Final Staff Assessment

# SALTON SEA GEOTHERMAL UNIT #6 POWER PROJECT

Application For Certification (02-AFC-2)
Imperial County

CALIFORNIA ENERGY COMMISSION

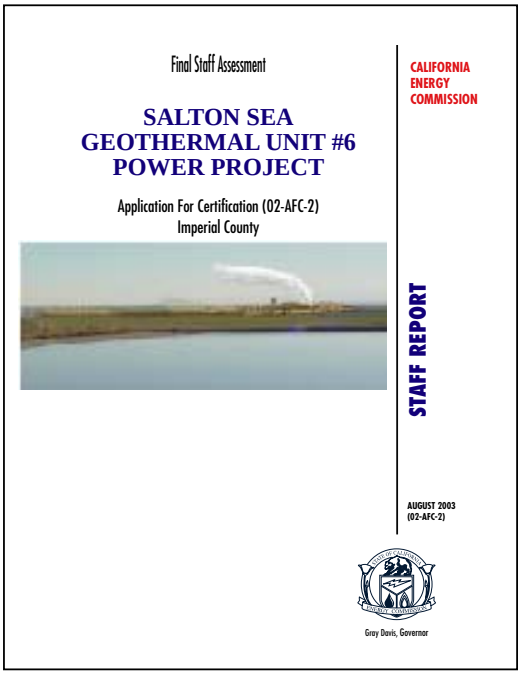
STAFF REPORT

DOCKET
02-AFC-2
DATE
RECD. AUG 05 2003

AUGUST 2003
(02-AFC-2)

PROOF OF SERVICE ( REVISED 3/10/03) FILED WITH
ORIGINAL MAILED FROM SACRAMENTO ON 8/5/03
ARH

Gray Davis, Governor

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# EXECUTIVE SUMMARY

The California Energy Commission staff has prepared this Final Staff Assessment (FSA) for the Salton Sea Unit 6 geothermal power project. The FSA has been divided into two parts. This report is Part 1 and contains staff's analysis and recommendations for all technical areas except Air Quality and Alternatives. These two sections will be published at a later date. (See discussion in the Overview of Staff's Conclusions below.)

On July 26, 2002, CE Obsidian Energy LLC (CEOE, project owner) filed an Application for Certification (AFC), for its proposed Salton Sea Unit 6 geothermal project (SSU6) with the California Energy Commission seeking approval to construct and operate a 185 megawatt (MW) geothermal steam-powered electric generating facility. The plant would be owned and operated by CEOE. The Energy Commission determined the application to be data adequate on September 25, 2002. This determination initiated staff's independent analysis of the proposed project.

The SSU6 and related facilities, including the electric transmission lines, and water supply pipeline are under the Energy Commission's jurisdiction. For geothermal power projects, the Energy Commission evaluates all aspects of the project but the licensing of the geothermal production and injection wells occurs through permitting by the Department of Conservation, Division of Oil Gas and Geothermal Resources (DOGGR), and the well pads and brine pipelines are permitted by Imperial County (Public Resources Code section 25120). Both agencies intend to use the Energy Commission's Decision as the CEQA document for their respective actions.

As a result of its analysis, Energy Commission staff has developed conditions of certification that mitigate impacts of the project. Where impacts of the project may occur from facilities licensed by other agencies, staff developed conditions of certification that are recommended to those agencies for inclusion in their respective permits based upon this FSA.

This FSA is not the decision document for these proceedings nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local, state, and federal legal requirements. The FSA will serve as staff's testimony in evidentiary hearings to be held by the Committee of two Commissioners who are hearing this case. The Committee will hold evidentiary hearings and will consider the recommendations presented by staff, the project owner, all parties, government agencies, and the public prior to proposing its decision. The Energy Commission will make the final decision, including findings, after the Committee's publication of its proposed decision.

## PROJECT LOCATION AND DESCRIPTION

The project area of the proposed Salton Sea Unit 6 project is located near the southeast shore of the Salton Sea, is within the unincorporated area of Imperial County, California, and is located approximately 6 miles north of Calipatria, on an 80-acre portion of a 160 acre agricultural parcel owned by the CEOE. The parcel is bounded by McKendry Road

on the north, Peterson Road on the south, Severe Road on the west and Boyle Road to the east. The site is approximately 1,000 feet from the southern end of the Sonny Bono Salton Sea National Wildlife Refuge. Lying within the Salton Sea Known Geothermal Resource Area (KGRA), the project is within a two-mile radius of nine operating geothermal power projects. A more complete description of the project is contained in the **PROJECT DESCRIPTION** section of this FSA and includes figures depicting the regional setting, transmission line routes, wells and pads, brine pipelines, water pipeline and the proposed plant configuration.

The SSU6 would consist of a geothermal steam power plant, associated water supply, production and reinjection wells and pads, brine pipelines, two 161 kV transmission lines that would connect at two locations in the Imperial Irrigation District's (IID) transmission system, the L-Line (IID designates many of their transmission lines with letter designations) to the southwest, and the Midway substation to the east. A new switchyard, located approximately 12.5 miles from the project site on Bannister Road, would facilitate the L-Line interconnection. Approximately 31 miles of new single-circuit transmission lines would be constructed.

The SSU6 project has infrastructure elements unique to a geothermal project including a geothermal Resource Production Facility (RPF), geothermal-steam Power Generation Facility (PGF), production and injection wells and pads, above-ground brine pipelines, a brine-waste solids handling system, and unique emissions characteristics.

The SSU6 includes a high efficiency condensing steam turbine with a net plant output of 185 MW. Normally, the facility would be operated in a base load mode: 8,000 hours per year or more. The renewable energy project is designed to supply capacity and energy to California's electric market with over 85 percent of the plant output contracted to the IID for a 20 year period following project completion.

The SSU6 air emissions are quite different from those of a natural gas-fired plant. Except for drilling and ancillary equipment, $NO_X$, and $SO_X$ are not emitted, but there will be emissions of ammonia and hydrogen sulfide ($H_2S$). Both ammonia and $H_2S$ are non-compressible gasses contained in the geothermal brine. The ammonia emissions, though not a regulated emission, are of concern as a $PM_{10}$ precursor. The project owner proposes to purchase $PM_{10}$ emission credits through the Imperial County Air Pollution Control District (ICAPCD). To control emissions and impacts of $H_2S$, the project owner proposes to install bio-oxidizers on the cooling towers of SSU6 and retrofit the cooling towers at an existing facility. Part 2 of the FSA will contain staff's analysis of the air quality impacts of the project and proposed mitigation measures.

## PUBLIC AND AGENCY COORDINATION

The Energy Commission's SSU6 Committee conducted an Informational Hearing and Site Visit on November 19, 2002. The Energy Commission also heard testimony regarding the sufficiency of the geothermal resources for support of the project through its projected 30-year life. The hearing provided a forum for the public to learn about the project, the Energy Commission's siting process, and to raise their questions and concerns about the proposed power plant. In addition, publicly noticed data response workshops were held on January 8 and 9, 2003 in Calipatria, and on February 27, 2003

in Sacramento. The Preliminary Staff Assessment was published April 14, 2003 with workshops held on May 14 and 15, 2003 in El Centro, and by phone on June 4, 2003.

Staff coordinated their review with: the Imperial County Air Pollution Control District (ICAPCD), the Imperial County Planning/Building Department, the U.S. Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (ACOE), the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR), the California Department of Fish and Game (CDFG) and the Colorado River Basin Regional Water Quality Control Board (RWQCB). The FSA provides agencies and the public an opportunity to review the Energy Commission staff's analysis of the proposed project. The ACOE and the BLM have federal jurisdictional authority and must take certain actions to permit certain aspects of the project. ACOE has already taken their action permitting fill of a small portion of degraded wetland necessary for construction of a brine pipeline from OB-1, the production well pad located at Obsidian Butte, to the project site, and evaluating the proposed site of the Bannister Road switchyard to be constructed by IID. BLM must amend the California Desert Conservation Act (CDCA) Plan to allow a transmission line corridor across a portion of BLM land and has initiated that process. BLM, acting as the federal lead agency, is also reviewing the entire project and has requested a Biological Opinion from the USFWS regarding potential impacts and proposed mitigation for threatened and endangered species within the project sphere of influence. Due to the potential for soil contamination at the project site, staff has also coordinated with the California Department of Toxic Substances Control.

## STAFF'S ASSESSMENT

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

- the environmental setting of the proposal;
- impacts on public health and safety and measures proposed to mitigate these impacts;
- environmental impacts and measures proposed to mitigate these impacts;
- the engineering design of the proposed facility and engineering measures proposed to ensure the project can be constructed and operated safely and reliably;
- project closure;
- project alternatives;
- compliance of the project with all applicable laws, ordinances, regulations and standards (LORS) during construction and operation; and
- proposed conditions of certification, including those conditions recommended to other agencies for inclusion in their permits for SSU6.

The following table summarizes the technical areas analyzed in Part 1 indicating levels of impact, LORS compliance and whether conditions of certification are recommended to other agencies for consideration. With the proposed conditions of certification the

project's environmental impacts can be mitigated to levels of less than significance, and the project would conform to all LORS. Additional detail is contained within each technical area analysis.

Air Quality and Alternatives are listed as "not complete" at this time. The project owner is planning to use $H_2S$ offsets obtained from retrofitting the cooling towers of the nearby Leathers power plant with bio-oxidizer boxes similar to those planned for use on the project. The expectation is that $H_2S$ reductions of at least 90 percent will be achieved through this application, providing the necessary offsets for the SSU6 project. Verification of this efficiency and determination of the applied offsets await the results of emissions verification testing at the Leathers facility. To further reduce emissions, a polishing system will be employed using a solid bed $H_2S$ removal scavenger system. While a formal source test is expected to be completed by late August, 2003, the APCD issued its Final Determination of Compliance for public comment July 25, 2003. Staff plans to review the FDOC as well as the proposed changes in modeling and mitigation strategies, and will provide its analysis and recommendations for impact mitigation in Part 2 of the FSA by early September 2003.

Staff is working with the Imperial County Planning/Building Department to coordinate the review and permitting of the SSU6 well pads and brine pipelines, and to assist in CEQA compliance for the project. DOGGR has also indicated their intent to use the Energy Commission Decision as the environmental document for their well permitting actions.

