workers and 12 non-local plant operating personnel, 23 school-aged children for plant construction and 12 school-aged children for plant operation are estimated to be added to the affected area schools. According to Table 8.8-14 in the AFC, six of thirteen affected area high schools are over capacity. Schools in western Kern County, west of Bakersfield, appear to be well below capacity in most cases and are estimated to receive 8 school-aged children during construction and 4 school-aged children during plant operation. The addition of project-related children to schools that are at- or over-capacity may increase costs in terms of supplies, equipment and/or teachers but the impact will be small. However, according to Senate Bill 50, signed by Governor Wilson on August 27, 1998, which amended section 17620 of the Education Code, school funding is restricted to property taxes and statutory facility fees collected at the time the building permit is acquired (\$.31 per square foot of covered or enclosed space). Public agencies may not impose fees, charges or other financial requirements to offset the cost for "school facilities." School facilities are defined as "any school-related consideration relating to a school district's ability to accommodate enrollment." Local and state agencies are precluded from imposing (additional) fees or other required payments on development projects for the purpose of mitigating possible enrollment impacts to schools (SB 50 1998).

The life of the Sunrise power plant is estimated by SCPC in the AFC to be a minimum of 20 years. Property taxes on the plant have been estimated to be \$1.75 to \$1.95 million in the first year for use on infrastructure and services such as schools, government, and social programs and services with about \$1.18 million allocated to education.

UTILITIES, EMERGENCY AND OTHER SERVICES

The West Kern Water District can meet the project's water supply needs with existing capacity. There are abundant electric supply options available for construction. During construction or operation, the project is not expected to place significant demands on the Kern County Fire Department or the Westside District Hospital.

FINANCIAL

SCPC estimates (SCPP 1999a1, AFC pp. 8.8-33 & 35) that the construction payroll will be \$18-23 million (1998 dollars) for 15 months, and the operation payroll will be \$1 million (1998) dollars for a minimum of 20 years, the bulk of which will be spent in the affected area communities. SCPC estimates that \$95 to \$105 million worth of materials and equipment will be purchased locally during construction and that

about \$1.0 to \$1.2 million will be spent locally for operating supplies annually for a minimum of 20 years. This spending will generate sales tax revenues for the local jurisdiction (about one percent for the county, and about 6.25 percent for the State, for a total of 7.25 percent).

ENVIRONMENTAL JUSTICE

The EJ screening analysis contained in the AFC (SCPP 1999a1, AFC pages 8.8-6 to 8) is consistent with the federal EJ guidelines, and the analysis is acceptable to staff. According to the federal EJ guidelines, a minority or low income population exists if the minority or low income population percentage of the affected area is fifty percent of the affected area's general population or greater.

The EJ analysis in the AFC indicates that the affected area's minority population is less than 50 percent. According to the data presented in Table 8.8-3 in the AFC, 36 percent of the affected area population are non-white, based on 1990 US Census Data. More recent minority population data for the total affected area was not available. However, using estimated 1998 minority and total population data for Bakersfield (SCPP 1998a, AFC page 8.8-6), the growth area of Kern County, staff concludes that the affected area would still fall below the 50 percent threshold, at an estimated 43 percent, to establish EJ as an issue. In addition, the highest low-income population percentages is for Arvin at 31 percent. Therefore, further EJ analysis is not necessary.

CUMULATIVE IMPACTS

Cumulative impacts might occur when more than one project has an overlapping construction schedule that creates a demand for workers that can not be met by local labor, resulting in an influx of non-local workers and their dependents. At the time of filing of the SCPP AFC, four other power plant projects were identified in the vicinity of the Sunrise project. The SCPP AFC included a discussion of cumulative impacts and concluded that there were none.

Several power plant projects in western Kern County have either filed AFCs or are expected to soon. La Paloma filed their AFC on July 15, 1998. SCPC filed an AFC on December 21, 1998 for a 320MW cogeneration project which will be located near the community of Fellows. Elk Hills Power Plant Project filed an AFC on February 24, 1999 for a 500MW combined cycle power plant to be located at Elk Hills. AFCs are expected to be filed for the Midway-Sunset and Pastoria projects in September and October 1999, respectively.

Additional facilities for the Sunrise project that might be important for cumulative impacts are the TCI Main Utility Corridor, the 20-inch gas pipeline interconnecting the KRGTC/MPC natural gas pipeline, and any future Midway-Sunset oil field expansion where the steam will be provided by the Sunset project, including new leaseholds, property acquisitions, and steam sales to business entities other than Texaco and its subsidiaries, occurring within the area affected by the Sunrise project during the life of the project. "The Sunrise project has no current plans to engage in steam sales to any third party other than TCI.... Any other TCI Midway-

Sunset oilfield expansion activities would occur independent of the Sunrise Project.” (SCPP 1999g, DR 55) The new oil field development, the TCI corridor and natural gas pipeline will be built largely with local labor so no additional impacts were estimated. (SCPP 1999g, DR 56 and Dailey 1999) The electric transmission line will have construction impacts that are small and short- term and in a worst-case scenario would likely be insignificant since construction workers are not likely to bring their families. Indeed, the SCPC has indicated (alternative A which appears in Socioeconomics Table 1) that it included electric power transmission construction workforce estimates in the SCPP AFC. Electric power transmission options B-F result in fewer total construction workers at the peak period (i.e., to 251 from 255) and total non-local workers would fall (i.e., to 29 from 30). Furthermore, the electric power transmission operation workforce remains unaffected by any electric power transmission option. (SCPP 1999m, AFC Transmission Supplement 2, pages 3.8-1 to 3.8-5)

SOCIOECONOMICS TABLE 1 shows the estimated number of workers by month for the estimated construction schedules for each of the power plant projects identified above. There are approximately nine months that the five projects will have overlapping construction schedules. During this period, the total number of workers needed for all five projects ranges from approximately 1,274 to over 1,718². As of April 1999, the number of unemployed workers in the Kern County labor force was 37,400 out of a total civilian labor force of 282,600 or 13.2 per cent (State of California – Employment Development Department, preliminary data, 1999).

Staff agrees that SCPC will primarily draw on the local labor force for construction and operation. No significant influx of permanent employee or secondary employment households is expected due to SCPC because Kern County has a large available labor pool. With the addition of each subsequent project into the construction phase, the ability of the available local labor force to meet project construction needs decreases. The cumulative need for workers in particular crafts or specialties will exceed the availability of workers in those crafts in the local area at different times based on the numbers of specialists available and the total number of specialists needed. Each of the currently filed projects has identified their forecast for local vs. non-local workers based on the available work force by craft and their estimate of worker availability based on other project needs.

La Paloma, likely the first of the five projects to start construction, estimates that 86 and 14 percent of their average worker needs will be supplied by local and non-local workers, respectively. For peak construction, the percentages remain relatively unchanged. SCPC's estimates are basically the same as La Paloma's. The Elk Hills AFC estimates 80 percent local and 20 percent non-local construction workers for average and peak periods. These estimates for local verses non-local workers are consistent with the availability of general construction laborers and the availability of workers in specific crafts in Kern County. There is sufficient housing available in Bakersfield and other communities closer to the project sites to meet all non-local worker needs.

² The number of workers for the Sunrise project's related facilities, such as the gas supply line and water line, were not available for their AFC analysis.

**SOCIOECONOMICS Table 1
Cumulative Construction Workers (Estimated)**

	La Paloma	Sunrise*	Elk Hills	Midway- Sunset West**	Pastoria **	Total
Year 2000						
Jan						
Feb						
Mar	53	64	111			117
Apr	76	75	128			151
May	146	96	142			244
Jun	222	142	195			364
Jul	304	157	241			461
Aug	403	197	306			711
Sep	467	233	333	111		939
Oct	555	241	352	128		1066
Nov	597	255	347	142		1189
Dec	637	237	329	195	72	1382
Year 2001						
Jan	665	213	317	241	140	1565
Feb	714	193	310	306	210	1756
Mar	729	124	231	333	289	1827
Apr	699	104	158	352	382	1884
May	625	78	124	347	444	1823
Jun	521			329	527	1694
Jul	399			317	567	1593
Aug	195			310	605	1341
Sep	141			231	631	1161
Oct				158	678	960
Nov				124	692	816
Dec					664	664
Year 2002						
Jan					593	593
Feb					495	495
Mar					379	379
Apr					185	185
May					134	134
June						

* Does not include the gas line and water line workers.

** AFCs not yet filed. The number of workers are estimated, based on generating capacity of the project, compared to the three projects that have filed AFCs.

Based on an average of approximately 1,706 workers during the six months of overlapping construction for all five projects, and using an IMPLAN construction multiplier of 3.23, approximately 3,804 secondary jobs are expected to result during that period. Staff does not expect a significant number of these jobs to be filled by non-local workers because these jobs are expected to be temporary, coincident with the construction schedule, and salaries associated with indirect and induced jobs generally do not attract new workers to an area. Over a period of approximately 21

months, secondary jobs, related to the construction of two or more of these projects at the same time, are expected to range from approximately 261 to 4,201.

Using an IMPLAN operation multiplier of 2.88, secondary jobs expected from the operation of the projects range from 111 for two projects to 246 for all five projects (based on estimates of 59 employees for La Paloma and Sunrise projects, and 131 employees for all five projects). These secondary jobs are estimated to be filled from the local work force.

Based on an estimated average of 258 non-local workers for all five projects during construction, and assuming the average family size to be 2.91 persons (State of California, Department of Finance 1998), approximately 235 children are estimated to be added to Kern County schools. These children will not enter and leave the schools at the same time, but will enter and leave schools over a period ranging from four to 19 months. During operation of the five projects, approximately 48 children are estimated to be added to western Kern County schools as a result of non-local workers relocating their families. The increase in school enrollments due to the five projects during construction will likely cause an impact on those schools in the Bakersfield area that are currently at or over-capacity. However, the increase in school enrollments due to the five projects during operation is not expected to cause an impact because students will attend many schools that are under-capacity and the number is relatively small and of a short duration. Indeed, many non-local workers may not bring their children so the estimates could be high. Schools that are expected to handle more students are expanding their overall capability to meet needs and school impacts fees and property taxes will help fund education.

The Kern County Fire Department (KCFD) provides emergency medical response for the proposed power plants. The KCFD believes that it has adequate resources to provide emergency medical response for the five power plants that have been identified in this cumulative analysis.

The KCFD fire fighting resources are sufficient to cover all five of the proposed power plant projects. However, the fire department has identified a need for one new ladder truck to maintain its current level of service and to effectively respond to the types of emergency incidents that occur at facilities such as the proposed power plant. Specifically, the fire department sees an increase in the number of emergency responses that will require High Angle and Confined Space Specialist Technicians and equipment. The fire department requires one new, properly equipped, ladder truck that will be assigned to Station 21 at Taft, nine new personnel to cover three work shifts per day, and a replacement ladder truck approximately 15 years in the future.

Currently, the County has three ladder trucks, two in service and one as a backup. All three trucks are located in the metropolitan Bakersfield area. The closest ladder truck is about 40 miles away from the four power plants proposed for western Kern County. This distance makes dispatching to the area where the power plants are planned unacceptable due to the excessive response time.

The KCFD estimates the cost of a new, properly equipped, ladder truck to be \$700,000, the cost of the first year's funding for the nine new personnel to cover three shifts per day for the ladder truck to be \$750,000, and the cost for the first year of a ladder truck replacement fund to be \$75,000. These costs should be paid by the four power plant projects currently proposed for western Kern County (La Paloma, Sunrise, Elk Hills and Midway-Sunset West) that will benefit directly from the new ladder truck. Because full property tax payments for these new power plants will not begin until approximately 18 months after start of construction, the fire department will require up-front payments from each of the power plant owners to cover the costs for the new ladder truck, staff for the truck, and the replacement truck fund.

The KCFD estimates that the new ladder truck will take nine months to be delivered once ordered. The need for the new ladder truck begins with the start of construction of the second power plant in western Kern County. Current estimates are that construction of the second power plant will begin approximately March 2000.

Staff is aware that La Paloma, LLC is in negotiations with the KCFD to reach an agreement on funding for the three items the fire department has identified as resource needs. This agreement is expected to involve up-front payments by La Paloma for the new truck, staffing and replacement truck fund. La Paloma will then be reimbursed by the County and/or the other power plant owners as appropriate.

According to the KCFD (Chaffin 1999), the fire department estimates that the Fire Fund share of the property taxes paid by the four projects expected in the Taft area will be approximately \$1,371,500 per year. This amount is based on the estimated property tax payments described in the AFCs for the La Paloma, Sunrise and Elk Hills projects. Taxes for the Midway-Sunset project were estimated based on the Elk Hills project (both are 500 megawatt projects).

The State Board of Equalization, at an April 21, 1999 Property Tax Committee meeting, formally decided to assess only power generating facilities with a Certificate of Public Convenience and Necessity (CPCN) using unitary valuation and allocation of revenues on a countywide basis. Thus, local collection and distribution of property taxes will apply to the La Paloma project and other power plant projects proposed for Kern County.

The Kern County Sheriff will provide police service for the five new projects, and existing resources are expected to be adequate to meet law enforcement needs during construction and operation of the five projects. Westside District Hospital serves the area for the five new projects, and their facility is expected to adequately meet medical service needs during construction and operation of the five new projects.

FACILITY CLOSURE

PLANNED CLOSURE

The SCPP AFC (see Facility Closure 4.0, pp. 4.1 to 4.3) provides for the inclusion of socioeconomic LORS which will be incorporated into the facility closure plan when it becomes necessary at the end of the project's economic life. The socioeconomic impacts of facility closure will be evaluated at that time.

UNEXPECTED TEMPORARY CLOSURE

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

UNEXPECTED PERMANENT CLOSURE

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

MITIGATION

Sunrise Cogeneration and Power Company contends that impacts to schools will be mitigated by the property taxes paid in connection with operation of the proposed project. Staff has determined that, even though a significant cumulative impact has been identified for Kern County schools during the construction period for four power plant projects in western Kern County, including the Sunrise project, with the changes to the Education Code resulting from the passage of SB 50 in 1998, school funding is now restricted to a combination of property tax revenues and a statutory development fee based on a project's covered or enclosed space.