**ENVIRONMENTAL IMPACTS, LORS CONFORMANCE, AND CONDITIONS RECOMMENDED TO OTHER AGENCIES**

| Technical Discipline | Environmental/ System Impact | LORS Conformance | Conditions Recommended To Other Agencies |
|---|---|---|---|
| Air Quality | Not complete | Not complete | Not complete |
| Biological Resources | Impacts mitigated | Yes | Yes |
| Cultural Resources | Impacts mitigated | Yes | Yes |
| Power Plant Efficiency | No impact | N/A | NA |
| Power Plant Reliability | No impact | N/A | NA |
| Facility Design | No impact | Yes | No |
| Geology/Paleontology | Impacts mitigated | Yes | Yes |
| Hazardous Materials | Impacts mitigated | Yes | No |
| Land Use | Impacts mitigated | Yes | No |
| Noise | Impacts mitigated | Yes | Yes |
| Public Health | Impacts mitigated | Yes | No |
| Socioeconomics | Impacts mitigated | Yes | No |
| Traffic and Transportation | Impacts mitigated | Yes | No |
| Transmission Line Safety | No Impact | Yes | No |
| Transmission System Engineering | Impacts mitigated | Yes | No |
| Visual Resources | Impacts mitigated | Yes | No |
| Waste Management | Impacts mitigated | Yes | No |
| Water and Soils | Impacts mitigated | Yes | Yes |
| Worker Safety | Impacts mitigated | Yes | No |

## OUTREACH AND ENVIRONMENTAL JUSTICE

The Energy Commission Public Adviser's Office has continued to solicit and support public input for the SSU6. A Spanish/English bilingual project description describing the project, explaining the process and providing contact information was prepared. Copies of the AFC were distributed to the El Centro and Calipatria libraries and, in addition to the project description flyers, posters were prepared announcing the project for those locations. Additionally, 1,400 bilingual project description flyers were distributed to homes through the Calipatria Unified School District. An additional 5,000 flyers were sent to the Imperial Valley Press for distribution. The Public Adviser also participated in the Informational Hearing and Site Visit in Calipatria on November 19, 2002, and at the Preliminary Staff Assessment Workshop held in El Centro on May 14 and 15, 2003. The Public Adviser continues to respond to requests for information from the public and provide referrals to staff.

Staff's environmental justice approach includes providing notice (in appropriate languages) to the public, including minority and/or low income communities, of the proposed project and opportunities for participation in public workshops. Analysis of potential environmental justice impacts includes assessing the minority population and low income economic status in an area within a 6-mile radius of the project.

Presentation and analysis of demographic and economic information is contained in the **SOCIOECONOMICS** section of this FSA. The environmental justice analysis includes assessment of potential impacts in the following technical areas because an environmental justice population occurs within the 6-mile radius of the SSU6: air quality, public health, hazardous materials, land use, traffic, water resources, waste management, visual resources, noise, and transmission line safety and nuisance.

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed SSU6 Project (please refer to **Socioeconomics Figure 1** in this document), and Census 2000 information that shows the low-income population is less than fifty percent within the same radius. Based on this analysis, staff for affected technical areas except air quality have identified no significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no environmental justice issues related to this project.

# SALTON SEA UNIT 6 PROJECT
# (02-AFC-2)
# FINAL STAFF ASSESSMENT


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# INTRODUCTION

## PURPOSE OF THIS REPORT

The Final Staff Assessment (FSA). presents the California Energy Commission (Energy Commission) staff's independent analysis of the CE Obsidian Energy, LLC (CEOE, applicant) Application for Certification (AFC) to construct and operate the Salton Sea Unit 6 geothermal power plant project (SSU6). This FSA is a staff document. It is neither a Committee document, nor a draft decision. The FSA describes the following:

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

The analyses contained in this FSA are based upon information from: 1) the AFC; 2) subsequent submittals; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. The FSA presents a description of the project, environmental setting, analyses, conclusions, recommendations, and proposed conditions of certification that apply to the design, construction, operation, and closure of the proposed facility.

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

## ORGANIZATION OF THE STAFF ASSESSMENT

The FSA contains an Executive Summary, Introduction, Project Description, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in a discussion of 19 technical areas. Each technical area is addressed in a separate chapter. They include the following: air quality, public health, worker safety and fire protection, transmission line safety,

hazardous material management, waste management, land use, traffic and transportation, noise, visual resources, cultural resources, socioeconomics, biological resources, soil and water resources, geological and paleontological resources, facility design, power plant reliability, power plant efficiency, and transmission system engineering. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report. Delays in receipt of important air quality information will require that the Air Quality and Alternatives sections be published by early September as Part 2 of the FSA. All other sections are contained in Part 1.

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

- laws, ordinances, regulations and standards (LORS);
- the regional and site-specific setting;
- project specific and cumulative impacts;
- mitigation measures;
- closure requirements;
- conclusions and recommendations; and
- conditions of certification for both construction and operation (if applicable).

## ENERGY COMMISSION SITING PROCESS

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

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

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

Staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act. No Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been certified by the

Resources Agency (Pub. Resources Code, §21080.5 and Cal. Code Regs., tit. 14, §15251 (k)). The Energy Commission acts in the role of the CEQA lead agency and is subject to all other applicable portions of CEQA.

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

Staff uses the PSA to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the period between publishing the PSA and the Final Staff Assessment (FSA), staff conducts one or more workshops in the project area (Calipatria and El Centro) to discuss their findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshops and written comments, staff refines the analysis, correct errors, and finalizes conditions of certification. This refined analysis, along with responses to written comments on the PSA, are incorporated into the FSA. The FSA serves as staff's testimony on a proposal.

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

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Members' Proposed Decision (PMPD). Following publication, the PMPD is circulated 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 intervenor may request that the Energy Commission reconsider its decision.

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 at the end of the projects life in compliance with the conditions adopted by the Energy Commission. Staff's proposed Compliance Monitoring Plan and proposed General Conditions are included as part of this FSA.

## Agency Coordination

As noted above, 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, § 25500). However, the Commission typically seeks comments from and works closely with other regulatory agencies that administer LORS that may be applicable to proposed projects. These agencies include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, the Army Corps of Engineers, California Department of Fish and Game, California Department of Toxic Substances Control, and the California Air Resources Board.

For geothermal power projects the Energy Commission evaluates and certifies all aspects of the project except for geothermal production and injection wells that are permitted by the Department of Conservation, Division of Oil Gas and Geothermal Resources (DOGGR), and the well pads and brine pipelines permitted by Imperial County (Pub. Resources Code, § 25120). Both agencies intend to use the Energy Commission's Final Staff Assessment as the CEQA document for their actions. Staff continues to work closely with Imperial County, BLM, and USFWS. Agency coordination is also discussed in relevant technical sections of the FSA.

## Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or a socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies. Meaningful involvement means that: (1) potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; (2) the public's contribution can influence the regulatory agency's decision; (3) the concerns of all participants involved will be considered in the decision making process; and (4) the decision makers seek out and facilitate the involvement of those potentially affected.

Energy Commission staff performs a demographic screening analysis in each energy facility siting process to determine whether a low-income and/or minority population exists within the six-mile radius area around the proposed project. For the Salton Sea Unit 6 project, based on Census 2000 data, staff found that the within a six-mile radius the minority population within the potential affected area is 65.77 percent. Therefore, staff has conducted a focused environmental justice review for this project. Please refer to the Socioeconomics section of this Final Staff Assessment to review staff's demographics screening analysis for this project.

## Public Outreach

Staff's environmental justice approach includes providing notice (in appropriate languages) of the proposed project and opportunities for participation in public workshops to minority and/or low-income communities, and providing information on

staff's environmental justice approach to persons who attend staff's public workshops. The table below lists the public outreach conducted to date.

| Meeting or Event | Date |
|---|---|
| AFC, Project Description Posters, and 25 English/Spanish Project Description Flyers sent to Libraries in El Centro, and Calipatria | August 2002 |
| 1,400 English/Spanish Project Description Flyers sent to Calipatria Schools for distribution | August 2002 |
| 5,000 English/Spanish Project Description Flyers sent to Imperial Valley Press for inserts to publications | August 2002 |
| Public Informational Hearing and Site Visit | November 19, 2002 |
| Notice of Intent-Geothermal Resource Availability Hearing | November 19, 2002 |
| Site Visit and Data Response Workshop | January 8, 9, 2003 |
| PSA and Issue Resolution Workshop | May 14, 15, 2003 |
| PSA and Issue Resolution Workshop-Transmission Lines | June 4, 2003 |
| Final Staff Assessment Part 1 Issued | August 5, 2003 |

# PROJECT DESCRIPTION

Robert Worl

On July 29, 2002 CE Obsidian Energy, LLC (CEOE) filed an Application for Certification (AFC) with the California Energy Commission seeking approval to construct and operate the Salton Sea Unit #6 (SSU6) project, a 185 megawatt (MW) net output geothermal steam powered electric generation facility. On September 25, 2002, the Energy Commission found the application to be data adequate, initiating staff's independent analysis of the proposed project.

The SSU6 project has elements unique to a geothermal project including a geothermal Resource Production Facility (RPF), geothermal-steam Power Generation Facility (PGF), production and injection wells and pads, above-ground brine pipelines, a brine waste solids handling system, and unique emissions characteristics. The project area, located near the southeast shore of the Salton Sea, is within the unincorporated area of Imperial County, California. The SSU6 Project will be owned by CEOE and operated by an affiliated company. The electric transmission lines will be owned and operated by the Imperial Irrigation District (IID).

The SSU6 includes a high efficiency condensing steam turbine with nominal 200 megawatts output and a net plant output of 185 MW. To power the turbine the project has a corresponding brine production rate of 12,815 kilo pounds per hour (kph). Normally, the facility will be operated in a base load mode: 8,000 hours per year or more. The renewable energy project is designed to supply capacity and energy to California's electric market, with over 85 percent of the plant output contracted to the IID for a 20 year period following project completion. The remaining energy will either be sold to the California Independent System Operator (ISO) or contracted to third parties via the IID (CEOE 2002a, AFC section 3.1).

Geothermal power project permitting varies from that of other thermal power plants. The Energy Commission conducts an environmental analysis of the project as a whole and permits all aspects of the project but the geothermal wells, pads and pipelines, which are subject to permitting by other agencies (Public Resources Code (PRC) section 25120). The production and injection wells are permitted by the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR). The well pads and the brine pipelines are permitted by Imperial County. Both agencies intend to use the Energy Commission's Final Staff Assessment as the California Environmental Quality Act (CEQA) document for their actions.

Geothermal projects may be subject to a lengthy Notice of Intent (NOI) process which can be avoided by providing evidence of commercial quantities of geothermal resources for the proposed project's life (PRC section 25140.2(a); and Title 20, Calif. Code of Regs., section 1804 (a)). A hearing was held November 19, 2002 and the assigned Committee issued an Order on Geothermal Resource Availability on January 17, 2003 The Committee found that the project was exempt from the NOI process, and that "there are commercial quantities of geothermal resources…for the operation of the project for its planned lifetime" (CEC 2003b).

## SALTON SEA UNIT 6 PROJECT

The SSU6 Project site is in the Imperial Valley, approximately 1,000 feet southeast of the southern reach of the Salton Sea, within the unincorporated area of Imperial County, California. The Imperial Valley is the southwest part of the Colorado Desert that merges northwestward into the Coachella Valley near the northern shore of the Salton Sea. The region is characterized by agriculture and geothermal power production. The town of Niland is approximately 7.5 miles to the northeast and the town of Calipatria is approximately 6.1 miles to the southeast of the plant site. The Sonny Bono Salton Sea Wildlife Refuge Headquarters is approximately 4,000 feet from the plant site. The Alamo River and New River are approximately 4.8 miles southwest and 2.7 miles east of the plant site, respectively. **PROJECT DESCRIPTION Figure 1** shows the regional setting for the proposed project.

The proposed power plant would be located on approximately 80 acres (Plant Site) of a 160-acre parcel owned by the applicant. The plant site will be located on the north half of the block bounded by McKendry Road to the north, Severe Road to the west, Peterson Road to the south, and Boyle Road to the east. The construction support area, including laydown and parking, will utilize approximately 24 acres and will be located immediately adjacent and south of the plant site. The plant site, construction laydown and parking areas are currently agricultural land. **PROJECT DESCRIPTION Figure 2** provides the local setting for the proposed project and depicts the project site, including proposed geothermal wells and pads, brine pipelines and electric transmission lines. Nine currently operating geothermal power plants are within a 2-mile radius of the proposed plant site, and are also shown on **PROJECT DESCRIPTION Figure 2**.

## SALTON SEA KNOWN GEOTHERMAL RESOURCE AREA

The Salton Sea and the area containing the project are within the 3,100-square-mile structural depression known as the Salton Trough. The Salton Trough is a seismically-active rift valley where sedimentation and natural tectonic subsidence are nearly in equilibrium. Distinct geothermal anomalies are distributed throughout the Salton Trough with brine of temperatures sufficient to support electric generation. Oil and gas exploration of the area in 1958 is credited with discovery of the Salton Sea field, an area including 161 square miles and 102,887 acres. (See **PROJECT DESCRIPTION Figure 1).** This area is designated as the Salton Sea Known Geothermal Resource Area (KGRA) by the United States Geological Survey:

"A KGRA is an area in which the geology, nearby discoveries, competitive interests, or other indicators would, in the opinion of the Secretary of the Interior, engender a belief in those who are experienced in the subject matter that the prospects for extraction of geothermal steam or associated geothermal resources are good enough to warrant expenditures of money for that purpose (30 U.S.C. 1001)." (CEOE 2002a, AFC §3.2.1).

## SITE SELECTION

Successful commercial development of the Obsidian Butte region of the KGRA began in 1982 and there are now nine operating power plants producing 350 gross MW, on 4,808 acres. These plants vary in production capacity from 10 MW to 49.8 MW. The SSU6

project will develop an additional 3,180 acres and produce an additional 185 net MW (CEOE 2002a, AFC § 3, Table 3.2-1, p. 3-49). Imperial County contains sixteen operating geothermal power plants, providing a variety of benefits to the region including tax revenue, employment, and electricity (Imperial County Planning/Building Department, 2003p).

Geophysical dynamics of the KGRA have a determining influence on the siting of energy projects. Experience and reservoir data from the earlier explorations, plant developments, and recent exploratory drilling were crucial in deciding the location of SSU6. The project site is located along a geologic main blind fault that bisects the Obsidian Butte area in a west-southwest to east-northeast direction. Reservoir temperatures increase to the northwest of this fault with the hottest area under the Salton Sea. Production wellhead temperatures will be from 450-480 degrees Fahrenheit, while injection temperatures are expected to be 230-240 degrees Fahrenheit. The features of this fault structure allow the existing power plants, and SSU6, to maximize the use of the geothermal resource through strategic placement of production and injection wells north of this fault. The blind fault allows injection of cooler steam-depleted brine on the opposite side of the fault from production wells, eliminating the short-term impacts from the cooled, spent brines on the hot production brines and maximizing the production life of the field.

The KGRA and geothermal development are recognized in the Imperial County General Plan's Geothermal and Transmission Element. The project site lies within the plan's A-3-G, heavy agriculture with geothermal overlay zone (Imperial County Planning/Building Department 1993).

## PROJECT COMPONENTS

The Salton Sea geothermal power plants rely upon steam extracted from geothermal brine brought to the plant sites through production wells strategically drilled to maximize use of the resource, without depleting or reducing the natural pressures from the field. To accomplish this specialized facilities are needed to extract the necessary steam at appropriate pressures for turbine operation, and then return the spent brine back to the subsurface resource. The process involves conditioning the steam for turbine use, utilizing condensed and cooled water from the process for cooling, and conditioning the residual brine for reinjection to the field at selected locations. The SSU6 will accomplish these tasks utilizing the following described project components, depicted in **PROJECT DESCRIPTION Figure 2** and **PROJECT DESCRIPTION Figure 3**:

The project plans to use an average of 293 acre-feet per year of fresh water primarily for dilution of the processed brine prior to reinjection.

### Resource Processing Facility (RPF)

The RPF extracts geothermal brine, produces steam to power the turbine, and reinjects the spent and reconditioned brine back into the formation. This is accomplished through the 10 production wells on 5 well pads, and the seven brine injection wells on 3 well pads. Brine is carried through specialized raised pipelines from the production wellheads and back to the injection wellheads. Two plant injection wells also are part of

the RPF, one for injecting cooling tower blow-down, and the other for use in reinjecting aerated brine accumulated in the brine pond.

A brine/steam handling system will extract high pressure (300 psi), standard pressure (120 psi), and low pressure (20 psi) steam, by passing the steam through separators and crystallizers to extract dissolved solids, then through scrubbers and demisters to clean and condition the steam for turbine use. A similar process train is employed for each of the operating pressure steam streams. All heat-depleted brine then flows through an additional flash system to reduce pressure to near-atmospheric pressure, and then through a clarifier system and a solids dewatering system, conditioning the brine, removing suspended solids, adding treated water to control brine quality, and then sending the cooler depleted brines back to the injection well system (CEOE 2002a, AFC § 3.3.2, pps. 3-7 to 3-10).

## Power Generation Facility (PGF)

The PGF facilities include the turbine generator system, heat rejection system, $H_2S$ abatement/carbon adsorber system and two cooling towers, each with 10 cells. The three-pressure turbine is direct-coupled to a totally enclosed water and air cooled synchronous-type generator with a nominal (gross) rating of 200 MW, with the plant parasitic load reducing output to a net 185 MW (CEOE 2002a, AFC § 3.3.3, pps. 3-12, and 3-13).

## Wells and Well Pads

There will be 10 production wells on five production well pads each connected by above-ground pipelines to the RPF. These wells and pads are located very close to the main facility and the combined length of production pipelines will be approximately one mile. Seven new injection wells located on three injection well pads will be connected to the RPF by approximately three miles of pipelines. The eight new production and injection well pads will average 5.2 acres in size (CEOE 2002a, AFC §§ 3.2.2.1, 3.3.1.3, 3.3.2.1, 3.3.2.4.2, and 3.3.2.4.3).

## Linear Facilities

Production pipelines will conduct hot brine from the well heads to the RPF, and injection pipelines will return conditioned, depleted brine to the injection wells. Total pipeline length will be approximately four miles, and will consist of 24 or 30-inch pipe elevated to approximately three feet above grade (CEOE 2002a, AFC §§ 3.2.2.1, 3.3.1.3, 3.3.2.1, 3.3.2.4.2, and 3.3.2.4.3).

Fresh water for the project will be IID canal water delivered through a 500-foot buried pipe from the Vail 4A lateral to the service water pond. The water is then used primarily for dilution of geothermal brine prior to reinjection and for potable use after treatment in an on-site reverse osmosis (RO) unit. Projected average use is approximately 293 acre-feet per year (CEOE 2002a, AFC § 3.3.4.2, 3.3.4.2.1, 3.3.4.2.3, 3.3.4.2.4). Extreme hot summer conditions, occurring approximately 5 days per year, could require some canal water be used to augment water condensed from steam extraction for use in plant cooling (CEOE 2002l, p. 62).

Two electric transmission interconnection lines are planned totaling 31 miles of new single-circuit 161 kV line. **PROJECT DESCRIPTION Figure 4** shows the full length and routes of the proposed transmission lines. One line will interconnect at the IID Midway substation 15-miles to the east of the site, and another will interconnect with the existing IID L-line approximately 16 miles southwest. The L-line interconnection will loop into the existing L-line via a new switchyard located on Bannister Road, approximately twelve miles from the project site (CEOE 2003b). This interconnection will then cross approximately 2.8 miles of Bureau of Land Management (BLM) land requiring approval of the route through amendment to the California Desert Conservation Area Plan (CDCA) (CEOE 2002a, AFC § 5.8.1.2.1. An approximately seven and one half-mile route paralleling State Highway 86 and interconnecting with the L-line after it leaves the BLM lands, is also proposed for review as a non-federal lands alternative. The IID has denoted several of its main transmission lines by letter designations. The L-line is an existing line connecting the Avenue 58 and El Centro substations (CEOE 2002a, AFC § 3.3.6.2).

## PROJECT CONSTRUCTION SCHEDULE

The overall project schedule is expected to take at least 26 months. Construction and startup of the power plant from the start of site mobilization to commercial operation is expected to take at least 20 months. The construction timeframe if approved under the current CEC review schedule is expected to begin in late 2003 and end during the winter of 2005-2006. The construction schedule is based upon a single-shift, eight-hour workday, and a five-day workweek (CEOE 2002a, AFC §3.4.1.1, and .AFC Table 3.4-1).

## FACILITY CLOSURE

The Salton Sea Unit 6 plant will be designed for an operating life of 30 years. If the plant were economically viable at the end of this 30-year period, and the equipment is maintained to industry standards, the plant's life could be extended beyond this timeframe. But at some point in the future, the project will cease operation and close down. At that time, it will be necessary to insure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts.

Although the setting for this project does not appear 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 at the time of closure. LORS pertaining to the facility closure are identified in the technical sections of this assessment. Facility closure will be consistent with laws, ordinances, regulations and standards in effect at the time of closure (CEOE 2002a, AFC § 3.6).

## REFERENCES

CEOE (CE Obsidian Energy LLC, Calipatria, California) 2002a. Application for Certification, Volumes I & 2. Submitted to the California Energy Commission on July 29, 2002.

CEOE (CE Obsidian Energy LLC, Calipatria, California) 2002l, Responses to California Energy Commission Data Requests, Set 1. December 2, 2002.