A potential significant cumulative impact on the KCFD has been identified. This impact results from the construction and operation of the La Paloma and one-to-three other power plant projects in western Kern County (Sunrise, Elk Hills and Midway-Sunset West). The introduction of the new power plants in this area reduces the fire department's emergency rescue capabilities below acceptable levels. The owners of the Sunrise project should be required to pay the KCFD a share of the cost to bring the fire department's emergency rescue capabilities up to acceptable levels. The La Paloma, Sunrise, Elk Hills and Midway-Sunset West projects will also be required to pay a share of the fire department's costs for the new ladder truck, truck staffing and replacement truck. Should one or more of the Sunrise, Elk Hills or Midway-Sunset West projects not be certified as expected, La Paloma's share of the cost for the new ladder truck, truck staffing and replacement truck will change.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The estimated gross benefits from the project include increases in the affected area's property and sales taxes, employment, and sales of services, manufactured goods and equipment. For example, during average construction, 517 total jobs will be created or 360 indirect jobs. For average operations, 69 total jobs will be created with 45 indirect jobs. The annual property tax collected by the County will be \$1.75-\$1.95 million.

Staff agrees with SCPC's conclusions in the AFC that the project will not cause a significant adverse impact on the affected area's housing, schools, police, fire, emergency services, hospitals, utilities and employment if mitigation for the fire department is provided consistent with the proposed conditions of certification. The KCFD will be reimbursed by the County and/or the other power plant owners as appropriate.

Although staff identified a significant cumulative impact on schools as a result of the Sunrise and other new power plant projects in western Kern County, mitigation for the impact of schools is not possible under current state law.

The project, as proposed, is consistent with all applicable socioeconomic LORS. The proposed conditions of certification ensure compliance with LORS, and mitigation of the identified cumulative impact on the KCFD.

RECOMMENDATIONS

For the area of socioeconomics, staff recommends that, with the adoption of the following conditions of certification, the Sunrise project be approved.

PROPOSED CONDITIONS OF CERTIFICATION

SOCIO-1 The project owner shall pay the statutory school impact development fee as required at the time of filing for the "in-lieu" building permit with the Kern County Department of Engineering and Survey Services and Building Inspection.

Verification: The project owner shall provide proof of payment of the statutory development fee in the next Monthly Compliance Report following the payment.

SOCIO-2 Not later than 30 days after certification, the project owner shall reach agreement with the KCFD on the amount of funding SCPC will provide for the following:

- a) Purchase of a new 105-foot Pierce Quint Aerial ladder truck equipped for high angle and confined space rescues;
- b) First year funding for nine new positions for personnel to cover three shifts for the new truck; and

c) First year funding for a replacement ladder truck.

Verification: Not later than 45 days after certification, the project owner shall provide the CPM with a copy of an agreement with the KCFD for funding of items a) through c) above.

REFERENCES

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BIOLOGICAL RESOURCES

Rick York

INTRODUCTION

This section provides the California Energy Commission staff's analysis of potential impacts to biological resources from the construction and operation of the Sunrise Cogeneration and Power Company's (SPCC) 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 as of June 30, 1999 from the Sunrise Application for Certification (AFC) (SCPP 1998a), workshops, staff data requests and applicant responses (SCPP 1999d, Radian 1999f, Radian 1999g and Radian 1999h) site visits, and discussions with various agency representatives.

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.

CALIFORNIA CODE OF REGULATIONS

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

FULLY PROTECTED SPECIES

Fish and Game Code sections 3511, 4700, 5050, and 5515 prohibits take of animals that are 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.

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.

KERN COUNTY GENERAL PLAN ENERGY ELEMENT OF 1990

PART 1 - ISSUES, GOALS, POLICIES, AND IMPLEMENTATION

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 SSCP 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 (*Taxidea taxus*). Common amphibians and reptiles found in the region include western toad (*Bufo boreas*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), western rattlesnake (*Crotalus viridis*), and gopher snake (*Pituophis 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 SPCP 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 on the following page 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 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. The following table, Biological Resources Table 1, identifies those sensitive species:

BIOLOGICAL RESOURCES Table 1
- Sensitive Species -

Sensitive Plants	Status*
Forked fiddleneck (<i>Amsinckia vernicosa</i> var. <i>furcata</i>)	CNPS List 1B
California jewelflower (<i>Caulanthus californicus</i>)	CNPS List 1B/FE/SE
Slough thistle (<i>Cirsium crassicaule</i>)	CNPS List 1B
Gypsum-loving larkspur (<i>Delphinium gypsophilum</i> ssp. <i>gypsophilum</i>)	CNPS List 4
Recurved larkspur (<i>Delphinium recurvatum</i>)	CNPS List 1B
Hoover's eriastrum (<i>Eriastrum hooveri</i>)	CNPS List 1B/FT
Cottony buckwheat (<i>Eriogonum gossypinum</i>)	CNPS List 1B
Tejon poppy (<i>Eschscholzia lemmonii</i> ssp. <i>kernensis</i>)	CNPS List 1B
Kern mallow (<i>Eremalche parryi</i> ssp. <i>kernensis</i>)	CNPS List 1B/FE
Hollisteria (<i>Hollisteria lanata</i>)	CNPS List 1B
San Joaquin wooly threads (<i>Lembertia congdonii</i>)	CNPS List 1B/FE
Oil neststraw (<i>Stylocline citroleum</i>)	CNPS List 1B
Sensitive Wildlife	Status*
Tricolored blackbird (<i>Agelaius tricolor</i>)	SSC
LeConte's thrasher (<i>Toxostoma lecontei macmillanorum</i>)	SSC
California condor (<i>Gymnogyps californianus</i>)	SE/FE
Golden eagle (<i>Aquila chrysaetos</i>)	SC
Swainson's hawk (<i>Buteo swainsoni</i>)	ST
Long-eared owl (<i>Asio otus</i>)	SSC
Burrowing owl (<i>Athene cunicularia</i>)	SSC
Northern harrier (<i>Circus cyaneus</i>)	SSC
Yellow warbler (<i>Dendroica petechia</i>)	SSC
White-tailed kite (<i>Elanus caeruleus</i>)	FP
California horned lark (<i>Eremophila alpestris actia</i>)	SSC
Prairie falcon (<i>Falco mexicanus</i>)	SSC
Loggerhead shrike (<i>Lanius ludovicianus</i>)	SSC
Blunt-nosed leopard lizard (<i>Gambelia sila</i>)	SE/FE/FP
San Joaquin coachwhip (<i>Masticophis flagellum ruddocki</i>)	SSC
Western spadefoot toad (<i>Scaphiopus hammondi hammondi</i>)	SSC
Giant kangaroo rat (<i>Dipodomys ingens</i>)	SE/FE
Short-nosed kangaroo rat (<i>Dipodomys nitratooides brevinasus</i>)	SSC
Tulare grasshopper mouse (<i>Onychomys torridus tularensis</i>)	SSC
San Joaquin pocket mouse (<i>Perognathus inornatus inornatus</i>)	SSC
San Joaquin antelope squirrel (<i>Ammospermophilus nelsoni</i>)	ST
San Joaquin kit fox (<i>Vulpes macrotis mutica</i>)	ST/FE
American badger (<i>Taxidea taxus</i>)	SSC
Longhorn fairy shrimp (<i>Branchinecta longiantenna</i>)	FE
Vernal pool fairy shrimp (<i>Branchinecta lynchi</i>)	FE
Vernal pool tadpole shrimp (<i>Lepidurus packardii</i>)	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's Midway substation near Buttonwillow. On May 21, 1999, SCPC filed supplemental testimony (Radian 1999d) 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 PG&E's 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 packardii*).

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 (Radian 1999h), 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 need 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 (Radian 1999g and 1999h) 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 (Radian 1999g).

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 facilities that may result in direct, indirect, and cumulative impacts. The Sunrise Project Committee, in an order dated _____, adopted the joint blueprint as the guiding document for the environmental analysis of the project.

Information provided by the applicant (SCPP 1999d and 1999f) and Radian (Radian 1999h) 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)		Conserved lands (acres)	
	Permanent	Temporary	Permanent	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
IMPACT ACREAGE TOTAL	176.4

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 in 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. SCPC has provided (Radian 1999h) 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. This analysis identifies 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 Kern County Valley Floor Habitat Conservation Plan and the Kern County General Plan Endangered Species Element (County of Kern and U. S. Fish and Wildlife Service 1998). 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**.

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 SCPP, to be built in the region in the near future. In addition, the SCPP 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. In addition, a new 20-inch natural gas pipeline is currently being installed to link up with the new utility corridor and provide natural gas to the proposed SCPP power plant. In addition to these activities, there is the overall anticipated expansion of the Midway-Sunset Oil Field that is expected over the next few years.

Energy development habitat loss in western Kern County is an ongoing concern of the CDFG, the USFWS, and the Energy Commission since several state and federally listed species occur in the region. To address this habitat loss and impacts to species in western Kern County, CDFG and the USFWS look for habitat compensation when habitat losses are anticipated for all development projects including energy projects. They also require the implementation of take avoidance measures to minimize impacts to individual species.

For the SCPP, SCPC has indicated (Radian 1999g) 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 Sunrise project will contribute to any cumulative impact 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 local sensitive species than that which is being impacted.

For these reasons, staff does not believe that the project will create incremental effects that are cumulatively considerable; and the combined impact associated with Sunrise's incremental effect and the effects of other projects is therefore not 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. SPCP'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 (Radian 1999g) 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 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 sensitive species known to 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:

<u>TYPE OF HABITAT IMPACT</u>	<u>COMPENSATION RATIO</u>
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:

	<u>Impact Acreages</u>	<u>Comp. Ratio</u>	<u>Comp. Acreages</u>
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
<u>Temporary impacts to other private habitat</u>	<u>= 28.0 acres</u>	<u>x 1.1 =</u>	<u>30.8 acres</u>
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:

	<u>Impact Acreage</u>	<u>Comp. Ratio</u>	<u>Comp. Acreage</u>
<u>Permanent impacts other private habitat</u>	<u>= 176.4 acres</u>	<u>x 3.0 =</u>	<u>529.2 acres</u>
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 situated approximately 10 miles north of the proposed Sunrise power plant site. The 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.

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 acreage to its Lokern Preserve, so 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 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 (Radian 1999g) 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.

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 final Biological Resources Mitigation Implementation and Monitoring Plan (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. 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 draft BRMIMP.

Protocol:

3. 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 being implemented to protect these species during project actions, and reporting requirements should incidental take occur. New workers will receive training within 15 days of their first day of employment.

4. No more than 14 days prior to commencement of construction activities, a qualified biologist(s) shall conduct pre-activity surveys of proposed work zones 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.

5. Biological monitors (*a 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.

6. Pets shall not be permitted on the project site during construction activities.

7. All food-related trash shall be disposed of in closed containers only and regularly removed from the project site.

8. All spills of hazardous materials within listed species habitat shall be cleaned up immediately.

9. No firearms will be allowed in the project area.

10. All construction activities conducted during the project shall be confined to daylight hours, unless circumstances warrant night work and approval is obtained from CDFG and USFWS.

11. 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.

12. 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.
13. 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.
14. 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.

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.

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).
15. 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.

16. 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.
17. 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 CEC 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;
18. 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;

19. One year of field experience with biological resources found in or near the project area; and
20. 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:

1. Advise the project owner's Supervising Construction or Operations Engineer on the implementation of the Biological Resource Conditions of Certification,
2. 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
3. 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 Supervising Construction and Operations Engineer shall act on the advice of the Designated Biologist to ensure conformance with the Biological Resources Conditions of Certification.

Protocol: The project owner's Supervising Construction and Operating Engineer 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 Supervising Construction and Operating Engineer 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 During construction of the new oil production wells, steam injection wells, and appurtenant facilities related to the SCPP, the project owner and the Designated Biologist will implement Best Management Practices and take avoidance measures to minimize impacts to sensitive species and their habitat.

Protocol: The Designated Biologist will complete pre-construction surveys for active San Joaquin kit fox dens, blunt-nosed leopard lizards, giant kangaroo rats, or San Joaquin antelope squirrels no more than 30 days prior to the start of construction activities. If any of these species is found within the area to be disturbed, the Designated Biologist is to report the findings to the CPM at least 30 days prior to the start of construction. The CPM will contact the project owner within 5 working days to discuss how best to mitigate the potential impacts.

If no sensitive species are found during the pre-construction survey, but construction does not occur within 30 days of completion of the survey, the area proposed for construction must be re-surveyed and the previously mentioned reporting protocol must be followed if any sensitive species are found.

The Designated Biologist will also make certain that the following Best Management Practices are implemented:

1. Oil and gas operators and their contractors shall adhere to practices provided by the state's Division of Oil, Gas and Geothermal Resources (DOGGR) that conform to environmental protections for preserving the landscape of the oil field.
2. Sumps for the collection of wastewater or oil shall not be located in natural drainage channels. Sumps shall be constructed and maintained so as not to be a hazard to wildlife.
3. Open, unlined channels and ditches shall not be used to transport wastewater which is harmful to freshwater or wildlife.
4. Provisions for containment of spilled fluids from tank facilities shall conform to DOGGR requirements for spill prevention and control.
5. Well cellars shall be covered and kept drained. Gratings and flooring shall be maintained to prevent wildlife entry.
6. Production facilities (including tanks, pipes, wellheads, and separators) shall not have excessive leakage.
7. Leaks and spills shall be promptly repaired and cleaned up.
8. Oil field wastes, including oil, water, chemicals, mud and concrete shall be disposed of in a manner as not to cause damage to wildlife and plants, and in accordance with state and local regulations.
9. Upon well abandonment, holes and cellars shall be removed or filled with earth, and cleared of equipment and trash. Aboveground pipes will be removed, and roads no longer used will be ripped and allowed to revegetate.
10. Herbicides and pesticide shall be used only in accordance with existing law and manufacturers instructions.
11. Firearms are not allowed.
12. The speed limit is 20 mph on oil field roadways.
13. The area disturbed around the oil production well pad will be allowed to naturally restore.
14. New facility construction shall be designed to minimize surface site disturbance to the extent practicable. Construction shall utilize existing disturbed sites and/or facilities wherever practicable.