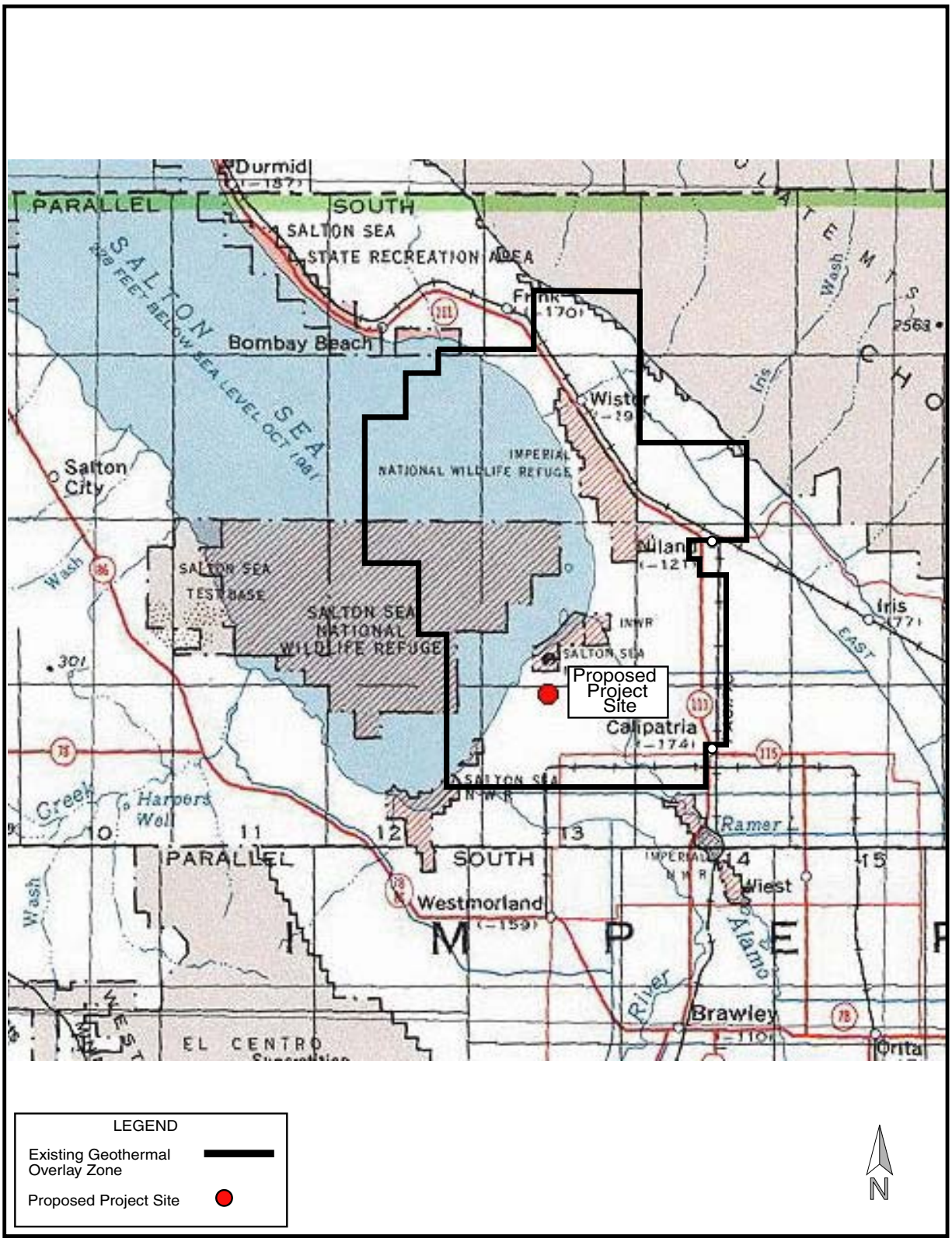
CEOE (CE Obsidian Energy LLC, Calipatria, California) 2003b. Clarifying a Project Change to a switching station at Bannister Rd., and eliminating the proposed substation adjacent to the project site. January 7, 2003.

CEC (California Energy Commission) 2003b. Order on Geothermal Resource Availability. Committee Order, January 17, 2003.

Imperial County Planning/Building Department 1993. Imperial County General Plan, Geothermal and Transmission Element.

**PROJECT DESCRIPTION - FIGURE 1**

Salton Sea Geothermal Unit #6 Power Project - Regional Map

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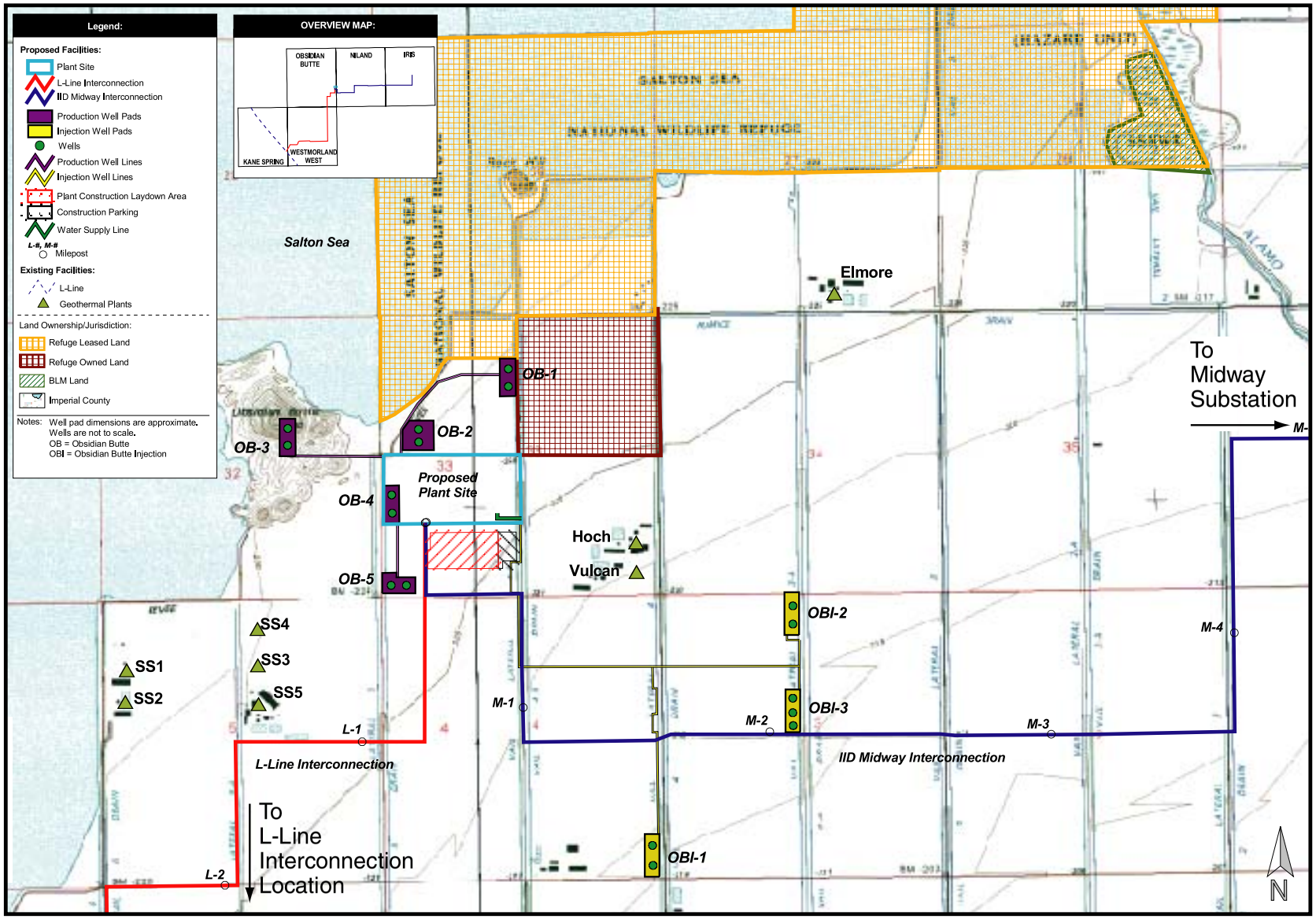
SOURCE: National Geographic TOPO map and AFC Figure 5.8-2

**PROJECT DESCRIPTION - FIGURE 2**

Salton Sea Geothermal Unit #6 Power Project - Project Area

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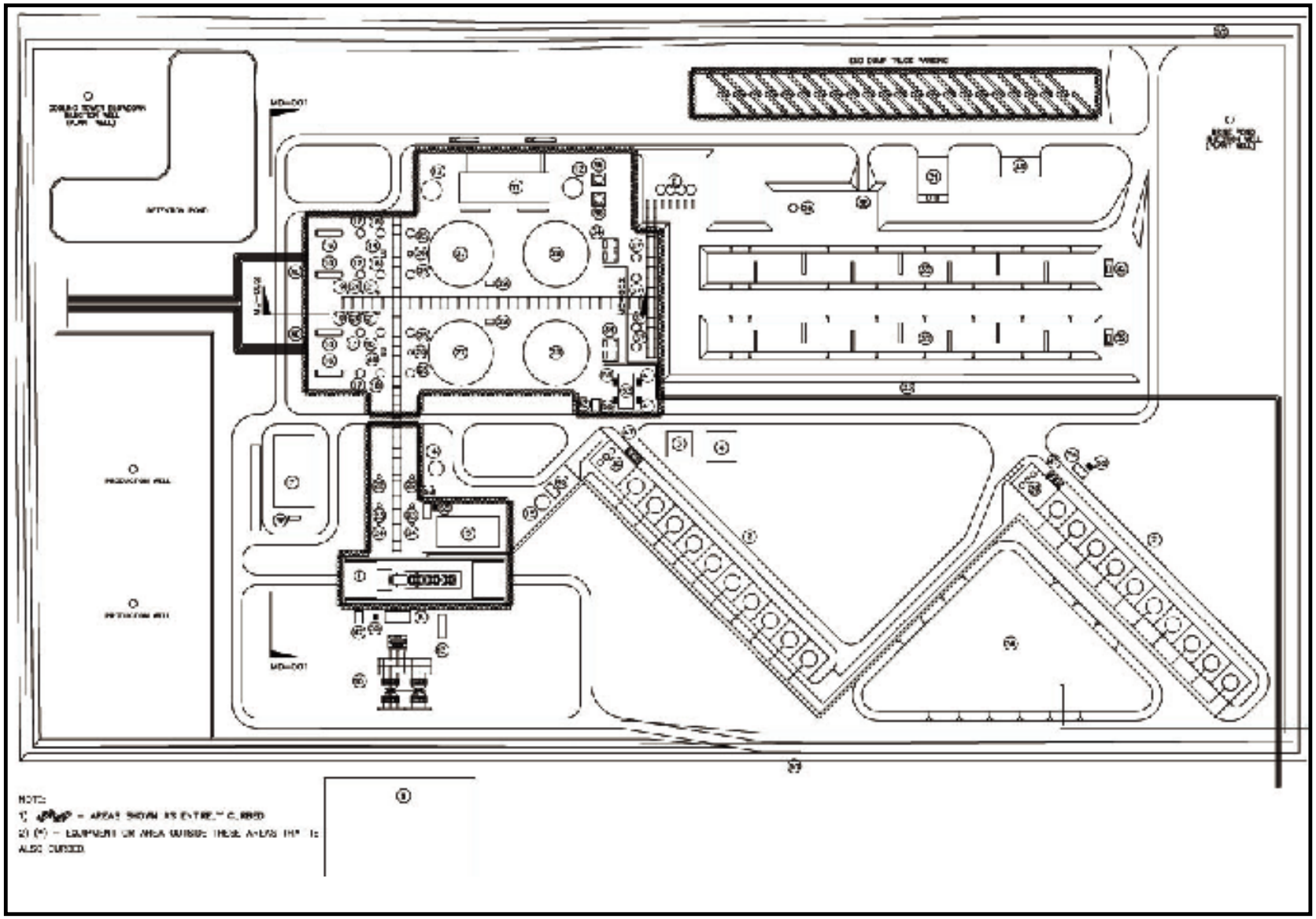
SOURCE: AFC Figure 5.8-1B

**PROJECT DESCRIPTION - FIGURE 3A**

Salton Sea Geothermal Unit #6 Power Project - Site Plan Layout



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SOURCE: AFC Figure 3.3-1B

**PROJECT DESCRIPTION - FIGURE 3B**

Salton Sea Geothermal Unit #6 Power Project - Plant Layout Legend

1. Steam Turbine/Generator
2. COOLING TOWER
3. BENZENE ABATEMENT
4. H2S ABATEMENT*
5. NCG REMOVAL SYSTEM
6. STEAM VENT TANKS
7. CONTROL BUILDING
8. PDC 601
9. N/A
10. SUBSTATION*
11. FILTER PRESS SYSTEM
12. THICKENER
13. LUBE OIL SKID*
14. CONDENSATE STORAGE TANK
15. FIRE WATER TANK (STORAGE CAPACITY 300,000 GALLONS)
16. HIGH PRESSURE SEPARAOR
17. STANDARD PRESSURE CRYSTALLIZER
18. LOW PRESSURE CRYSTALLIZER
19. HIGH PRESSURE SCRUBBER
20. STANDARD PRESSURE SCRUBBER
21. LOW PRESSURE SCRUBBER
22. HIGH PRESSURE DEMISTER
23. STANDARD PRESSURE DEMISTER
24. LOW PRESSURE DEMISTER
25. ATMOS. FLASH TANK
26. DILUTION WATER HEATER (BAROMETRIC CONDENSOR)
27. PRIMARY CLARIFIER
28. SECONDARY CLARIFIER
29. SEED PUMPS
30. CIRC. WATER PUMPS
31. HYDRO-BLAST PAD*
32. AERATED BRINE INJECTION PUMPS*
33. INJECTION LINES
34. MAIN INJECTION PUMPS
35. BRINE POND
36. WATER POND
37. EMERGENCY RELIEF TANK
38. TRUCK WASH DOWN*
39. PRODUCTION TEST UNIT*
40. PRODUCTION MANIFOLD
41. 4160 V. TRANSFORMER
42. 480 V. DIESEL GENERATOR
43. 4160 V. GENERATOR
44. DILUTION WATER PUMPS
45. FIRE WATER PUMP HOUSE
46. HCL TANK
47. CHEMICAL TANKS - TOWERS*
48. CHEMICAL TANKS – FLOCCULANT
49. CHEMICAL/OIL STORAGE PAD*
50. PLANT ACCESS POINT
51. CANAL WATER SUPPLY FROM IID VAIL 4A
52. PDC 602
53. PDC 603
54. PDC 604
55. 480 V. TRANSFORMER
56. SEPTIC TANK

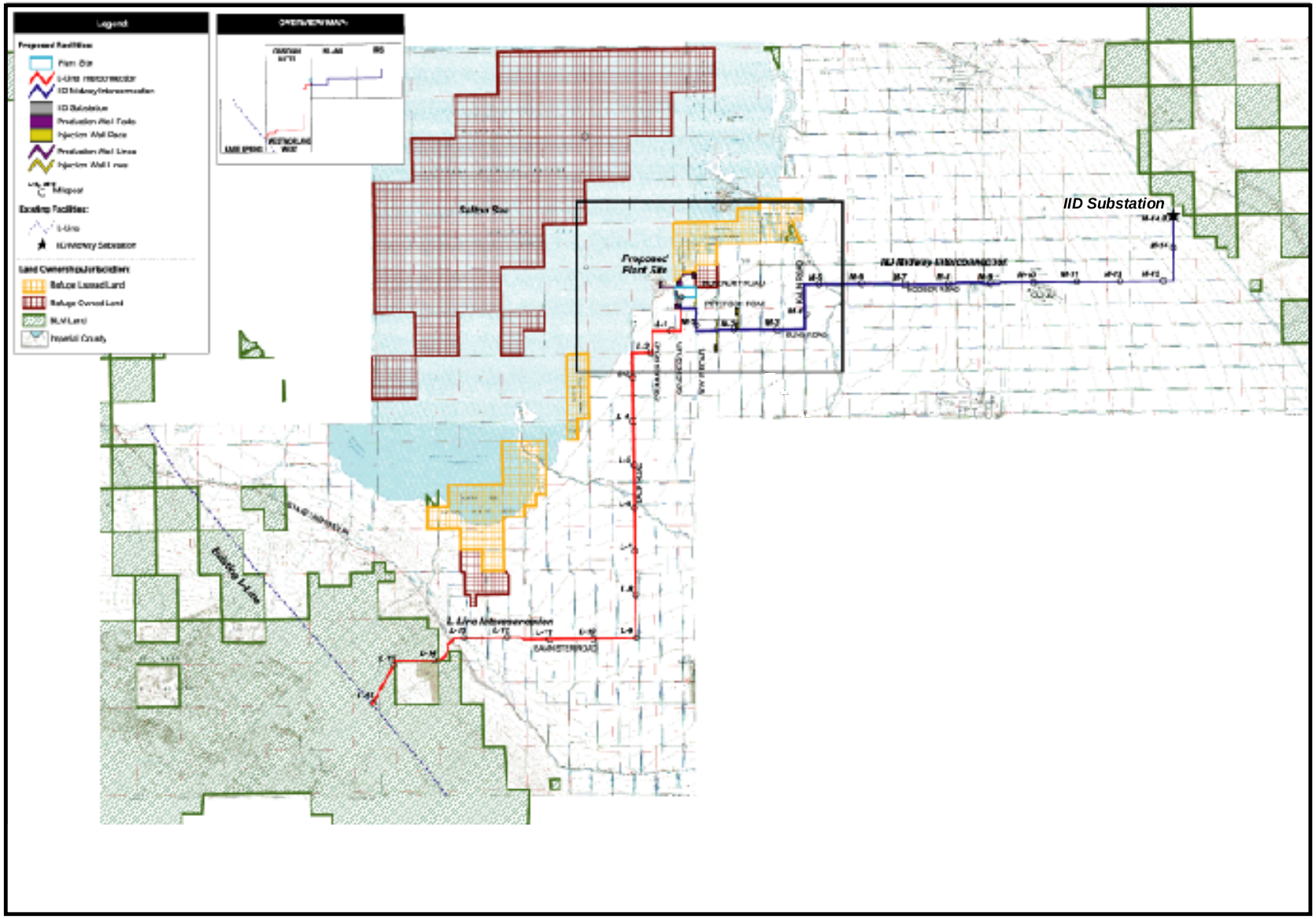




SOURCE: AFC Figure 3.3-1B

**PROJECT DESCRIPTION - FIGURE 4**

Salton Sea Geothermal Unit #6 Power Project - Jurisdictional Boundary

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SOURCE: AFC Figure 5.8-1A

# ENVIRONMENTAL ASSESSMENT

# BIOLOGICAL RESOURCES

Testimony of Natasha Nelson

## INTRODUCTION

This section provides the California Energy Commission's (Energy Commission) Final Staff Assessment (FSA) of potential impacts to terrestrial and aquatic biological resources from the construction and operation of the Salton Sea Unit 6 Project (SSU6) proposed by CE Obsidian Energy, LLC (CEOE; applicant). Information provided in this document addresses potential impacts to state and federally listed species, Species of Special Concern, and areas of critical biological concern. This analysis also describes the biological resources of the project site and at the locations of ancillary facilities. This document determines the need for mitigation, the adequacy of mitigation proposed by the applicant, and where necessary, specifies additional mitigation measures to reduce identified impacts to less than significant levels. It also determines compliance with applicable laws, ordinances, regulations and standards (LORS), and recommends conditions of certification.

This analysis is based, in part, upon information provided in the Application for Certification (AFC) for the Salton Sea Project (CEOE 2002a, Section 5.5 and Appendix K), data adequacy responses (CEOE 2002e), various responses to staff data requests (CEOE 2002l and 2003d) and CURE data requests (CEOE 2003a, 2003f, 2003g, 2003o), responses to U.S. Fish and Wildlife Service data request (USFWS 2003b, CEOE 2003s), site visits conducted on August 21, 2002 and January 9, 2003, and discussions with various agency and applicant representatives during a Data Response and Issues Workshop on January 9, 2003 and a special workshop regarding the L-line transmission lines on June 4, 2003.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The applicant will need to abide by the following laws, ordinances, regulations, and standards during project construction and operation.

### FEDERAL

#### Clean Water Act of 1977

Title 33, United States Code, sections 1251-1376, and Code of Federal Regulations, part 30, section 330.5(a)(26), prohibit the discharge of dredged or fill material into the waters of the United States without a permit. The administering agency is the U.S. Army Corps of Engineers (USACE). The applicant has submitted an application for a Section 404 permit for its proposed impacts to wetlands along McKendry Road.

#### Endangered Species Act (ESA) 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. The administering agency is the U.S. Fish and Wildlife Service (USFWS). The USACE and Bureau of

Land Management (BLM) are requesting consultation pursuant to Section 7 of the ESA for the proposed project.

## Migratory Bird Treaty Act

Title 16, United States Code, sections 703 through 712, prohibit the take of migratory birds, including nests with viable eggs. The administering agency is the USFWS. The applicant would need to request a permit for the take of nest(s) during construction.