15. Vehicle travel for operation and maintenance purposed shall be limited to existing roadways whenever practicable. Construction of new roads shall be avoided if existing roads can be used.
16. New wells and other facilities shall be constructed at least 50 feet from banks of USGS topographic defined blue line drainage washes where practicable, unless otherwise permitted through the CDFG 1603 agreement process.

Verification: The above Best Management Practices and take avoidance 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 (including any new oil wells, new steam injection wells and steam lines, access roads, equipment storage areas, transmission lines, water and gas lines) 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: 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 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.

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 new oil production wells, steam injection wells, and appurtenant facilities) that will be implemented to avoid and/or minimize temporary habitat disturbances 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. 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 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 90 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.
- California Department of Fish and Game 1999. Natural Diversity Database Special Plants List. Biannual publication mimeograph, 119 pp.
- 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) 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/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.
- 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.
- 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.

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Submitted to the California Energy Commission, April 15, 1999.

SOIL & WATER RESOURCES

Joe O'Hagan

INTRODUCTION

This report analyzes the potential adverse environmental affects associated with the construction and operation of the Sunrise Cogeneration and Power Company's (SPCP) Sunrise Cogeneration and Power Project (SCPP) in Kern County. Specifically, this report examines the potential negative impacts on the soil and water resources due to construction and operation of the power plant and associated facilities. As the project is expected to disturb approximately 61 acres during construction and operation, the nature of the soils will be examined to determine whether or not erosion control measures provided by Texaco North American Production will adequately protect the soils of the project and adjacent areas. In addition, the potential for the Sunrise project to adversely affect water supplies and sources in the area will be examined, such as sources of water for plant operation and the potential of waste water and steam injection to damage sensitive water sources. This testimony also addresses the project's ability to comply with all applicable federal, state and local laws, ordinances and standards, identifies mitigation measures and recommends conditions of certification.

Surface water hydrology is addressed in the **Geology** section of this document. Soil contamination and solid waste disposal is discussed in the **Waste Management** section.

APPLICABLE LAWS, ORDINANCES AND STANDARDS

FEDERAL

WATER POLLUTION CONTROL ACT AND CLEAN WATER ACT

The Clean Water Act (33 USC section 1257 et seq.) requires states to set standards to protect water quality. Point source discharges to surface water are regulated by this act through requirements set forth in specific or general National Pollutant Discharge Elimination System (NPDES) permits. Stormwater discharges during construction of a facility and incidental non-stormwater discharges associated with pipeline construction also fall under this act, and are addressed through a general NPDES permit. In California, the nine Regional Water Quality Control Boards (RWQCB) administer the requirements of the Clean Water Act. The Central Valley Regional Water Quality Control Board has

LOCAL

Kern County Code of Building Regulations, Chapter 17.28 sets forth grading requirements.

ENVIRONMENTAL SETTING

SITE DESCRIPTION

The proposed Sunrise project is to be located three miles northwest of Fellows, California in southwestern Kern County. The proposed site currently lies at an elevation of 1,430 to 1,440 feet above mean sea level. Occupying approximately 31 acres, the Sunrise project will be constructed on alluvial fan deposits predominantly composed of Guijarral gravelly sandy loam and the Wellport-Elkhills Association. Underlying geologic units consist of the Bakersfield arch, composed of crystalline rocks, marine sedimentary rocks, and continental sedimentary deposits.

Water resources in the area of the facility include small volumes of water from annual streams and groundwater observed in continental sedimentary deposits intermixed with other geologic bodies at depths greater than 300 feet. With no permanent surface water resources and groundwater of very poor water quality due to previous petroleum production operations, water for operations requiring high quality water is to be provided by the West Kern Water District.

Approximately 15 miles of transmission lines will run east from the facility site to the substation and connect with the Midway-Wheeler Ridge double circuit owned by PG&E and DWR at the Valley Acres Substation at the California Aqueduct (SCPP 1998b). As with the facility site, soils in the transmission line areas are not currently used for agricultural purposes. Compared to the facility site and laydown area, 13 soil types will be encountered during associated construction. These soil types are described in the AFC in Table 8.9-2.

Construction of the transmission lines will disturb a total of 26 acres; ¼ acre of soil will be disturbed and 100 square feet of soil will be permanently removed from potential agricultural production at each support structure. While these soils, when undisturbed, have slight to moderate potentials for wind erosion and slight to severe potentials for water erosion, the hazard of erosion once uncovered by construction activities is severe.

No perennial water bodies are found within the site vicinity. Two small, ephemeral drainages cross the proposed power plant and construction lay down sites. The watersheds of these drainages are in the foothills of the Temblor Range, resulting in 2 streams that originate approximately 2.1 miles west of the facility site and flows east through the site to Buena Vista Creek. Nineteen annual streams crossing the first 3 miles of transmission line routes also drain into Buena Vista Creek. In addition, 20 annual streams cross the final 12 miles of transmission lines, flowing to Broad Creek (SCPP 1998b). Although Buena Vista Creek and Broad Creek are usually dry, both do have the potential of reaching the California Aqueduct in major precipitation events. Concern should be given to the erosion potential of major precipitation events and their ability to contribute sediment to the Aqueduct, a principal source of irrigation and drinking water.

Groundwater in the area of the Sunrise Project has not previously been utilized for agriculture due to high total dissolved solids (TDS) levels. Previous hydrogeologic investigations have indicated that groundwater can be found at depths no shallower than 300 feet (SCPP 1998b). This aquifer lies within a mixture of unconsolidated and consolidated continental sediments. Although previous research indicated the aquifer is unconfined, multiple clay lenses have been identified in the region that have the potential to significantly retard vertical percolation of groundwater, resulting in areas of perched bodies of groundwater (SCPP 1998b). Furthermore, previous petroleum activities throughout the region, including injection of wastewater, have resulted in water with TDS and salt concentrations undesirable for agricultural applications (SCPP 1998b).

WEST KERN WATER DISTRICT

The Sunrise Cogeneration and Power Project will lie within the boundary of the West Kern Water District (WKWD). This water district covers approximately 250 square miles of western Kern County and serves a population of approximately 25,000 people, residing in the Cities of Taft and Maricopa, as well as a number of unincorporated communities (WKWD 1997). The district also has approximately 400 connections for industrial users. The district's water supply is groundwater, deliveries from the State Water Project and mutual agreements with other water agencies in Kern County (LPLG 1998a). In water year 1995-1996, total water district water demand was 13,239 acre feet of water.

WKWD is entitled to 25,000 acre feet of State Water Project water per year through a contract with the Kern County Water Agency. An additional 10,000 acre-feet of State Water Project, known as interruptible water is also available to the district during wet years (WKWD 1997). WKWD receives the majority of its water through an in-lieu groundwater banking and pumping program with the Buena Vista Water District (BVWD). The BVWD water supply is groundwater and Kern River water. As part of the exchange, BVWD takes WKWD water from the California Aqueduct instead of pumping local groundwater (WKWD 1997). WKWD then can pump or bank a volume of groundwater that BVWD would have otherwise pumped. During high runoff years when flows in the Kern River are sufficient to meet its needs, BVWD can choose not to take the State Water Project water. At these times, WKWD is not entitled to pump groundwater.

The availability of State Water Project supplies is variable and subject to cutbacks during drought years. The district attempts each year to take the maximum amount of State Water Project available. SOIL & WATER RESOURCES Table 1 shows the amount of State Water Project water received, water acquired from other sources, water demand and water banked for water years 1990 through 1996.

As shown in this figure, the average volume of water banked by the District since 1979 is 11,468 acre-feet per year and the total water currently banked at the end of 1995-1996 water year is estimated at 216,503 (WKWD 1997; LPGP 1998a).

**SOIL & WATER RESOURCES Table 1
West Kern Water District Water Supply**

Water Year	SWP Entitlement	SWP Interruptible	Tehachapi-Cummings	Water Purchased	Water Sold	Water Banked
1990-1991	24,348	0	5,477	29,825	10,948	155,488
1991-1992	10,464	32	1,792	12,289	14,755	155,408
1992-1993	9,496	0	5,310	14,806	12,335	160,137
1993-1994	19,523	5,387	2,325	27,235	12,317	174,484
1994-1995	19,838	5,465	5,050	30,353	11,334	194,956
1995-1996	25,000	0	0	25,000	13,239	216,503
Total	108,705	10,884	19,945	139,508	74,928	-
Average	18,118	1,814	3,326	23,251	12,488	13,165

Source: WKWD 1997

The District's well field is located approximately 15 miles northeast of Taft in the Tupman area (WKWD 1997). Total peak production capacity of the six active wells is 99 acre-feet per day, but maximum daily usage averages approximately 41.5 acre-feet per day (WKWD 1997). The district has another agreement with the BVWD to pump 3,000 acre-feet of groundwater per year. This water cannot be banked and therefore the district uses this water first (WKWD 1997). The district must recharge the basin for the amounts pumped in excess of 3,000-acre feet. Average basin recharge between 1979 and 1996 has been 11,250 acre-feet (WKWD 1997). Because of water treatment requirements, groundwater is provided for all domestic uses.

ENVIRONMENTAL IMPACTS

PROJECT SPECIFIC IMPACTS

EROSION AND SEDIMENTATION

The construction of the facility will disturb approximately 61 acres, of which 26 acres consist of soils at the facility site. The remaining acres will be disturbed during the installation of concrete support structures for associated transmission lines and switchyard. Additional soil disturbance will be incurred by above ground piping for natural gas, steam, HRSG feedwater and wastewater interconnections. While pipeline construction should not require any significant amount of excavation, soil disturbance and compaction due to heavy equipment operation will occur.

Accelerated wind and water induced erosion may result from earth moving activities associated with construction of the proposed project. Removal of the vegetative cover and alteration of the soil structure leaves soil particles vulnerable to detachment and removal by wind or water. Typical of an arid environment such as the western San Joaquin Valley, rainfall may be intense, which greatly enhances the potential for water erosion. Grading activities may redirect runoff into areas more vulnerable to erosion. Areas where linear facilities cross drainages are also vulnerable to erosion.

Once the protective cover of vegetation is removed and the structure of the surface soil has been altered, however, all of these soils are highly vulnerable to erosion. Permanent and temporary land disturbance acreages directly affected by the different project elements are shown in SOIL & WATER Table 2 below.

SOIL & WATER RESOURCES Table 2

Disturbance Description	Temporary	Permanent
Power plant/laydown area	13.8	12.4
Sunrise switchyard	-	3.2
Steam/feed/wastewater lines	-	1.4
Freshwater pipelines	-	0.07
Natural Gas Pipeline	-	0.07
Start-up steam injection lines/wells	-	1.2
Access road improvements	-	3.5
Transmission line route*	17.6	8.2
Total	31.4	30.0

Source: SCPP 1998 *Worse case.

The existing topography at the power plant site will be leveled to 1,430 feet above sea level (ASL). Vegetation removal and earth moving activities are anticipated at the 23-acre laydown area. Similar soil disturbance will be expected for the installation of transmission lines and above ground interconnection pipeline systems. Topographic maps provided in the Soil and Water Resources Sections indicates a drainage flowing east to Buena Vista Creek to the south of the project where interconnections will be made. This annual stream is within 600 feet of the south boundary of the project site and could transport eroded soil particles from interconnection construction.

SCPP has proposed a transmission line corridor (Route B) with three alternatives (Routes D, E, and F). This corridor consists 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. The acreage disturbed for the transmission line corridor represents those alternatives that would disturb the largest area.

Transmission lines will be constructed along existing service/access roads to minimize soil disturbance from heavy equipment and reduce the need for the construction of new access roads.

During project operation, wind and water action can continue to erode unprotected surfaces. An increase in the amount of impervious surfaces can increase runoff, leading to the erosion of unprotected surfaces. SCPP (1999a, Data Response 59) has provided a draft Erosion Control and Stormwater Management Plan that identifies potential temporary and permanent erosion and stormwater runoff control measures. This plan is discussed further under Mitigation below. Streambed alteration permit requirements for transmission line crossing of natural drainages is discussed in the **Biological Resources** section of this document.

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 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. In addition to the new production and injection wells, the existing produced water facility will have to be expanded (SCPP 1999m). 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 (Radian 1999f).

Staff has estimated that these elements will disturb an additional 176.4 acres. For a discussion of how this figure was calculated, please see the **Biological Resources** section of this document.

The potential for erosion and sedimentation associated with development of the steamfield deal primarily with the generation of fugitive dust. The extensive earth moving activities associated with construction of the SCPP project will not be necessary for steamfield development. For fugitive dust control, please see the **Air Quality** section of this document.

WATER SUPPLY

The proposed SCPP facility will obtain water for domestic, fire fighting and evaporative make-up uses from the West Kern Water District (WKWD). The source of the West Kern Water District water is groundwater from wells located in the Tupman area. The project will connect to potable water lines used to supply the communities of Taft and McKittrick. SCPP will also use produced water from the TNAP oil fields for the heat recovery steam generators (HRSG). Produced waters refers to generally brackish groundwater brought to the surface during oil and

natural gas production. Oilfield produced water is filtered and softened at an existing TNAP water treatment facility two miles from the power plant site (SPCC 1999g, data response 66). Current capacity at the treatment facility is 125,000 barrels per day (16-acre feet per day). This will be soon expanded to 275,000 barrels per day (35-acre feet per day).

Produced water from the oilfield is treated by removing entrained oil using air flotation, removing suspended solids by using filtration units and reducing water hardness by using strong acid cation exchange water softeners (SCPP 1999e, data response 65). Incoming produced water on the average contains 100-ppm solids and oil and 210-ppm hardness (measured as CaCO_3) and 3,000-ppm total dissolved solids. Treated water has on the average 1-ppm solids and oil and less than 2-ppm hardness (SPCC 1999e).