## California Desert Conservation Area Plan

The California Desert Conservation Area Plan (CDCA) encompasses 25 million acres of land in Southern California that was designated by Congress in 1976 through the Federal Land Policy Management Act. The BLM directly administers about 10 million acres of the CDCA. The 1980 CDCA Plan, as amended, is based on the concepts of sustained yield, multiple-use, and maintenance of environmental quality. The CDCA, among other tasks, designated utility corridors; any utilities outside of these corridors require an amendment to the CDCA. The BLM has announced their intent to prepare an amendment permit and is currently holding public workshops.

## Management and General Public Use of the National Wildlife Refuge System

Executive Order 12996 of March 25, 1996 stated the mission of the National Wildlife Refuge System is to preserve a national network of lands and waters for the conservation and management of fish, wildlife, and plant resources of the United States for the benefit of present and future generations. The Order set forth-guiding principles for public access and involvement, habitat preservation, and local partnerships.

## National Wildlife Refuge System Improvement Act of 1997

The Act's main components improve the National Wildlife Refuge System Administration Act of 1966 by amending it to include a unifying mission for the Refuge System, a new process for determining compatible uses of refuges, and a requirement for preparing comprehensive conservation plans. The legislation requires that a comprehensive conservation plan (also known as comprehensive management plan) be in place for each national wildlife refuge within 15 years after passage of this bill. The plans must be revised at least every 15 years. Guidelines on producing a comprehensive conservation plan were published in the Federal Register on May 25, 2000. Salton Sea does not have a comprehensive conservation plan completed.

## Salton Sea Reclamation Act of 1998

The Salton Sea Reclamation Act of 1998 (Public Law 105-372; Sonny Bono Memorial Salton Sea Reclamation Act) directs the Secretary of Interior to "complete all studies of various options that permit the continual use of the Salton Sea as a reservoir for irrigation drainage and:

- reduce and stabilize the overall salinity of the Salton Sea;
- stabilize the surface elevation of the Salton Sea;
- reclaim, in the long term, healthy fish and wildlife resources and their habitats; and

- enhance the potential for recreational uses and economic developments of the Salton Sea."

## Lea Act

The Lea Act was enacted to help farmers who were experiencing problems with crop damage from ducks and geese. This Act enacted on May 18, 1948 (16 U.S.C. 695-695c; 62 Stat. 238) authorized the Secretary of Interior to acquire and develop waterfowl and other wildlife management areas in California, provided the State acquires equivalent acreage. Lands acquired under the Act as management areas are not subject to the prohibition against taking birds, nests, or eggs, and hunting may be regulated in a cooperative manner necessary to carry out the provisions of the Act and subject to the provisions of the Migratory Bird Treaty Act. The Salton Sea Wildlife Refuge currently rents land from Imperial Irrigation District (IID) in partial fulfillment of this Act.

## STATE

With exception of the last LOR in this part of the FSA, the administering agency is the California Department of Fish and Game.

## California Endangered Species Act (CESA) of 1984

Fish and Game Code sections 2050 through 2098 protect California's rare, threatened, and endangered species. The applicant would need to request review of the USFWS permits for conformance with CESA.

## California Code of Regulations

California Code of Regulations Title 14, Division 1, Subdivision 3, Chapter 3, sections 670.2 and 670.5 list plants and animals of California that are designated as rare, threatened or endangered.

## California Public Resources Code

Division 15, Chapter 6, Sections 25527, the code which guides the Energy Commission, prohibits placing facilities within ecological preserves, wildlife refuges, estuaries, and unique or irreplaceable wildlife habitats of scientific or educational value.

## Fully Protected Species

Fish and Game Code sections 3511, 4700, 5050, and 5515 prohibit take of animals that are classified as fully protected in California.

## Nest or Eggs – Take, Possess, or Destroy

Fish and Game Code section 3503 protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically protects California's birds of prey and their eggs by making it unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird.

## Migratory Birds – Take or Possession

Fish and Game Code section 3513 protects California's migratory birds by making it unlawful to take or possess any migratory non-game bird as designated in the Migratory Bird Treaty Act or any part of such migratory non-game bird.

## 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.

## Wildlife and Natural Areas

Fish and Game Code section 2700 *et seq.* provide funding to the Wildlife Conservation Board and CDFG for acquisition, enhancement, restoration, and protection of areas that are most in need of proper conservation. In the southern Salton Sea area, CDFG operates Imperial Wildlife Area in three units: Wister, Hazard, and Finney-Ramer.

## Ecological Reserves

Fish and Game Code section 1580 et seq. establish ecological reserves that shall be preserved in a natural condition for the general public to observe native flora and fauna. It is unlawful to take a bird, mammal, or plant from an ecological reserve. San Felipe Creek Ecological Reserve, one such reserve, is located near the intersection of State Highways 86 and 78, about 10 miles west of the proposed project.

## Native Plant Protection Act of 1977

Fish and Game Code section 1900 *et seq.* designate state rare, threatened, and endangered plants.

## Streambed Alteration Agreement

Fish and Game Code section 1603 *et seq.* regulates activities by private utilities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake designated by the CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. The applicant may need a CDFG permit for its proposed impacts to wetlands along McKendry Road.

## Regional Water Quality Control Board

By federal law every applicant for a federal permit or license for an activity which may result in a discharge into a water body must request state certification that the proposed activity will not violate state and federal water quality standards. The project owner may need a CWA section 401 certification from the Colorado River Basin Regional Water Quality Control Board (RWQCB). The RWQCB provides its certification after reviewing the federal permits provided by the USACE.

## LOCAL

### Imperial County General Plan: Conservation and Open Space Element

The purpose of the Conservation and Open Space Element is to promote the protection, maintenance, and use of the County's natural resources with particular emphasis on scarce resources, and to prevent wasteful exploitation, destruction, and neglect of the State's natural resources. The Conservation and Open Space Element contains specific Biological Resource objectives[1] including:

- Objective 2.1: Conserve wetlands, fresh water marshes, and riparian vegetation.
- Objective 2.2: Protect significant fish, wildlife, plants species, and their habitats.
- Objective 2.3: Protect unique, rare, and endangered plants and animals and their habitat.
- Objective 2.4: Use the environmental impact report process to identify, conserve and enhance unique vegetation and wildlife resources.
- Objective 2.6: Attempt to identify, reduce and eliminate all forms of pollution, which adversely impact vegetation and wildlife.
- Objective 2.8: Adopt noise standards, which protect sensitive noise receptors from adverse impacts.

The primary mechanism to implement the Goals and Objectives of the Conservation and Open Space Element is to incorporate environmental concerns into land use planning. Thus, this Element also incorporates policies, and then identifies the programs the County intends to undertake to promote that policy. Under the heading of Biological Resource Conservation the County defines several relevant land planning policies.

#### Policy 1

Provide a framework for the preservation and enhancement of natural and created open space, which provides wildlife habitat values.

Protect riparian habitat and other types of wetlands from loss or modification by dedicating open space easements with adequate buffer zones, and by other means to avoid impacts from adjacent land uses. Road crossings or other disturbances of riparian habitat should be minimized and only allowed when alternatives have been considered and determined infeasible.

#### Policy 2

Landscaping should be required in all developments to prevent erosion on graded sites and, if the area is contiguous with undisturbed wildlife habitat, the plan should include revegetation with native plant species.

[1] Objectives 2.5 and 2.7 are not applicable

## Imperial County General Plan: Noise Element

The purpose of the Noise Element is to make land use planning decisions, which protect the environment from excessive noise sources. The policy of the Noise Element is that construction noise, from a single piece of equipment or a combination of equipment, shall not exceed 75 dB $L_{eq}$[2], when averaged over an eight (8) hour period, and measured at the nearest sensitive receptor. This standard assumes a construction period, relative to an individual sensitive receptor of days or weeks. In cases of extended length construction times, the standard may be tightened so as not to exceed 75 dB $L_{eq}$ when averaged over a one (1) hour period. The Noise Element identifies that many riparian bird species are sensitive to excessive noise, and as such they are considered a sensitive receptor. During operations, the project would be held by the County to the property line standard[3]. The property line standard allows from 50 dB to 75 dB to be generated from the project depending on the adjacent land use (see the NOISE section of this FSA).

The Noise Element includes a few applicable objectives relating to the issues staff identified related to biological resources:

- Objective 1.5 Identify sensitive receptors with noise environments which are less than acceptable, and evaluate measures to improve the noise environment.
- Objective 1.6 Collect data for existing noise sources in the County in order to improve the data base and enhance the ability to evaluate proposed projects and land uses.
- Objective 2.3 Work with project proponents to utilize site planning, architectural design, construction, and noise barriers to reduce noise impacts as projects are proposed.

## Imperial County General Plan: Geothermal/Transmission Element

The Geothermal and Transmission Element of the General Plan presents the Goals and Objectives relative to geothermal development within the unincorporated areas of the County. The Geothermal/Transmission Element identifies that any transmission line exporting power from Imperial County may impact agricultural lands, wildlife, and the natural desert landscape. The planning and design of these lines should take into account these factors. The Geothermal and Transmission element contains specific Biological Resource objectives including:

- Objective 2.1 Site and design [geothermal] production facilities to lessen impacts on agricultural land and biological resources.
- Objective 2.3 Utilize existing easements or rights-of-way and follow field boundaries for liquid transmission lines.
- Objective 2.5 Consider relocating or creating new habitat as might be appropriate.

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[2] $L_{eq}$ is the level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.

[3] The property line standard implies the existence of a sensitive receptor on the adjacent, or receiving, property. In the absence of a sensitive receptor, an exception or variance to the standards may be appropriate. The property line standards do not apply to construction noise.

- Objective 5.2 Design [transmission] lines for minimum impacts on agriculture, wildlife, urban areas, and recreational activities.

## SETTING

## REGIONAL

The proposed project site and linear facility routes would be located at the southern end of the Salton Sea in Imperial County. The Salton Sea covers over 380 square miles, and thousands of waterfowl and other birds spend the winter in its waters or along the shoreline. The Salton Sea provides feeding, resting, and nesting habitat for birds and supports a diversity of wildlife species throughout the year.

The dry desert east and south of the Salton Sea has been converted to a highly productive agricultural area with an intricate system of dikes, pump stations, drains, and irrigation canals. Most parcels of land are actively farmed and are isolated between the taller water conveyance features. Much of the agricultural production is alfalfa or food crops for retail sale during the winter months. Areas to the west and north of the Salton Sea are less developed.

The Chocolate Mountains stand just over 2,000 feet high on the east and northeast side of the valley, and the Santa Rosa Mountains stand over 4,500 feet high on the west and northwest. Because much of the valley area is below sea level, the mountains have isolated this part of the desert and created what is known as the Salton Sink. All rain that falls on the interior slopes of the trough or water used as irrigation, is isolated and flows into the lowest point in the trough, the Salton Sea (currently about 227 feet below sea level). This has created a large salinity problem because no salts or chemicals can be flushed out of the system. Currently the level of dissolved salt in the Salton Sea is around 40,000 parts per million. As a comparison, the Pacific Ocean is around 35,000 parts per million.

The southeast edge of the Salton Sink is gently sloping, and has a 40-mile-long dune system on the west side of Sand Hills. This is one of the largest in the United States and was formed by windblown beach sands of ancient Lake Cahuilla. Some crests reach heights of over 300 feet. These dunes are a large recreational attraction, but the northern portion has been designated a wilderness area by the BLM and is off limits to vehicles. The southwest edge of Salton Sink is a gently sloping desert environment with little topographical relief, with the exception of the Superstition Hills and Fish Creek Mountains which stand from 200 to 270 feet above sea level. These flatter areas are criss-crossed with highways, transmission lines, and other linear facilities which connect the United States and Mexico.

### Existing Vegetation and Wildlife

The applicant completed a survey of flora and fauna in the project area. The observed plant species consisted primarily of a mixture of native and non-native herbaceous species commonly found in disturbed areas, fallow fields, meadows and wetlands. This is to be expected since the majority of the area is in active agriculture production. West of State Highway 86 are some relatively undisturbed lands under the jurisdiction of the

BLM. The habitat west of State Highway 86 is creosote bush scrub consisting of creosote bush (*Larrea tridentata*), burroweed (*Ambrosia dumosa*), saltbush (*Atriplex* spp.), and ephedra (*Ephedra viridis*).

The Sonny Bono Salton Sea Wildlife Refuge (Refuge) actively manages agricultural lands, wetlands, and upland habitat to supply foraging and nesting opportunities to the many birds that migrate to the Salton Sea. However, the majority of the land surface in the project area is subject to regular disturbance from agricultural activity. On the agricultural lands there is little or no cover or suitable nesting habitat above one foot from the surface; however there is foraging habitat for species that prey on small mammals and insects. There are currently several geothermal facilities in the region similar to the proposed project.

An extensive survey of birds was undertaken to quantify the bird migration routes to the Salton Sea. Birds were detected in September and October 1994, December 1999, March through June 2000, May and June 2001, October through December 2001, and January through June 2002 (CEOE 2002a, Appendix K, Flyover and Abundance Survey Results). The surveys found a diverse array of shorebirds, raptors, and waterfowl (see CEOE 2002a, Appendix K, Flyover and Abundance Survey Results). Birds arrive from distant southern locations crossing into the Refuge which lies to the north of the project site. Some species were found in groups, like red-winged blackbirds (*Agelaius phoeniceus*), and others as individuals, like cattle egret (*Bubulcus ibis*). Stations near the New River and Alamo River showed high levels of flyover use, while others, like the proposed power plant site, showed little avian flyover use.

The Salton Sea was stocked with several marine fish in the 1950's when the salinity of the Salton Sea was nearly that of the Pacific Ocean. The introductions resulted in the establishment of orange-mouth corvina (*Cynoscion xanthulus*), sargo (*Anisotremus davidsoni*), and gulf croaker (*Bairdiella icistius*). Continued increases in salinity are threatening the fisheries in the Salton Sea. Fresh water game fish (e.g., striped bass [*Morone saxatilis*], black crappie [*Pomoxis nigromaculatus*]) were introduced to the canals of the irrigation system in the 1950's to remove weeds in the canals (Imperial County 1977). Tilapia (*Tilapia* ssp.), an introduced species from Africa, are also present in the canals. Increased salinity in the canals would also be deleterious to these species.

## Special Status Species

Although the area around the project site has been highly modified, several special status plant and animal species are known to historically occur within one mile of the project area or along the project's linear facilities, or were specifically identified in USFWS and CDFG correspondence as likely to occur within the project area. The Salton Sea, just north of the project, supports over five endangered species at the Refuge. A list of these species is presented in **Biological Resources Table 1**.

**Peirson's Milk-vetch** (*Astragalus magdalenea* var. *peirsonii*). Peirson's milk-vetch is found on the slopes and hollows of mobile sand dunes, usually in the lee of the prevailing winds. The closest recorded occurrence of Peirson's milk-vetch is Kane Spring, which is on the west side of the Salton Sea. Suitable habitat is lacking in the

immediate area of the project. No further analysis of this plant is warranted as it is not expected to occur in the project vicinity.

**Desert Pupfish** (*Cyprinodon macularius*). The Desert pupfish was listed as a California endangered species in 1980; the USFWS listed this species as endangered and designated critical habitat in 1986 because of habitat alteration, the introduction of exotic species and contaminants, and other habitat impacts. The species was once endemic to the Colorado River and numerous springs throughout the Salton Sink, but is presently found only in the Salton Sea and some of its tributaries. Researchers have been surveying for this species intensively since 1980 and found they are using several of the laterals, agricultural drains, and shoreline pools (CEOE 2002l, Data Response BR-16; Black 1980). Surveys in the 1990s did not consistently detect Desert pupfish in the Salton Sea area (CEOE 2002a, Appendix K, Biological Assessment, Table 4).

**Pelicans** (*Pelecanus* ssp.). The federally and state-listed endangered California brown pelican (*Pelecanus occidentalis californicus*) regularly occurs in the Salton Sea. The migrants usually begin to arrive in June and depart by late fall. Highest densities are found from July to September. Most do not nest in the area, although a few pairs formed in 1996 through 1999, and nests were established on Obsidian Butte, Mullet Island, and at the mouth of the Alamo River (Charles Pelizza, personal communication). American white pelicans (*Pelecanus erythrorhynchos*), a state Species of Special Concern, use the area as a migratory stop over in spring and fall, and some individuals may spend the winter. Both species use the open water portion of the sea for resting and feeding. Tens of thousands of pelicans use Mullet Island (about 4 miles north of Obsidian Butte). A California brown pelican loafing area is located along the islands south and west of Obsidian Butte (Obsidian Butte Rookery; January 9, 2003 Data Reponse and Issues Meeting). California brown pelicans were consistently seen in spring 2003 along the Salton Sea shoreline at the corner of Lack and Lindsey Roads (USFWS 2003c).

Since 1996, there have been several outbreaks of avian botulism at the Salton Sea. The most affected birds in this botulism outbreak, which normally targets waterfowl, were American white pelicans and California brown pelicans. Mortality from these outbreaks is high, for example in 1996 over 8,000 American white pelicans and over 1,000 California brown pelicans were killed. Disease outbreaks are a chronic problem that is hard to remedy.

There are approximately 15 fish farming operations (or aquaculture) around Salton Sea (Rafferty 2003). California brown pelicans have been attracted to aquaculture farms in the area, and rapid flights from these ponds have resulted in deaths due to collisions with distribution lines (CDFG, personal communication to N. Nelson). California brown pelicans are also documented in USFWS records as striking distribution lines near the Salton Sea. There is no recorded evidence of the birds striking transmission lines, which are much taller and have a thicker gauge wire.

**BIOLOGICAL RESOURCES - Table 1**
**Sensitive Species Known to Occur in the Project Vicinity**
**(CE Obsidean Energy 2002a, Table 5.5-1B and 5.5-1C)**

| **Sensitive Plants** | **Status* (Federal, State)** |
|---|---|
| *Astragalus magdalenae* var. *peirsonii* (Peirson's milk-vetch) | FT, --, CNPS List 1B |

| **Sensitive Wildlife** | **(Federal, State)** |
|---|---|
| **Birds** | |
| *Pelecanus erythrorhynchos* (American white pelican) | --, CSC |
| *Pelecanus occidentalis californicus* (California brown pelican) | FE, CE, CFP |
| *Phalacrocorax auritus* (double-creasted cormorant) | --, CSC |
| *Ixobrychus exilis* (least bittern) | --, CSC |
| *Plagadis chichi* (white-face ibis) | --, CSC |
| *Accipiter cooperi* (Cooper's hawk) | --, CSC |
| *Accipiter striatus* (sharp-shinned hawk) | --, CSC |
| *Falco mexicanus* (prairie falcon) | --, CSC |
| *Circus cyaneus* (Northern harrier) | --, CSC |
| *Buteo regalis* (ferruginous hawk) | --, CSC |
| *Falco columbarius* (merlin) | --, CSC |
| *Pandion haliaetus* (osprey) | --, CSC |
| *Rallus longirostris yumanensis* (Yuma clapper rail) | FE, CT, CFP |
| *Laterallus jamaicensis coturniculus* (California black rail) | --, CT, CFP |
| *Charadrius montanus* (mountain plover) | FPT, CSC |
| *Numenius americanus* (long-billed curlew) | --, CSC |
| *Chlidonias niger* (black tern) | --, CSC |
| *Larus californicus* (California gull) | --, CSC |
| *Larus atricilla* (Laughing gull) | --, CSC |
| *Rynchops niger* (black skimmer) | --. CSC |
| *Sterna caspia* (Caspian tern) | --, CSC |
| *Sterna elegans* (Elegant tern) | --, CSC |
| *Sterna nilotica vanrossemi* (Van Rossem's gull-billed tern) | --, CSC |
| *Athene cunicularia hypugaea* (western burrowing owl) | --,CSC |
| *Empidonax traillii extimus* (southwestern willow flycatcher) | FE,-- |
| *Vireo bellii pusillus* (least Bell's vireo) | FE,CE |
| Lanius ludovicianus (loggerhead shrike) | --, CSC |
| *Dendroica petechia* (yellow warbler) | --, CSC |
| *Icteria virens* (yellow-breasted chat) | --, CSC |
| *Toxostoma lecontei* (Le Conte's thrasher) | --, CSC |
| **Fish** | |
| *Cyprinodon macularius* (Desert pupfish) | FE, CE |
| **Reptiles and Amphibians** | |
| *Phyrynosoma mcallii* (Flat-tailed horned lizard) | --, CSC |
| **Mammals** | |
| *Eumops perotis californicus* (California mastiff bat) | --, CSC |
| *Macrotus californicus* (California leaf-nosed bat) | --, CSC |
| *Plecotus townsendii* (Townsend's big-eared Bat) | --, CSC |

* - **Status Legend: FE**: Federally Endangered; **FT**: Federally Threatened; **FSC**: Federal Species of Concern; **FPE**: Federal Proposed Endangered; **FPT**: Federal Proposed Threatened; **FC**: Federal Candidate for Listing; **CE**: California Endangered; **CT**: California Threatened; **CPE**: California Proposed Endangered; **CSC**: California Species of Special Concern; **CFP**: California Fully-protected Species; **CR**: California Rare; California Native Plant Society (CNPS); **CNPS List 1B**: Rare or endangered in California and elsewhere.