Demineralized water supply for the combustion turbine generator wash, approximately 720 gallons per day (gpd), will be trucked in periodically as needed for on-line and off-line washing or produced on-site using a portable self-contained demineralizing system. SCPP will, on average, require 57,900-gpd from WKWD and 5,323,680-gpd from TNAP. Maximum water demand for WKWD and TNAP water supplies will be 203,760-gpd and 5,294,880-gpd, respectively (SCPP 1998). Because of higher operating temperatures, maximum make-up water demand for the HRSGs is actually less than the average demand. Average annual demand of WKWD is calculated to be 52.7 acre-feet while TNAP demand is calculated to be 5,670 acre-feet (SCPP 1998). Maximum annual water usage of WKWD and TNAP water supplies are calculated to be 61.57 acre-feet and 5,664 acre-feet, respectively (SCPP 1998). The water demands for produced water for the HRSGs are probably high, because low quality start-up steam for the HRSGs was to be disposed of through the use of two Class II injection wells on-site. Now, however, this steam will be condensated and recycled, reducing slightly the over all produced water demand. The project, over the course of a year, will operate in both average and maximum modes, therefore, actual annual water demand is probably somewhere between these two numbers.

Service of the proposed project by WKWD will not adversely affect the district's water supply. Domestic water supply demands within the district are projected to decrease in the future as oil field operations are anticipated to decrease (WKWD 1997). Peak water demand within the district during this time period occurred in 1983-84 when 17,403 acre-feet of water were sold (WKWD 1997). Demand for WKWD has generally declined over the last 25 years and has significantly declined between 1984 and 1999. However, if domestic water demands were to increase or water supplies were to decrease due to drought conditions, WKWD would be able to rely on banked water supplies to provide for SCPP demands (SCPP 1998).

The use of produced water for the vast majority of project water needs will not adversely affect groundwater resources. The quality of produced water, although it varies greatly, is not suitable for domestic and agricultural uses. Generally, produced water resulting from oil field operation is re-injected into the aquifer. Use of this water source by the project reduces demand on fresh water supplies.

WATER QUALITY

Incorrect disposal of wastewater, contaminated stormwater runoff or inadvertent chemical spills can degrade soil, surface water and groundwater. SCPP (1998a; 1998b) has proposed to manage all waste streams in order to prevent the contamination of surfacewater and groundwater bodies. As mentioned earlier, erosion can contribute a significant amount of sediment to local streams when soils are disturbed due to facility construction operations. Construction operations will adhere to NPDES, SWPPP, and BMPs to ensure minimal pollution of surface waters from erosion. All runoff and liquids entering facility drains will be collected and routed to the Valley Waste system for appropriate disposal.

Groundwater in the area of the SCPP is the most likely body of water to be threatened by facility operation. As noted above, groundwater is encountered beneath the project site at depths as deep as 300 feet. Approximately 300-gpd of septic waste will be disposed of in a septic tank and tile leach field. (SCPP 1998a). According to SCPP, this septic system will by serving 20 or more people per day in a commercial environment, this system may potentially be included in the proposed Environmental Protection Agency Class V injection well regulations. These proposed regulations state that new cesspools serving 20 or more people per day and discharging waste in an area that is a potential source of drinking water will be banned. SCPP states that groundwater in the vicinity of the proposed facility is of quality unsuitable for drinking water as "TDS levels in the Tulare formation range from 4,000-21,000 ppm according to DOGGR...(and do not) meet (secondary) drinking water standards of secondary Maximum Containment Levels of 500ppm," (SCPP 1998). However, the enforcement of this restriction on cesspools is contingent on the completion of the State of California's Source Water Assessment Program (SWAP), to be completed and approved by the EPA in May 2003. Upon completion, any region with potable bodies of groundwater will be required to enforce the proposed cesspool regulations.

A second source of potential groundwater contamination is the disposal of wastewater and certain stormwater runoff streams through injection wells by Valley Waste Disposal Company. The waste stream will originate from off-line combustion turbine generator washing, wastewater from the transformer sump drains and various facility drains that is pooled in an underground waste water tank prior to transport to Valley Waste Disposal Company's Buena Vista II injection wells.

Stormwater that could be potentially contaminated will be collected from curbed or walled areas covering approximately 0.18 acres in size and routed to the underground storage tank prior to being routed to Valley Waste with other project wastewater streams for disposal. Containment areas are enclosed by curbs with a minimum height of 12 inches. Based upon a 100-year, 24 hour storm, SPCC (1999e) estimates that stormwater runoff flows to the wastewater disposal tank would be 14 gpm. The capacity of the disposal tank is 7,500 gallons. The capacity of the pumps transferring the wastewater to the pipeline to Valley Waste is 500 gpm, more than sufficient capacity to handle the anticipated flows.

The stormwater generated in areas not subject to contact with contaminants will

drain to drainage ditches and directed off site to natural drainage channels. Drainage issues are discussed further in the **Geology** section of this document.

The project applicant has indicated that it is their belief that because drainage would be segregated that a NPDES General Industrial Permit is not required. SPCC (1998) estimates that 7,200 gpd (171 barrels per day) will be discharged to Valley Waste. The anticipated quality of the wastewater is shown in **Soil & Water Resources Table 3** below.

In addition, an unspecified volume of produced water will result from the addition of new production wells due to the availability of steam from the project. In general, the volume of produced water is equal to the amount of steam injected for thermal enhanced oil recovery. Excess produced water will be also be disposed of through injection wells at Valley Waste. Texaco Corporation, International (TCI) is entitled to dispose of up to 63,644 barrels per day (8.2 acre feet per day). In addition, water softener re-generation brine from the water treatment facility is sent to Valley Waste for disposal. Currently, approximately 12,000 barrels per day is discharged to Valley Waste. Valley Waste has sufficient capacity to accommodate the additional volumes from new production wells as well as from the power plant (Bright 1999).

The Valley Waste facility which is proposed for use by SCPP is the Buena Vista Facility #2. This facility is located approximately 3 miles from the proposed project site and consists of evaporation ponds and Class II injection wells. Only non-hazardous wastewater is accepted and oil field related waste flows, such as the wastewater from SCPP, must be disposed of through Class II injection wells. Class II injection wells are defined as those wells associated with oil and gas field operations and are permitted by the Division of Oil, Gas and Geothermal Resources (DOGGR).

In addition, SCPP (1998) originally proposed that two Class II underground injection wells be constructed at the site to dispose of low-quality HRSG steam (SCPP 1998). Now, however, SCPP (Soares 1999) plans to condensate the steam and recycle the water.

**SOIL & WATER RESOURCES Table 3
Expected Wastewater Quality**

Constituent	Concentration (mg/l)
Ca (as CaCO ₃)	74
Mg (as CaCO ₃)	11
Na (as CaCO ₃)	104
SO ₄ (as CaCO ₃)	40
Cl (as CaCO ₃)	44
M-Alkalinity (as CaCO ₃)	106
SiO ₂	19
PH	6.5-7.5
Oil and Grease	72
TDS	299

Source: SCPP 1998; 1999e

CUMULATIVE IMPACTS

Temporary and permanent disturbance associated with construction of the proposed project will cause accelerated wind and water induced erosion. Mitigation measures proposed by SCPP should ensure that the proposed project would not contribute to cumulative erosion and sedimentation impacts (SCPP Data Response 1999). In addition, proposed linear facilities and structures will not remove any currently productive agricultural lands from cultivation. The reliance on produced water for facility operations will avoid any impacts on local drinking or agricultural supply and will not result in any appreciable changes in water allocations or new water rights.

FACILITY CLOSURE

A planned, unexpected temporary or permanent closure of the proposed SCPP should not be a significant concern if the injection wells, site drainage, and potential for erosion are properly dealt with for any possible closure. DOGGR have requirements for the closure of injection wells. The RWQCB may require a bond to ensure proper closure of the wells. Unexpected permanent closure may pose the threat of drainage and erosion problems due to a lack of maintenance of the facilities. Staff will require SCPP to address this concern in their closure plan.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

At this time, the project is concurring with all required LORS. Verification of potential drinking water sources per completion of the local SWAP will be required before the construction and operation of the septic tank and associated leach field. As stated above, Commission staff does not anticipate the presence of any underground sources of drinking water.

MITIGATION MEASURES

SPCC PROPOSED MEASURES

PROTECTION OF SOIL RESOURCES

- Soil-1:** Prepare a detailed Erosion Control Plan prior to construction and implement the plan during and after construction. Surface soil protection may include the use of mulches, synthetic netting material, and riprap; the installation of a sediment detention basin on the downgrade edge of the Sunrise Project site; and the compacting of native soil.
- Soil-2:** Conduct all grading operations in compliance with the Kern County Grading Ordinance.
- Soil-3:** Conduct all construction activities in accordance with California's General Industrial Storm Water Permit for Construction Sites, including the erosion control measures under Soil-1 and Best Management Practices (BMPs) to reduce erosion and the transport of increased suspended sediment from construction areas.
- Soil-4:** Stabilize soil in areas that will be disturbed by construction but not compacted or covered by pavement or concrete structures. This stabilization will apply in particular to the areas disturbed by construction of the transmission line supports. To stabilize the areas, 4-inches of topsoil should be selectively removed, stored, and replaced. In areas of excavation, soil should be graded and compacted to ensure that removed soil is not left in irregular piles that are more susceptible to water and wind erosion. Seeding will be performed in the areas where natural vegetation has been distressed or removed by construction activity.

SCPP (1999h, Data Response 59) has provided a draft Erosion Control and Stormwater Management Plan that identifies temporary and permanent erosion and stormwater control measures. Furthermore, the intent of this plan, when finalized, is to serve as the stormwater pollution prevention plan as required under the General Construction and Industrial Activity Stormwater Permits issued by the State Water Resources Control Board.

The draft plan identified a number of potential best management practices for the construction and operation phases of the project.

BEST MANAGEMENT PRACTICES THAT REDUCE EROSION AND SEDIMENT-LADEN STORMWATER RUNOFF

- Mulching on disturbed soils or in combination with temporary or permanent seeding strategies;
- Direct runoff away from disturbed areas by means of temporary drainage ways;
- Stabilize plant site roadways with compaction or gravel;

- Utilize soil stabilizers as appropriate and as required in Air Permit conditions;
- Straw bale barriers to intercept sediment-laden runoff from small areas of disturbed soil;
- Check dams to reduce erosion of existing drainage channels and to promote sedimentation behind the dam;
- Silt fencing to promote sedimentation behind silt fence; and
- Stormwater retention basins to retain runoff and allow excessive sediment to settle out.

BEST MANAGEMENT PRACTICES TO PREVENT STORMWATER CONTAMINATION

- Provide secondary containment for hazardous material delivery and storage areas to prevent spills or leakage of fluid materials from contaminating soil or soaking into the ground;
- Covered dumpsters and waste containers; and
- Designate storage areas for construction wastes.
- Provide for proper storage of hazardous materials, paints, and related products;
- Train employees on the proper use of materials such as fuel, oil, asphalt and concrete compounds, acids, glues, solvents, etc.;
- Implement a spill prevention and control plan;
- Timely remove construction wastes; and
- Store all liquid wastes in covered containers.

PROTECTION OF WATER RESOURCES

- Water-1:** Designs and construction practices will minimize soil erosion during construction and operation of all associated facilities. The site drainage plan will conform to the Kern County Flood District Design and Procedure Manual.
- Water-2:** Stormwater management during operation will consist of collecting stormwater from within bermed and confined areas and will be routed to the TNAP wastewater interconnection to the Valley Waste system
- Water-3:** Equipment refueling and maintenance during construction will be performed within designated areas consistent with BMPs. Spill contingency plans will be prepared and followed where appropriate.
- Water-4:** During construction of transmission lines, existing roads will be used as much as possible.
- Water-5:** During construction, a buffer area will be established using stakes or fences along the intermittent drainage. No heavy equipment operation will be permitted within those areas to ensure the drainage will not be disturbed.
- Water-6:** During operation, the minimum conditions required to maintain exemption from the California General Stormwater Permit will be

maintained and documentation sufficient to certify those conditions will be retained onsite.

SPILL PREVENTION

Spill containment measures will be provided for chemical storage. The containment structure for the aqueous ammonia storage tank will be sized for 110 percent of the tank capacity. All other chemical storage tank and all outdoor containment structures will have a volume equal to at least the capacity of the largest single tank in the contained area. Concrete curbs will be provided for anhydrous ammonia delivery areas. At this time, SSCP has not indicated that precipitation events are considered in the design of containment structures. Storm events must be considered in designing spill control structure as precipitation may fill the basin and allow the spilled product to breach the containment structure berms.

SITE DRAINAGE

The site drainage system will be designed to comply with all applicable federal, state, and local regulations. Onsite drainage will be accomplished by gravity flow, whenever possible. Runoff with possible contamination will be routed to a wastewater drain tank prior to discharge to the TNAP wastewater interconnection. All other runoff will flow through the facility by gravity through cement culverts and ditches. Once off site, uncontaminated runoff waters will follow existing natural drainage patterns (SCPP 1998).

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that the proposed SSCP will not cause an adverse significant impact to soil and water resources and will likely comply with all applicable laws, ordinances and standards.

CONDITIONS OF CERTIFICATION

SOILS&WATER 1: Prior to beginning any clearing, grading or excavation activities associated with project construction, the project owner will develop and implement a Storm Water Pollution Prevention Plan (SWPPP).

Verification: Two weeks prior to the start of construction, the project owner will submit to the Energy Commission CPM a copy of the Storm Water Pollution Prevention Plan (SWPPP).

SOILS&WATER 2: Prior to the initiation of any earth moving activities, the project owner shall submit an erosion control and revegetation plan for staff approval. The final plan shall contain all the elements of the draft plan with changes made to address the final design of the project.

Verification: The final erosion control and revegetation plan shall be submitted to the Energy Commission CPM for approval 30 days prior to the initiation of any earth moving activities.

REFERENCES

- Bright, Larry. 1999. Valley Waste Management. Telephone conversation with Mary Elizabeth (California Energy Commission), March 19.
- Hardey, T. 1999. Kern County Environmental Health. Telephone conversation with Jason Vestal (California Energy Commission), June 18.
- SCPP (Sunrise Cogeneration and Power Project) 1998a. Application for certification (98-AFC-4). Submitted to the California Energy Commission, December 21.
- SCPP (Sunrise Cogeneration & Power Project) 1999e. Data Responses – SET ONE. Submitted to the California Energy Commission on March 31, 1999.
- SCPP (Sunrise Cogeneration & Power Project) 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.

GEOLOGICAL AND PALEONTOLOGICAL RESOURCES

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 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 AFC, in Sections 8.14.5, 8.15.4, 18.16.1 and Appendix I Section 2.2 (SC&PP 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 the investigation, design, (Chapters 16 and 18) and construction (including grading and erosion control as found in Appendix Chapter 33) that were based upon the UBC that 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 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.

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 the second supplement to the AFC 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, HYDROCOMPACTION, EXPANSIVE SOILS

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 (SC&PP 1998a). Eleven soil borings were advanced as a part of a preliminary geotechnical investigation for the Sunrise project, including route "A". The low unit weight of the soils, low to moderate moisture content of soils, and the presence of soils that were potentially prone to collapse at the Midway-Sunset site give Energy Commission staff reason to be concerned about the potential for collapsing soils. 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 foundation types selected by the applicant will have to take into consideration the potential for collapsible soils.

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 (SC&PP 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 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 site. 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.

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.

IMPACTS

SITE SPECIFIC IMPACTS

The project 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, and no paleontological resources are known to be within the footprint of the powerplant. 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 is nearing completion. The report is understood to (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 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.

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 Chief Building Official (CBO) prior to the start of construction, the project owner shall submit to the CPM for approval 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 the following: A final description of the geology of the site and any new information disclosed during grading, and 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.

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: At least ninety (90) days prior to the start of construction, 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 mitigation team leadership and organizational structure, and the inter-relationship of tasks and 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;
- 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: At least sixty (60) days prior to the start of construction on the project, 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: At least (30) thirty days prior to the start of project construction, 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.
- SVP (Society of Vertebrate Paleontologists). 1994. Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources: Standard Procedures. October.

FACILITY DESIGN

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 applicable LORS, and in a manner that protects environmental quality and assures 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 applicable LORS, and 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. The SCPP is located on a 20-acre site, in Section 23, Township 31 South, Range 22 East in western Kern County, California. The Sunrise project 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 (SCPP 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 (SCPP 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, and which staff believes are essential to ensuring that the project is designed in a manner which protects the environment and/or public health and safety.

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 the SCPP 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 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

¹CBO is the City or County Chief Building Official, his or her representative or the California Energy Commission's duly appointed representative.

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), portable water, plumbing and sanitary sewage systems.

MECHANICAL LORS AND DESIGN CRITERIA

The application (SCPP 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 (SCPP 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 90°C in 40°C ambient air with a maximum emergency overload temperature of 130°C and a short circuit temperature of 250°C. 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, 66 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 208 or 480 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.

The AFC (SCPP 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

NO_x 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 NO_x 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 1,000 feet in length and 30 inches in diameter will be constructed north of the site fence-line to interconnect with two steam injection wells. 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 applicable LORS, and also 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.

In the event that the SPPP 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 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.

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).

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, self-cleaning.
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.	
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.	2,130 gpm.	From tank to HRSGs.
1	Feedwater storage tank.	2.4 million gal.	To feed water pumps.
1	Demineralized water-unloading pump.	200 gpm.	Truck to tank.
1	Demineralized water storage tank.	18,800 gal.	
1	Wastewater tank.	7,500 gal.	
2	Wastewater transfer pump.	250 gpm.	To TNAP.
1	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.	--	107.5 dia.	36
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 tank.	--	7 dia.	26
1	Switchyard control building (Sunrise).	40	20	14
1	Switchyard buses and towers.	700	230	35
1	Switchyard Control Building (Valley Acres).	30	80	20
1	Switchyard control building.	20	20	14

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 (or a lesser number of days mutually agreed to by the project owner and the CBO) 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 project owner 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 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 13.8 kV and lower 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, 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 the items 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.
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- 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.
- 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.

POWER PLANT RELIABILITY

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. Such a level of reliability is selected 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 (SCPP 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 (SCPP 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 (SCPP 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 (SCPP 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 (SCPP 1998a, AFC §§ 2.4.1, 2.4.5). In conjunction with an overall plant quality control program (SCPP 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-inch diameter gas line from the new TCI twenty-inch diameter gas line located in the TCI Main Utility Corridor (SCPP 1998a, AFC §§ 1.6.5, 2.2.5). The applicant plans to purchase gas supplies on the open market through KRGTC/MPC (SCPP 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 (SCPP 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 (SCPP 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 (SCPP 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 (SCPP 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 (SCPP 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 (SCPP 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.

CUMULATIVE IMPACTS

The reliability, or lack thereof, of this project cannot be affected by the reliability of any other nearby projects. Likewise, this project's reliability cannot affect that of other nearby projects. Since this project is expected to be built to normal industry standards of power plant reliability, staff believes the potential for cumulative electric system reliability impacts is nil. Any system reliability impacts that might accrue from multiple nearby power plant projects are dealt with in that portion of this document entitled **Transmission System Engineering**.

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

- 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.
- 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.
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POWER PLANT EFFICIENCY

Steve Baker

INTRODUCTION

PROJECT DESCRIPTION

Sunrise Cogeneration and Power Project (SCPP) proposes to construct the Sunrise project, 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). Sunrise 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 Sunrise project 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 Sunrise project 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. Sunrise 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 LHV¹ (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 Sunrise project (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 Sunrise project will require development of any new sources of energy.

COMPLIANCE WITH ENERGY STANDARDS

The efficiency standards applicable to the Sunrise project 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 Sunrise project could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce or eliminate those

¹ Lower heating value.

impacts. 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

Sunrise 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.

Sunrise 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 Sunrise project, however, is intended largely to satisfy a cogeneration need; electric generation is not necessarily the prime consideration.

Economically, the chosen configuration yields substantial benefits because the HRSGs will be fed produced water from the TNAP oilfield. A combined cycle cogeneration unit would instead require immense quantities of very high quality water, in order to protect the steam turbine from catastrophic damage. The difficulty and expense of providing this demineralized water, and additional high quality water for the cooling system that would also be required, easily justify SCPC's decision to build a simple cycle cogeneration plant instead of a combined cycle (SCPP 1998a, AFC § 5.3.4).

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 Sunrise project 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 ISO² conditions (GTW 1998).

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

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.

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 (GTW 1998). Given the minor efficiency improvement promised by the G-class turbine, SCPC's decision to purchase an "F-class" machine is not unreasonable.

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, while an evaporative cooler promises slightly higher operating efficiency on dry days. Capital and operating costs are higher for the chiller. 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 psig³ 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 Sunrise project 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.

³ Pounds per square inch, gage.

⁴ These milestones must be achieved on an annual basis.

CUMULATIVE 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.

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 Sunrise project, 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 Sunrise project would present no significant adverse impacts upon energy resources.

No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

RECOMMENDATION

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

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TRANSMISSION SYSTEM ENGINEERING

Mark Hesters and Al McCuen

INTRODUCTION

The Transmission System Engineering (TSE) analysis provides the basis for the findings in the Energy Commission's decision. This preliminary staff analysis indicates whether or not the transmission facilities associated with the proposed project conform to all applicable laws, ordinances, regulations and standards (LORS) required for safe and reliable electric power transmission.

The Sunrise Cogeneration and Power Company (Sunrise) proposes to connect their project, the Sunrise Cogeneration and Power Project (SCPP) to Pacific Gas & Electric Company's (PG&E) transmission system. The California Independent System Operator (Cal-ISO) is responsible for ensuring electric system reliability for all participating transmission owning utilities and determines both the standards necessary to achieve reliability and whether a proposed project conforms with those standards. The Energy Commission will rely on the Cal-ISO's determinations to make its finding related to applicable reliability standards, the need for additional transmission facilities, and environmental review of the whole of the project. In this case, staff is primarily a facilitator, coordinating the Cal-ISO's process and results with the certification process and the Energy Commission decision. The Cal-ISO will provide testimony at the Energy Commission's hearings.

Staff's analysis also evaluates the power plant substation, outlet line, termination facilities and outlet alternatives identified by the applicant and provides proposed conditions of certification to ensure that the project complies with applicable LORS during the design, construction, operation and potential closure of the project.

Public Resources Code, section 25523 requires the Energy Commission to "prepare a written decision...which includes: ...findings regarding conformity of the proposed site and related facilities...with public safety standards...and with other relevant local, regional, state, and federal standards, ordinances, and laws." Under the California Environmental Quality Act (CEQA) the Energy Commission must conduct an environmental review of the "whole of the project," which may include facilities not licensed by the Energy Commission (CCR, tit. 14, §15378). Therefore, the Energy Commission must identify and evaluate the environmental effect of construction and operation of any new or modified transmission facilities beyond the project's interconnection with the existing transmission system that are required as a result of the power plant addition to the California transmission system.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), "Rules for Overhead Electric Line Construction", formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to

persons engaged in the construction, maintenance, operation or use of overhead electric lines and to the public in general.

- CPUC Rule 21 provides standards for the reliable connection of parallel generating stations connected to participating transmission owners.
- Western Systems Coordinating Council (WSCC) Reliability Criteria provides the performance standards used in assessing the reliability of the interconnected system. These Reliability Criteria require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. The WSCC Reliability Criteria includes the Reliability Criteria for Transmission System Planning, Power Supply Design Criteria, and Minimum Operating Reliability Criteria. Analysis of the WSCC system is based to a large degree on WSCC Section 4 "Criteria for Transmission System Contingency Performance" which requires that the results of power flow and stability simulations verify established performance levels.

ce levels are defined by specifying the allowable variations in voltage, frequency and loading that may occur on systems other than the one in which a disturbance originated. Levels of performance range from no significant adverse effect outside a system area during a minor disturbance (loss of load or facility loading outside emergency limits) to a performance level that only seeks to prevent system cascading and the subsequent blackout of islanded areas. While controlled loss of generation, load, or system separation is permitted in extreme circumstances, their uncontrolled loss is not permitted (WSCC 1998).

- North American Electric Reliability Council (NERC) Planning Standards provides policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC's Criteria for Transmission System Contingency Performance. The NERC planning standards provide for acceptable system performance under normal and contingency conditions, however the NERC planning standards apply not only to interconnected system operation but also to individual service areas (NERC 1998).
- Cal-ISO Reliability Criteria also provide policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC's Criteria for Transmission System Contingency Performance and the NERC Planning Standards. The Cal-ISO Reliability Criteria incorporate the WSCC Criteria and NERC Planning Standards. However, the Cal-ISO Reliability Criteria also provide some additional requirements that are not found in the WSCC Criteria or the NERC Planning Standards. The Cal-ISO Reliability Criteria apply to all existing and proposed facilities interconnecting to the Cal-ISO controlled grid.
- Cal-ISO Scheduling Protocols and Dispatch Protocols require conformance with NERC, WSCC, and Local Area Reliability and Planning Criteria. These standards will be applied to the assessment of the system reliability implications of the Sunrise project. Also of major importance to the Sunrise project, and other privately funded projects which may

sell through the California Power Exchange (Cal-PX) are the Cal-ISO Day/Hour Ahead Inter-zonal Congestion Management Scheduling Protocol (SP 10), the Transmission System Loss Management Scheduling Protocol (SP 4), and the Creation of the Real Time Merit Order Stack (SP 11). The Congestion Management Scheduling Protocol provides that the operation of power plants not violate system criteria when market participants request generation dispatch or the use of major interties. The Real Time Merit Order Stack is developed based on increasing energy bid prices so that the least cost bids are accepted early on and if congestion is anticipated the highest bids are not selected. The Transmission System Loss Management Scheduling Protocol uses the Cal-ISO power flow model to identify total transmission losses at each generating unit and scheduling point. Additional calculations are performed to determine if the participant will be paid more or less than, for instance, the generating units dispatched net power output (Cal-ISO 1998a, Cal-ISO 1998b).

- Cal-ISO Participating Generator Agreement consists of detailed explanations of the requirements in the Cal-ISO Tariff pertaining to the paralleled generating unit.

PROJECT DESCRIPTION

The Sunrise project is a cogeneration project with potentially three phases located in western Kern County. The first phase will produce 338 MW operate by September 2000. SCPC has tentative plans to expand the project to 507 MW (phase II) in 2001 and to 845 MW (phase III) in 2005. Staff and the Cal-ISO have only evaluated the transmission system engineering implications for first phase or 345 MW. The project is therefore not certifiable for phase II or phase III. The project will be located on approximately 16 acres of land 3 miles Northwest of Fellows, California. Please refer to the Project Description section for a more detailed presentation of the site and setting. This will be a merchant power plant that will sell electricity in the California market.

The Sunrise project will access the California market directly or indirectly through PG&E's Midway substation near Buttonwillow, California. The applicant is currently considering four interconnection options for the project. One is a direct connection to the Midway substation and the other three are indirect connections through other proposed power plants in western Kern County. SCPC is seeking certification for four transmission routes, one of which will be used by the project. In the AFC, Transmission Supplement 2, these routes are called route B, D, E and F. Route B is currently the preferred by the applicant (Radian 1999d, page 1-1).

All four routes will have the same type of substation and transmission line characteristics. The transmission line routes and end-points are different. Also the first 3.5 miles of each transmission line route alternatives are the same. The similar characteristics of each line will first be discussed and then the particular routes, after milepost 3.5, will be described.

Sunrise substation¹: The power produced by the plant will be stepped up to 230 kV and fed directly to the Sunrise substation. The Sunrise substation will be a three-position bus in a ring configuration. Two of the three positions will connect to the Sunrise generators and the

¹ The AFC refers to the Sunrise switchyard as a substation. Technically a substation must contain transformers. In order to be consistent with the AFC, this document will refer to the Sunrise power plant switchyard, the La Paloma power plant switchyard, and the Midway-Sunset Sunrise power plant switchyard as substations.

third will connect to the 230 kV transmission outlet line (SCPP 1999k, page 2-3). This configuration is acceptable.

Transmission Line Characteristics: The proposed line will be a 230 kV double circuit line with the circuits connected (paralleled) so that they function as a single circuit. This configuration will allow SCPC to increase the capacity of the line to accommodate potential project expansion by separating the circuits at the Sunrise substation bus and the bus at the end of the line. Each phase of the three phase lines will be made of 1,431 kilo-circular-mills (KCM) aluminum alloy conductor, named "carnation." The normal rating for each of these conductors at 230 kV is 486 mega-volt-amperes (MVA) or about 476 megawatts (MW), assuming a 0.98 power factor. Thus, the total line capacity will be approximately 952 MW. The emergency rating of each conductor will be 557 MVA or approximately 546 MW, if operated as a double circuit line (SCPP 1999k, pages 2-3 to 2-4). All four proposed line routes will use single shaft galvanized tubular steel poles up to the point of interconnection at either the Midway-Sunset substation or the La Paloma substation. This configuration of conductors and poles is acceptable.

All four route alternatives begin by exiting the south side of the project site generally paralleling the section line. At mile 0.9, the lines cross Mocal Road and go west on the south side of the section line. At mile 1.7, the routes cross PG&E's 115 kV Midway-Santa Maria line. At mile 3.5, the line crosses Crocker Springs Road (SCPP 1999j, pages 2-3 to 2-8 and SCPP 1999k, page 9).

Route B: This route connects the Sunrise substation directly to the Midway substation. To connect to the Midway substation the line will be approximately 23.3 miles long and will require about 170 poles.

After mile 3.5, the line passes the West Side of the Midway-Sunset project site and parallels the existing 230 kV Midway-Sunset transmission line. At mile 5.4, the line crosses the 230 kV Midway-Sunset line and the 115 kV Midway-Santa Maria line. The Sunrise Project line then parallels the existing Midway-Sunset 230 kV line and at mile 12.7 the Midway-Diablo 500 kV line and the proposed La Paloma 230 kV line. The line crosses the California Aqueduct and various other canals. At miles 20.1 and 21.2, the line crosses and then recrosses the Midway-Sunset 230 kV line. At mile 22.4, the line parallels the Midway-Vincent 500 kV lines into the Midway substation (SCPP 1999j, pages 2-4 to 2-6).

The connection at the Midway substation will require the addition of one 230 kV line termination to accommodate the Sunrise Project line. This bay is expected to lie within the fence at the Midway substation. PG&E has not yet decided whether or not the fence would be expanded for access purposes. This decision should be made in time to be included in the Final Staff Assessment (SCPP 1999j, pages 2-6).

Route D: This route connects the Sunrise substation to a future Midway-Sunset substation and from there through a joint ownership line runs to the Midway substation. This route would be approximately 23.7 miles long and would require about 175 poles.

After mile 3.5, at mile 3.6, the route D line loops into and out of a future Midway-Sunset substation. The new route runs parallel to the existing Midway Sunset 230 kV line. At mile

5.4 the line crosses the 230 kV Midway-Sunset line and the 115 kV Midway-Santa Maria line. The Sunrise Project line then parallels both the Midway-Sunset 230 kV line and the 115 kV Midway- Santa Maria line and at mile 12.7 the line begins to parallel the Midway-Diablo 500 kV line and the proposed La Paloma 230 kV line as well. The line crosses the California Aqueduct and various other canals. At miles 20.1 and 21.2, the line crosses and then recrosses the Midway-Sunset 230 kV line. At mile 22.4, the line parallels the Midway-Vincent 500 kV lines into the Midway substation. The Midway substation will require a 230 kV line termination to accommodate this new line (SCPP 1999j, pages 2-3 to 2-7).

Route E: This is a three part route that connects the Sunrise Project and the future Midway-Sunset substation and then a joint ownership line connects to the proposed La Paloma substation and from there to the Midway Substation. This is a 10.5 mile route to the La Paloma substation and a total of 24.2 miles to the Midway substation. Approximately 80 poles will be used to get to the La Paloma substation.

After looping in to the Midway-Sunset substation at mile 3.6, the now joint ownership line parallels the existing Midway-Sunset 230 kV line. At mile 5.4, the line crosses the Midway-Santa Maria 115 kV line. The route then parallels the Midway-Sunset 230 kV line and the Midway-Santa Maria 115 kV line. After crossing Reserve Road at mile 9.6, the line turns east and parallels the road until it connects to the La Paloma substation at mile 10.5. After connecting to the La Paloma substation, the route follows the route described in the La Paloma AFC into the Midway substation. A 230 kV line termination would be required at the La Paloma substation (SCPP 1999j, pages 2-7 and 2-8).

From the La Paloma substation to the Midway substation, the route description is the same as that described in the Final Staff Assessment for the La Paloma project.

“The transmission line will be approximately 14.2 miles long and will run parallel to existing structures wherever possible. The line parallels PG&E’s Midway-Sunset 230 kV transmission line for about three miles from mile 0.9 to milepost 4. After milepost 4 the line parallels PG&E’s #2 500 kV Diablo-Midway line until it reaches the Midway substation. At the Midway substation the line is situated to maintain the necessary clearances around the numerous lines that converge at the substation (LPGP 1998a, pages 3.6-1 to 3.6-2)”.

I transmission line for the La Paloma project can carry 2116 MW at its normal rating which is enough for La Paloma (940 MW), the first 500 MW of Sunrise (phases 1 and 2), and the Sunset expansion (500 MW). Because line losses are high when lines are loaded as fully as the La Paloma-Midway portion would be with all three projects, a higher capacity conductor may be used.

Route F: This route connects the Sunrise substation to the proposed La Paloma substation and from there a joint ownership line would connect to the Midway substation. This is a 10.5 mile route to the La Paloma substation and a total of 24.2 miles to the Midway substation. Approximately 80 poles will be used to get to the La Paloma substation.

After mile 3.5, the line passes the West Side of the Midway-Sunset project site and parallels the 230 kV Midway-Sunset transmission line. At mile 5.4, the line crosses the 230 kV Midway-Sunset line and the 115 kV Midway-Santa Maria line. The route then parallels the Midway-Sunset 230 kV line and the Midway-Santa Maria 115 kV line. After crossing Reserve Road at mile 9.6, the line turns east and parallels the road until it connects to the La Paloma substation at mile 10.5. After connecting to the La Paloma substation the route follows the route described in the La Paloma AFC into the Midway substation. A 230 kV line termination would be required at the La Paloma substation (SCPP 1999j, pages 2-6 and 2-7).

From the La Paloma substation to the Midway substation, the route description is the same as that described in the Final Staff Assessment for the La Paloma project.

“The transmission line will be approximately 14.2 miles long and will run parallel to existing structures wherever possible. The line parallels PG&E’s Midway-Sunset 230 kV transmission line for about three miles from mile 0.9 to milepost 4. After milepost 4 the line parallels PG&E’s #2 500 kV Diablo-Midway line until it reaches the Midway substation. At the Midway substation the line is situated to maintain the necessary clearances around the numerous lines that converge at the substation (LPGP 1998a, pages 3.6-1 to 3.6-2)”.

The transmission line for the La Paloma project can carry 2116 MW at its normal rating which is enough for the La Paloma and all three phases of the Sunrise project. Because line losses are high when lines are loaded as fully as the La Paloma-Midway portion would be with these projects, a higher capacity conductor may be used.

EXISTING FACILITIES AND RELATED SYSTEMS

The following electric facilities are located near the Sunrise project site and transmission line routes:

Texaco’s Morgan Substation: connected to PG&E’s Midway-Santa Maria 115 kV line and five 12 kV distribution feeders;

PG&E’s Fellows Substation: connected to PG&E’s Midway-Santa Maria 115 kV line and several 21 kV distribution feeders;

PG&E’s Midway Substation: Connected to PG&E’s 115 kV, 230 kV and 500 kV transmission systems;

PG&E’s Midway-Santa Maria 115 kV transmission line;

PG&E’s Taft-Mckittrick 69 kV transmission line;

PG&E’s Midway-Taft 115 kV transmission line;

PG&E’s Taft –Elk Hills 69 kV line.

Line routes include several line and road crossings as well as the California Aqueduct. Major line crossings include the Midway-Sunset 230 kV line and the Midway-Santa Maria 115 kV. Other line crossings may be required in and around the Midway substation. TSE condition 1(f) requires that line crossings be coordinated with the line owner and comply with the owners standards. Major road crossings include State Highways 33 and 58, Crocker Springs Road, Reserve Road, and Mirasol Avenue (SC&PP 1998a, pages 6-1 to 6-3 and SCPP 1999j, pages 2-3 to 2-7)

SYSTEM RELIABILITY

INTRODUCTION

A system reliability study is performed to determine the affects of connecting a new power plant to the existing electric grid. The study should not only identify impacts but also ways negative impacts can be minimized or negated. Any new transmission facilities, or downstream facilities, required for connection to the grid are considered part of the project and are subject to the full AFC review process. The Cal-ISO has reviewed the Preliminary Facilities Study for the Sunrise project and has given preliminary approval to the project and does not anticipate the need for any facilities beyond the breakers and bus in the Midway substation and the use of remedial action schemes (Cal-ISO letter, March 30, 1999). The Cal-ISO will give its final approval to the project after reviewing the Detailed Facilities Study. The Cal-ISO and staff do not anticipate the analysis of the Detailed Facilities Study will result in the need for any mitigation other than the use of remedial action schemes based on.

The Cal-ISO decided to assign responsibility for congestion on transmission facilities caused by new generators to the project. This is called the "Advanced Congestion Cost Mitigation" solution to congestion. This solution would require the project owner to mitigate congestion impacts prior to connecting to the Cal-ISO controlled grid. The options for advanced mitigation include upgrading overloaded facilities, the construction of new facilities, remedial action schemes (RAS), a combination of upgrading and RAS, or absorbing congestion costs caused by the new generation. Staff expects the project owner and the ISO to develop remedial action schemes that will mitigate any congestion caused by the Sunrise project. The schemes will be included as conditions of certification for the project. The Cal-ISO will provide testimony on the Preliminary Facilities Study and will provide conclusions and findings in the Energy Commission's hearings.

At this time staff does not expect the project will require any downstream facilities. Completion of the Detailed Facilities Study and the subsequent issuance of the Cal-ISO's conclusions and findings regarding the study will assure conformance with NERC, WSCC and Cal-ISO reliability criteria. A condition of certification (TSE-1g) is recommended to provide for Energy Commission review of the Detailed Facilities Study and the PG&E/applicant facility Interconnection Agreement.

SYSTEM RELIABILITY STUDY

A system reliability evaluation determines whether the new project would cause thermal overloads, voltage violations (voltages too high or low), and/or electric system instability (excessive oscillations). In addition to the above analysis, studies are performed to verify

that sufficient reactive power (see Definition of Terms) is available. The reliability evaluation must be conducted for all credible "emergency" conditions. Emergency conditions could include the loss of a single or double circuit line, the loss of a transformer or generator, or a combined loss of these facilities. A Preliminary Facilities Study is conducted in advance of potential system changes, such as the addition of the Sunrise project into the system, in order to prevent criteria violations. The criteria used in this evaluation include the WSCC Planning Criteria, NERC Planning Standards and applicable Cal-ISO reliability criteria. The reliability implications of the Sunrise project and the need for additional facilities will be determined by the Cal-ISO based on the Detailed Facilities Study. A preliminary determination of compliance with applicable reliability criteria has been provided by the Cal-ISO (Cal-ISO Letter, March 30, 1999).

The Sunrise project will have a maximum plant delivery in phase I of 338 MW. The Preliminary Facilities Study provided in the SCPC AFC analyzed two interconnection alternatives from a reliability perspective and SCPC is now seeking certification for only one of the two plus three others. Route B or the Sunrise-Midway 230 kV line, is the route that has been studied. The other three, D, E and F have not been studied from a reliability perspective. A Preliminary Facilities Study analyzing the other route alternatives, routes D, E and F, will be completed in time to include the results in the Final Staff Assessment. This study is not expected to identify the need for any new transmission facilities beyond those discussed in this analysis and the SCPC AFC. The Cal-ISO has given its preliminary approval to the Sunrise project based on the Preliminary Facilities study provided in the SCPC AFC and does not anticipate the need for downstream facilities (Cal-ISO letter, March 30, 1999).

Power delivered from the Sunrise project to the existing Midway substation in all four route options will impact power flows on existing transmission lines and substations in the Kern county region. By interconnecting at the Midway substation to PG&E's electric grid, the Sunrise project would have the most impact on the substation itself and the transmission network's ability to move power from the north to the south during heavy load periods and from the south to north during light load periods. The PG&E study included the La Paloma Project producing 940 MW. Power flow studies analyzed the affects of Sunrise on line flows for three cases (SCPP 1998a, page 6) as follows:

- 1) Heavy summer 2000: this case was developed from the full-loop 2003 heavy summer must-run study case.
- 2) Light winter 2000-01: this case was developed from the full-loop LW1A WSCC case.
- 3) Summer peak 2003: this case used the summer peak 2003 case for the PG&E transmission assessment (Kern Division case).

21.

The power flow study results indicate that under most conditions all electric facilities would operate within their rated levels and voltages were within required ranges. However, when the Midway 500/230 kV bank 12 is out of service, the Midway 500/230 kV bank 11 overloads to 103% of its emergency rating. Rather than requiring new facilities, this overload would be mitigated by reducing local generation. The fault duty study indicated that, when the Sunrise project is connected to the Midway substation, the

fault duty increases at nearby breakers. Eight 230 kV breakers at the Midway substation would need to be replaced with higher rating breakers (SCPP 1998a, page 6).

To fully comply with NERC's reliability criteria "extreme contingency" analysis must be conducted, but is not presently available. Such analysis is required by reliability criteria not to identify facility upgrades or new facilities, but rather to identify necessary mitigation consisting of operational measures. These measures include congestion management and the implementation of RAS. The Cal-ISO does not anticipate the need for facility modification or new facilities as a result of these planned studies other than perhaps new or modified RAS (Cal-ISO Letter, March 30, 1999). These studies will be included in the Detailed Facilities Study. The Cal-ISO will make its final determination based on the Detailed Facilities Study.

Short circuit analyses are conducted to assure that breaker ratings are sufficient to withstand high levels of current during a fault (such as when a line touches the ground). The acceptability of breaker ratings can also be determined during the compliance phase; it need not be done during the AFC process. Condition of certification TSE-1 has been provided to ensure that breaker ratings are adequate.

Based on the Preliminary Facilities Study results and the conclusions and recommendations of the Cal-ISO, staff believes that the Sunrise project will be interconnected to the existing system in accordance with reliability criteria and that no new or modified downstream facility is required. Conformance verification with reliability criteria and interconnection standards will be assessed in the Commission's Compliance and Monitoring Process (see Conditions of Certification-TSE 1, 2 and 3). Staff's proposed conditions of certification require a Detailed Facilities Study and an executed Interconnection Agreement between SCPC and PG&E. As a practical matter staff anticipates that the Detailed Facilities Study and approval by the Cal-ISO will be available near the end of the siting process.

ALTERNATIVES

Sunrise looked at seven different transmission line alternatives and is seeking certification for four of them. The three alternatives that were dropped include transmission routes A, C and G.

Route A was the preferred route in the original SCPC AFC and was an alternative for a 15 mile transmission line that would loop in to the Midway-Wheeler Ridge 230 kV line owned by PG&E and the California Department of Water Resources (CDWR). This route is no longer commercially feasible because the applicant has not been able to get a long-term capacity lease from CDWR.

Route C was a connection to a new Pastoria substation. This option would require a transmission line more than 35 miles long, which was too costly.

Route G would have connected the Sunrise project to the proposed Elk Hills Power Project (Elk Hills) and from there to the Midway substation. Because Elk Hills is scheduled to be completed after Sunrise Project, this option introduces schedule risk into the Sunrise construction process. The proposed Elk Hills line also doesn't offer the

opportunity to parallel existing lines and does not provide the benefits of the other alternatives. Hence, this option is no longer considered viable by the applicant.

CUMULATIVE IMPACTS

There is insufficient data to fully evaluate cumulative impacts on the transmission system. Two other projects, La Paloma and Elk Hills, located in the same general area have filed AFCs with the Energy Commission. Staff expects two more projects, the Midway-Sunset Power Project (Midway-Sunset) and the Morro Bay Power Plant Project (Morro Bay) will file AFCs later this year. Finally, the Pastoria Power Project (Pastoria) AFC is expected later this year as well, and while it is not located in the same area it may affect the transmission system in the region.

The SCPC AFC included a Preliminary Facilities Study for three phases of the Sunrise project. Thus a reliability analysis was completed for a 328 MW, 507 MW and 845 MW project. The case with an 845 MW Sunrise project provides information on the effects of approximately 1,785 MW of new generation connected to the Midway substation. The analysis includes 940 MW for the La Paloma Project plus all three phases or 845 MW for Sunrise. This 1,745 MW level is very close to the expected output of La Paloma, Sunrise phase 1 and the Midway-Sunset Expansion ($940 + 320 + 500 = 1,760$). Under normal operating conditions, there were no voltage or thermal loading problems. When contingencies occurred, specifically when either the Midway 500/230 kV banks 11 or 12 were out of service, there were overloads. These overloads would be mitigated through the implementation of remedial action schemes (SCPP 1998a, Preliminary Facilities Study).

Elk Hills has filed an interconnection study in the La Paloma case on the cumulative system impacts of the La Paloma, Sunrise and Elk Hills projects. Neither staff nor the Cal-ISO has fully reviewed this study. According to the Elk Hills study, the interconnection of either or both of the Sunrise and Elk Hills projects to the Midway substation after the La Paloma project will require:

- 1) replacing eight 230 kV circuit breakers at the Midway substation with higher duty circuit breakers;
- 2) rearranging the existing 230 kV bus and transmission towers at the Midway substation;
- 3) the extension of the existing 230 kV bus at the Midway substation and adding two 230 kV bays (Elk Hills, March 19, 1999).

Both the Sunrise and Elk Hills projects have described interconnection options that loop into the Midway-Wheeler Ridge 230 kV transmission line that is co-owned by PG&E and the California Department of Water Resources. If the projects use this option, eight breakers at the Midway substation will need to be replaced and a remedial action scheme will be implemented under specific conditions (Elk Hills, 1999a). As previously discussed in the alternatives analysis, this isn't a viable option.

The Midway-Sunset, Pastoria and Morro Bay projects have not filed AFCs with the Energy Commission. Staff does not have any information on the effects of these projects on the transmission grid and cannot analyze potential impacts due to these projects.

FACILITY CLOSURE

INTRODUCTION

The parallel operation of generating stations is controlled, in part by CPUC Rule 21. This rule and standard utility practices for interconnecting a generating unit provide for the participating transmission owner (PTO) to have control of breakers and disconnect switches where the outlet line terminates (the Midway substation) and general control over the interconnected generators. Prior to construction and interconnection of a generating unit, the PTO reviews and comments on the plans and specifications for the power plant and termination equipment that is important to safe and reliable parallel operation² and inspects the interconnection facilities. Contractual provisions may be developed to provide backup, or other power service, and codify procedures to be followed during parallel operation. Before generating stations are permitted to bid into the Cal-PX and be dispatched by the Cal-ISO, generator standards must be met and the generating station must commit to comply with instructions of the Cal-ISO dispatchers. All participating generators must sign a Participating Generator Agreement (Cal-ISO 1998a, Cal-ISO 1998b). Procedures for planned, unexpected temporary closure and unexpected permanent closure must be developed or verified to facilitate effective communication and coordination between the generating station owner, the PTO and the Cal-ISO to ensure safety and system reliability.

CPUC General Order 95, Rule 31.6 requires that “lines or portions of lines permanently abandoned shall be removed by their owners so that such lines shall not become a public nuisance or a hazard to life or property.” Condition of certification TSE-1c requires compliance with this rule.

The ability of the above LORS to reasonably assure safe and reliable conditions, in the event of facility closure, was evaluated for three scenarios:

PLANNED CLOSURE

This type of closure occurs in a planned and orderly manner such as at the end of its useful economic or mechanical life or due to gradual obsolescence. Under such circumstances, the requirement for the owner to provide a closure plan 12 months prior to closure, in conjunction with applicable LORS, is considered sufficient to provide adequately for safety and reliability. For instance, a planned closure provides time for the owner to coordinate with the PTO³ to assure (as one example) that the PTO’s system will not be closed into the outlet thus energizing the project substation. Alternatively, the owner may coordinate with the PTO to maintain some power service via the outlet line to supply critical station service equipment or other loads⁴.

² As an example, the PTO has control over the generating unit breakers so that only when the PTO’s line crews have completed maintenance, for instance, and are clear of the line or other facilities, could the unit reclose into the system.

³ The PTO, in this instance, is PG&E e.g., the system owner to which the project is interconnected.

⁴ These are mere examples, many more exist.

UNEXPECTED TEMPORARY CLOSURE

This unplanned closure occurs when the facility is closed suddenly and/or unexpectedly for a short term due to unforeseen circumstances such as a natural or other disaster or emergency. During such a closure the facility cannot insert power into the utility system. Closures of this sort can be accommodated by establishment of an on-site contingency plan (see General Conditions Including Compliance Monitoring and Closure Plan).

UNEXPECTED PERMANENT CLOSURE

This unplanned closure occurs when the project owner abandons the facility. This is considered to be a permanent closure. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. An on-site contingency plan, that is in place and approved by the CPM prior to the beginning of commercial operation of the facilities, will be developed to assure safety and reliability (see General Conditions Including Compliance Monitoring and Closure Plan).

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Staff has received the Preliminary Facilities Study and the Cal-ISO has issued preliminary findings regarding the Sunrise connection to the Midway substation. The power flow and stability analysis of the proposed interconnection alternatives (Routes B, D, E and F) are expected to be completed in time to be included in the Final Staff Assessment. The Cal-ISO's preliminary findings indicate that reliability criteria will be met and no downstream facilities beyond the eight circuit breakers at the Midway substation will be required for the interconnection of the Sunrise project to meet NERC, WSCC and Cal-ISO reliability criteria; staff concurs.

Phase II and Phase III of the Sunrise project have not been analyzed and no affirmative finding can be made.

RECOMMENDATIONS

Staff proposes the following conditions of certification to insure system reliability and conformance with LORS.

CONDITIONS OF CERTIFICATION

TSE-1 The project owner shall ensure that the design, construction and operation of the proposed transmission facilities will conform to requirements listed below. The substitution of Compliance Project Manager (CPM) approved "equivalent" equipment and equivalent substation configurations is acceptable.

- a) The Sunrise project 230 kV substation shall include busses in a ring configuration or a breaker and a half scheme.

- b) Breakers and bus shall be sized to comply with a short circuit analysis.
- c) The transmission facilities shall meet or exceed the requirements CPUC General Order 95.
- d) One of the four line alternatives shall be constructed.
- e) Termination facilities at the Midway substation shall comply with applicable Cal-ISO and PG&E interconnection standards (PG&E Interconnection Handbook and CPUC Rule 21).
- f) Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.
- g) The applicant shall provide a Detailed Facilities Study and an executed Facility Interconnection Agreement for the Sunrise project transmission interconnection with PG&E. The Detailed Facilities Study and Interconnection Agreement shall be coordinated with the Cal-ISO.

Verification: At least 60 days prior to start of construction of transmission facilities, the project owner shall submit for approval to the CPM, electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements 1a through 1g above. The Detailed Facilities Study and executed interconnection agreement shall concurrently be provided. Substitution of equipment and substation configurations shall be identified and justified by the project owner for CPM approval.

TSE-2 The project owner shall inform the CPM of any impending changes, which may not conform to the requirements 1a through 1f of TSE-1, and have not received CPM approval, and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction, involving changed equipment or substation configurations, shall not begin without prior written approval of the changes by the CPM.

Verification: At least 60 days prior to construction of transmission facilities, the project owner shall inform the CPM of any impending changes which may not conform to requirements of **TSE-1** and request approval to implement such changes.

TSE-3 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM approved changes thereto, to ensure conformance with CPUC GO-95 and CPUC Rule No. 21 and these conditions. In case of non-conformance, the project owner shall inform the CPM in writing, within 10 days, of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after synchronization of the project, the project owner shall transmit to the CPM an engineering description(s), and one-line drawings of the "as-built"

facilities, signed and sealed by the registered electrical engineer in charge. A statement attesting to conformance with CPUC GO-95, CPUC Rule No. 21, the PG&E Interconnection Handbook, and these conditions shall be concurrently provided.

REFERENCES

- Cal-ISO (California Independent System Operator). 1998a. Cal-ISO Tariff Scheduling Protocol, posted April 1998, Amendments 1,4,5,6, and 7 incorporated.
- Cal-ISO (California Independent System Operator). 1998b. Cal-ISO Dispatch Protocol, posted April 1998.
- NERC (North American Electric Reliability Council). 1998. NERC Planning Standards, September 1997.
- WSCC (Western Systems Coordinating Council). 1997. Reliability Criteria, August 1998.
- 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/Muraoka) 1999j. Transmission Alternatives, Supplement One. Submitted to California Energy Commission on May 5, 1999.
- SCPP (Sunrise Cogeneration and Powe Project/D. Muraoka) 1999k. Transmission Alternatives Supplement Two. Submitted to the California Energy Commission on May 21 1999.
- LPGP (La Paloma Generating Project). 1998a. Application for Certification, La Paloma Generating Project (98-AFC-2). Submitted to the California Energy Commission, August 12, 1998.
- Elk Hills, LLC (Elk Hills), 1999. Elk Hills submittal, March 1999.

DEFINITION OF TERMS

ACSR	Aluminum cable steel reinforced. A composite conductor made up of a steel core surrounded by aluminum wire.
Ampacity	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
Ampere	The unit of current flowing in a conductor.
Bundled	Two wires, 18 inches apart.
Bus	Conductors that serve as a common connection for two or more circuits.
Conductor	The part of the transmission line (the wire) which carries the current.
Congestion Management	Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports), will not violate criteria.
Emergency Overload	See Single Contingency. This is also called an L-1.
Kcmil or kcm	Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.
Kilovolt (kV)	A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.
L-1	The outage of a single circuit.
Megavar	One megavolt ampere reactive.
Megavars	Mega-volt-Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.
Megavolt ampere (MVA)	A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000.
Megawatt (MW)	A unit of power equivalent to 1,341 horsepower.

Normal Operation/ Normal Overload	When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.
N-1 Condition	See Single Contingency. Also called an L-1.
Outlet	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.
Power Flow Analysis	A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.
Reactive Power	Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.
Remedial Action Scheme (RAS)	A remedial action scheme is an automatic control provision, which, for instance, will trip a selected generating unit upon a circuit overload.
SF6	Sulfur hexafluoride is an insulating medium.
Single Contingency	Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.
Solid dielectric cable	Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.
Thermal rating	See ampacity.
TSE	Transmission System Engineering.
Undercrossing	A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.
Underbuild	A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

ALTERNATIVES

Eileen Allen & Kristina Bergquist

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
- Conduct a screening analysis to assess the feasibility of the alternative sites discussed in the AFC and any others considered.¹

SUNRISE COGENERATION AND POWER PROJECT

BASIC PROJECT OBJECTIVES

After studying the Sunrise Cogeneration and Power Project (Sunrise Project) Application For Certification (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 North American Production's (TNAP) 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.

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 Sunrise project will be located on a 16-acre² 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 Sunrise Project 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 PSA).

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 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 Sunrise Project 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

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.

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 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 \the Mojave Pipeline Company (KRGTC\MPC) natural gas pipeline. A complete description of the project is contained in the **PROJECT DESCRIPTION** section of this PSA.

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 Sunrise project 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 TNAP corridor.

POTENTIALLY SIGNIFICANT ADVERSE IMPACTS

The environmental consequences of the proposal are discussed in detail in the individual sections of the PSA. 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 area⁴, cumulative transmission system impacts and biological resource

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 known to staff are:

- PG&E. Generating Company: La Paloma (98-AFC-2) – 1,048 megawatts (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 Preliminary Staff Assessment (PSA).

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

-
- Sunrise Generation and Power Company: Sunrise (98-AFC-4) – 320 MW
 - Sempra/Oxy: Elk Hills (99-AFC-1) – 500 MW
- 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.

emissions would be smaller, since the emissions from both the 320 MW proposed 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.

**ALTERNATIVES Figure 1
Site 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.

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 Sunrise project 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 Sunrise Project 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 Sunrise project.

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 TNAP 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 away for a feasible oil field cogeneration 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 Sunrise Project, 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

Jeri Zene Scott

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 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:

22. 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.
23. 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.

GENERAL CONDITIONS OF CERTIFICATION

COMPLIANCE PROJECT MANAGER (CPM) RESPONSIBILITIES

A CPM will oversee the compliance monitoring and shall be responsible for:

4. ensuring that the design, construction, operation, and closure of the project facilities is in compliance with the terms and conditions of the Commission Decision;

24. resolving complaints;

25. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;

26. documenting and tracking compliance filings; and,

27. 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;
- 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 must remit to the Secretary of the Resources Agency a filing fee in the amount of eight hundred and fifty dollars (\$850). The filing fee shall be paid upon the filing of the notice of determination pursuant to Section 21080.5 of that code.

The project owner shall submit a copy of the receipt for the filing fee to the CPM within 30 days of the payment. The receipt shall identify the project, the date paid and the amount paid.

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. Notwithstanding 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 than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the 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 than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the 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:

- 1) immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;
- 2) secure the attendance of appropriate Energy Commission staff and staff of any other agency with expertise in the subject area of concern as necessary;
- 3) conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and,
- 4) after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum 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 _____

<i>EVENT DESCRIPTION</i>	<i>DATE ASSIGNED</i>
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	ARCO	Atlantic Richfield Company
AAL	All aluminum (electricity conductor)	ASAE	American Society of Architectural Engineers
AADT	Annual Average Daily Traffic	ASHRAE	American Society of Heating Refrigeration & Air Conditioning Engineers
AAQS	Ambient Air Quality Standards	ASME	American Society of Mechanical Engineers
AC	Alternating Current	ATC	Authority to Construct
ACEC	Area of Critical Environmental Concern	AWS	American Welding Society
ACGIH	American Conference of Government and Industrial Hygienists	B	
ACE	(U.S.) Army Corps of Engineers	BACT	Best Available Control Technology
ACSR	Aluminum Covered Steel Reinforced (electricity conductor)	BARCT	Best Available Retrofit Control Technology
AERA		bbf	barrel
AFC	Application for Certification	BCF	billion cubic feet
AFY	acre-feet per year	Bcfd	billion cubic feet per day
AHM	Acutely Hazardous Materials	b/d	barrels per day
AIHA	American Industrial Hygienists Association	BO	Biological Opinion
ANSI	American National Standards Institute	BLM	(U.S.) Bureau of Land Management
APCD	Air Pollution Control District	BR	Biennial Report
APCO	Air Pollution Control Officer	BRMIMP	Biological Resources Mitigation and Monitoring Plan
AQMP	Air Quality Management Plan	Btu	British thermal unit
ARB	Air Resources Board	C	
		CAA	(U.S.) Clean Air Act

CAAQS	California Ambient Air Quality Standards	CESA	California Endangered Species Act
CalEPA	California Environmental Protection Agency	CFB	Circulating Fluidized Bed
Cal-OSHA	California Occupational Safety and Health Administration	CFCs	Chloro-fluorocarbons
Cal-PX	California Power Exchange	cfm	cubic feet per minute
Caltrans	California Department of Transportation	CFR	Code of Federal Regulations
CAPCOA	California Air Pollution Control Officers Association	cfs	cubic feet per second
CARB	California Air Resources Board	CLUP	Comprehensive Land Use Plan
CATEF	California Toxic Emissions Factors	CNEL	Community Noise Equivalent Level
CBC	California Building Code	CNLM	Center for Natural Lands Management
CBO	Chief Building Official	CO	Carbon Monoxide
CCAA	California Clean Air Act	CO2	Carbon Dioxide
CCR	California Code of Regulations	COC	Condition of Certification
CDF	California Department of Forestry	CPM	Compliance Project Manager
CDFG	California Department of Fish and Game	CPUC	California Public Utilities Commission
CEERT	Coalition for Energy Efficiency and Renewable Technologies	CRTR	Cultural Resources Technical Report
CEM	Continuous Emissions Monitoring	CT	Combustion Turbine Current Transformer
CEQA	California Environmental Quality Act	CTG	Combustion Turbine Generator
CERCLA	Comprehensive Environmental Response Compensation and Liability Act	CUPA	Certified Unified Program Agency
		CURE	California Unions for Reliable Energy
		D	
		dB	decibel

dB(A)	decibel on the A scale	EFS&EPD	Energy Facilities Siting and Environmental Protection Division
DC	Direct Current	EIA	(U.S.) Energy Information Agency
DCS	Distributed Control System	EIR	Environmental Impact Report
DCTL	Double Circuit Transmission Line	EIS	Environmental Impact Statement
DEIR	Draft Environmental Impact Report	EJ	Environmental Justice
DEIS	Draft Environmental Impact Statement	ELFIN	Electric Utility Financial and Production Simulation Model
DHS	(California) Department of Health Services	EMF	Electromagnetic Field
DISCO	Distribution Company	EPA	(U.S.) Environmental Protection Agency
DOC	Determination of Compliance	EPA-ARI	(U.S.) Environmental Protection Agency-Accidental Release Information Program
DOE	(U.S.) Department of Energy	EPRI	Electric Power Research Institute
DOG	(California) Department of Oil and Gas	ER	Electricity Report
DSM	Demand Side Management	ERC	Emission Reduction Credit {offset}
DTC	Desert Tortoise Council	ERNS	Emergency Response Notification System
DTSC	(CalEPA) Department of Toxic Substances Control	ERPG	Emergency Response Planning Guidelines
DWR	(California) Department of Water Resources	ESA	Endangered Species Act (Federal) Environmental Site Assessment
E		ETSR	Energy Technologies Status Report
EA	Environmental Assessment	F	
EDF	Environmental Defense Fund		
EDR	Energy Development Report		
EEGL	Emergency Response Planning Guidelines		

FAA	(U.S.) Federal Aviation Administration	H ₂ S	Hydrogen Sulfide
FBE	Functional Basis Earthquake	HCP	Habitat Conservation Plan
FCAA	Federal Clean Air Act	HHV	Higher Heating Value
FCC	Federal Communications Commission	HRA	Health Risk Assessment
FE	Federally (listed) Endangered	HRSG	Heat Recovery Steam Generator
FEIR	Final Environmental Impact Report	HV	High Voltage
FERC	Federal Energy Regulatory Commission	HVAC	Heating, Ventilation and Air Conditioning
FIP	Federal Implementation Plan	I	
FLPMA	Federal Land Policy Management Act	IAR	Issues and Alternatives Report
FONSI	Finding of No Significant Impact	IDLH	Immediately Dangerous to Life and Health Level
FP	(State) Fully Protected	IEA	International Energy Agency
FSA	Final Staff Assessment	IEEE	Institute of Electrical & Electronics Engineers
FT	Federally (listed) Threatened	IIPP	Injury and Illness Prevention Program
G		IIR	Issues Identification Report
GE	General Electric	IMPLAN	Impact Analysis for Planning
GEP	Good Engineering Practice	IOU	Investor-Owned Utility
GIS	Gas Insulated Switchgear Geographic Information System	IS	Initial Study
gpd	gallons per day	ISO	Independent System Operator
gpm	gallons per minute	ISCST3	Industrial Source Complex Short-Term model, Version 3
GW	gigawatt	J	
GWh	gigawatt hour	K	
H		KCFD	Kern County Fire Department

KCM	thousand circular mils (also KCmil) (electricity conductor)	MCM	thousand circular mil (electricity conductor)
km	kilometer	$\mu\text{g}/\text{m}^3$	micro grams (10 ⁻⁶ grams) per cubic meter
KOP	Key Observation Point	MG	milli gauss
kV	kilovolt	mgd	million gallons per day
KVAR	kilovolt-ampere reactive	MOU	Memorandum of Understanding
kW	kilowatt	MPE	Maximum Probable Earthquake
kWe	kilowatt, electric	m/s	meters per second
kWh	kilowatt hour	MS	Mail Station
kWp	peak kilowatt	MVAR	megavolt-ampere reactive
L		MW	megawatt (million watts)
LAER	Lowest Achievable Emission Rate	MWh	megawatt hour
lbs	pounds	MWp	peak megawatt
lbs/hr	pounds per hour	N	
lbs/MMBtu	Pounds Per Million British Thermal Units	N-1	One transmission circuit out
LORS	Laws, Ordinances, Regulations and Standards	N-2	Two transmission circuits out
LOS	Level of Service	NAAQS	National Ambient Air Quality Standards
M		NAHC	Native American Heritage Council
m (M)	meter, million, mega, milli or thousand	NCR	Non-Conformance Report
MCE	Maximum Credible Earthquake	NEC	National Electrical Code
MCF	thousand cubic feet	NEPA	National Energy Policy Act National Environmental Policy Act
MCL	Maximum Containment Level	NERC	National Electric Reliability Council

NESHAPS	National Emission Standards for Hazardous Air Pollutants	OLM	Ozone Limiting Method
NIOSH	National Institute of Occupational Health and Safety	OSHA	Occupational Safety and Health Administration (or Act)
NMHC	nonmethane hydrocarbons	P	
NO	nitrogen oxide	PAH	Polycyclic Aromatic Hydrocarbons
NOI	Notice of Intention	PG&E	Pacific Gas & Electric Company
NO _x	nitrogen oxides	PHC(S)	Prehearing Conference (Statement)
NO ₂	nitrogen dioxide	PIFUA	Federal Powerplant & Industrial Fuel Use Act of 1978
NOP	Notice of Preparation (of EIR)	PM	Project Manager particulate matter
NOV	Notice of Violation	PMPD	Presiding Member's Proposed Decision
NRC	National Research Council National Response Center	PM ₁₀	Particulate matter 10 microns and smaller in diameter
NRDC	Natural Resources Defense Council	PM _{2.5}	Particulate matter 2.5 microns and smaller in diameter
NSPS	New Source Performance Standards		
NSR	New Source Review		
O			
O ₃	Ozone	PPE	Personal Protective Equipment
	OASIS	ppb	parts per billion
	Open Access Same-Time Information System	ppm	parts per million
OCB	Oil Circuit Breaker	ppmvd	parts per million by volume, dry
OCSG	Operating Capability Study Group	ppt	parts per thousand
O&M	Operation and Maintenance	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)	TSP	Total Suspended Particulate Matter
STIG	Steam Injected Gas Turbine	U	
SWP	State Water Project	UBC	Uniform Building Code
SWRCB	State Water Resources Control Board	UDC	Utility Displacement Credits
T		UDF	Utility Displacement Factor
TAC	Toxic Air Contaminant	UEG	Utility Electric Generator
Tbtu	trillion Btu	UFC	Uniform Fire Code
TCF	trillion cubic feet	USC	United States Code
TCM	Transportation Control Measure	USC(A)	United States Code (Annotated)
TDS	Total Dissolved Solids	USCOE	U.S. (Army) Corps of Engineers
TE	Transmission Engineering	USEPA	U.S. Environmental Protection Agency
TEOR	Thermally Enhanced Oil Recovery	USFS	U.S. Forest Service
TL	Transmission Line (or lines)	USFWS	U.S. Fish and Wildlife Service
T-Line	Transmission Line	USGS	U.S. Geological Survey
TLV	Threshold Limit Value	V	
TOG	Total Organic Gases	VISCREEN	
TPD	tons per day	VOC	Volatile Organic Compound(s)
TPY	tons per year	VRM	Visual Resource Management
TS&N	Transmission Safety and Nuisance	W	
TSE	Transmission System Engineering	W	Watt
TSIN	Transmission Services Information Network	WAA	Warren-Alquist Act
		WEPEX	Western Energy Power Exchange
		WHO	World Health Organization

WICF	Western Interconnection Forum	WRTA	Western Region Transmission Association
WIEB	Western Interstate Energy Board	WSCC	Western System Coordination Council
WPLT	Western Pluvial Lakes Tradition	WSPP	Western System Power Pool

PREPARATION TEAM

Executive Summary.....	Kristina Bergquist
Introduction	Kristina Bergquist
Project Description.....	Kristina Bergquist
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Worker Safety and Fire Protection.....	Ellie Townsend-Smith
Transmission Line Safety and Nuisance.....	Obed Odoemelum
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Waste Management.....	Mike Ringer
Land Use	Amanda Stennick
Traffic and Transportation.....	David Flores
Noise.....	Kisabuli/Steve Baker
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Cultural Resources	Kathryn Matthews
Socioeconomics.....	Joe Diamond
Biology	Rick York
Water and Soils	Joe O'Hagan
Paleontological Resources	Robert Anderson
Facility Design	M. Kisabuli
Reliability	Steve Baker
Efficiency	Steve Baker

Transmission System Engineering Mark Hester
Alternatives.....Kristina Bergquist and Eileen Allen
Compliance Monitoring Plan and General ConditionsJeri Zene Scott
Glossary of Terms and Acronyms Bert Fegg
Project Secretary Luz Manriquez
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