**Yuma Clapper Rail** (*Rallus longirostris yumanensis*). On March 11, 1967, the Yuma clapper rail was designated as federally endangered. The Yuma clapper rail is a year around resident and breeds in marsh habitats around the southeastern portion of the Salton Sea. The preferred habitat is mature cattail-bulrush stands with shallow water, although they will forage in adjacent agricultural areas. These secretive birds find mates and defend territories in the dense marsh habitat by using calls. Rails call primarily near dawn and dusk, or during times of morning and evening civil twilight[4]. The applicant completed surveys for Yuma clapper rail along the OB3 pipeline route, and noted several individuals were present in the project area (CEOE 2002a, Figure 5.5-1). The majority of rails (94 of 97 found) are using Refuge lands which are managed to promote dense cattails (Burditt 2002). Six areas off of the Refuge have been identified as habitat, but researchers suggest exploring new areas in the Imperial Valley may locate more occupied habitat (Burditt 2002). A very small percentage of the local area is suitable nesting habitat due to the dominance of agriculture and the active removal of cattails within irrigation canals to improve water supplies.

**Riparian Birds**. Both the New River and Alamo River have areas of mature riparian habitat, mostly dominated by tamarisk (*Tamarix* spp.). The federally and state listed endangered least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*) are dependant on mature riparian vegetation near open water. Although tamarisk is generally low quality nesting habitat for these species, the species will nest in dense tamarisk near open water (USFWS 1995). Neither species has been observed in the project area. Yellow-breasted chats (*Icteria virens*), a state Species of Concern, occasionally can be found in the Salton Sea area, but normally there are less than five individuals in any given season.

**California Black Rail** (*Lateralius jamaicensis coturniculus*). The California black rail is a state-listed threatened species that has scattered occurrences in the Salton Sink. Black rails require dense vegetation cover, but the vegetation types utilized at the Salton Sea have not been described. General surveys in 2002 did not detect black rail within the project area, and surveys by applicant's consultants also did not detect birds. The Refuge lists the black rail as having occasional use, normally less than five individuals per season.

**Mountain Plover** (*Charadrius montanus*). Mountain plover is a federally proposed threatened species and a state Species of Concern. Current estimates are that Imperial Valley provides wintering habitats for about one-half of the global population (Wunder and Knopf 2002). Mountain plover predominately use either alfalfa fields grazed by sheep or cattle, fallow fields of any crop type, and also use recently burned Bermuda grass fields and sprouting wheat fields (Wunder and Knopf 2002). The amount of

[4] According to the U.S. Naval Observatory civil twilight "is defined to begin in the morning, and to end in the evening when the center of the Sun is geometrically 6 degrees below the horizon. This is the limit at which twilight illumination is sufficient, under good weather conditions, for terrestrial objects to be clearly distinguished; at the beginning of morning civil twilight, or end of evening civil twilight, the horizon is clearly defined and the brightest stars are visible under good atmospheric conditions in the absence of moonlight or other illumination. In the morning before the beginning of civil twilight and in the evening after the end of civil twilight, artificial illumination is normally required to carry on ordinary outdoor activities. Complete darkness, however, ends sometime prior to the beginning of morning civil twilight and begins sometime after the end of evening civil twilight."

suitable habitat in the Imperial Valley varies slightly across the landscape and over time, but about 500,000 acres of the Salton Sea Basin is in grass seed production, hay and pasture and about 155,000 acres is in wheat which makes the majority of the basin suitable for mountain plover (US Census 1997). The species is documented within the project area (CEOE 2002a, page 5.5-8).

**Western Burrowing Owl** (*Athene cunicularia hypugaea)*. Western burrowing owls, a state Species of Concern, inhabit open areas such as grasslands, pastures, coastal dunes, desert scrub, and the edges of agricultural fields. They use rodent burrows or construct burrows in semi-compacted soil in the slopes of drainage canals next to agricultural fields. Burrowing owls are abundant in this portion of the state, and they were found along almost the entire length of the transmission line routes (CEOE 2002a, Figure 5.5-1). The URS surveys in 1999 to 2002 found 3 burrowing owls within 300 ft. and 4 additional owls within 1,800 feet of the power plant site. These same surveys found 35 burrowing owls within 300 feet and 23 additional owls within 1,800 feet of the IID transmission line interconnection and 17 within 300 feet and 15 additional owls within 1,800 feet of the L-Line transmission interconnection. URS surveys found 14 burrowing owls within 1,800 feet injections and production wells and pipelines. Overall, there have been at least 100 sightings of burrowing owls within 1,800 feet of the project features. The Fish and Game Commission received a petition to list the western burrowing owl as an endangered or threatened species on April 3, 2003 (Fish and Game Commission 2003). A ruling on the petition is scheduled for October 2, 2003.

**Loggerhead shrike** (*Lanius ludovicianus*). Loggerhead shrike, a state Species of Concern, is an uncommon resident of the area. This species prefers very open and semi-open habitats where suitable hunting perches are available. The species was not seen during avian surveys. No further analysis of this bird is warranted, as it is not expected to occur except on rare occasions for reasons unrelated to habitat quality (e.g., accidental).

**Terns.** Elegant terns (*Sterna elegans*), a state Species of Concern, are recorded at the Salton Sea less than ten times, and are not to be expected in the area. Caspian terns (*Sterna caspia*), a state Species of Concern, are recorded using an area just southeast of Rock Hill (1 mile northeast of Obsidan Butte) for nesting. There were an estimated 1,400 adults and 200 juveniles near Rock Hill in 1998 (CEOE 2002e, Comment BIO-2). The Van Rossem's gull billed tern (*Sterna nilotica vanrossemi*), a state Species of Concern, breeds sporadically in the Salton Sea. The main nesting location is near Rock Hill within a wetland impoundment managed by the Refuge (USFWS 2003b). The species also uses Mullet Island. In the mid-1990s terns nested on the shoreline of Obsidian Butte (CEOE 2002a, page 5.5-11; CEOE 2002e, Comment BIO-2). In the spring of 2003, gull-billed terns established a nesting colony on one of the offshore islands adjacent to Obsidian Butter (USFWS 2003b).

**Black Skimmer** (*Rynchops niger*). Mullett Island also plays host to nesting black skimmers, a state Species of Concern. This species was recorded there in 1973. Rock Hill is consistently used for nesting by this species. The nesting colonies for black skimmer are typically in the same location as the gull-billed terns.

**Le Conte's Thrasher** (*Toxostoma lecontei*). Le Conte's thrashers typically found in sparsely vegetated desert flats, dunes, alluvial fans, or other areas where saltbush (*Atriplex* spp.) or cholla cactus (*Opuntia* spp.) are present. Le Conte's thrasher is absent from the irrigated portions of the Imperial Valley and the Colorado River, but it breeds in drier habitats outside of these areas (Garrett and Dunn 1981). This species was not detected during avian surveys and there are no records of this species since 1952. Suitable habitat is lacking in the immediate area of the project. No further analysis of this species is warranted as this bird is not expected to occur.

**Flat-tailed horned lizard** (*Phyrynosoma mcallii*). The USFWS determined in January 2003 that the listing of the flat-tailed horned lizard was not warranted (USFWS 2003a). This species is a state Species of Special Concern. Although native creosote bush scrub is present along the L-Line interconnection route, habitat along the route is not considered suitable for flat-tailed horned lizard. The area lacks sandy soils and there are many off-highway vehicle disturbances, which preclude lizards.

**Birds of Prey.** Birds of prey have found abundant prey within the agricultural fields surrounding the proposed project and are year-around residents of the area. Tall structures and poles are used extensively by the raptors. A northern harrier (C*ircus cyaneus*) and two ferruginous hawks (*Buteo regalis*) were recorded over agricultural fields in the project area (CEOE 2002a, Appendix K).

**Bats.** Several bat species are attracted to the agricultural lands in the area for foraging on fruit and insects. Several species of bats are California Species of Concern including the California leaf-nosed (*Macrotus californicus*), Townsend's big-eared (*Plecotus townsendii*) and California mastiff (*Eumops perotis californicus*) bats.

## Sensitive Habitats

The Refuge and CDFG are managing many wetlands throughout the southern Salton Sea area. Three large complexes are within the project area: Wister Unit, Alamo river delta, and Unit 1 of the Refuge. The Wister Unit of the Imperial Wildlife Area includes the largest complexes of managed wetlands in the Salton Sink. The Alamo River delta has a variety of managed wetlands, some of which have been breached to become part of the Salton Sea. Unit 1, managed by the Refuge, contains a number of cells in succession that are progressively flooded and drained.

The largest riparian area in southern Salton Sea Area is at the mouth of Thiery Creek (near Bombay Beach) about 15 miles north of Obsidian Butte. The riparian area is largely the result of long-term seepage from the Coachella Canal. The New River and Alamo River also have patches of riparian habitat along their banks and at their mouths, some of which may be disturbed during installation of the transmission lines.

Before the Salton Sea was formed, waterfowl would pass over the area during migration. Now, the open water and shoreline attract thousands of waterfowl and other birds, which spend the winter at the Refuge. The many canals and drains in the area provide ribbons of open water for use by wildlife. Efforts during the 1950's to control weeds by adding herbivorous game fish to the canals created a plentiful food supply for migrating birds.

Several islands are identified for the abundant amount of bird nesting that occurs on them; such a high density breeding area is known as a rookery. The southern edge of Salton Sea has fifteen identified rookeries and Alamo River has one (Redlands Institute 2002). More islands may have been present in the past, but are under water now.

As farming in the Salton Sink increased in the 1940's, so did the waterfowl's dependence on these crops for food. Flooded croplands can attract tens of thousands of waterfowl. The Refuge manages lands throughout the area as cropland for use by wildlife.

## Refuges, Wilderness Areas and Parks

Sonny Bono Salton Sea National Wildlife Refuge (Refuge) was established in 1930 and it leases and owns lands along the southeast shoreline of Salton Sea. Because the Salton Sea is rising, much of the land that the Refuge holds jurisdiction over is now underwater. The primary purpose of the Refuge is to protect habitat for migrating birds and for endangered species. The Refuge is also important for resting, feeding, and nesting for a large number of shorebirds. Wildlife species can be found at the Refuge year-round.

On February 12, 1955 the Salton Sea State Park, later to become the Salton Sea State Recreation Area, was dedicated. Salton Sea State Recreation Area is located approximately 14 miles to the northwest of the power plant site along the Salton Sea's eastern edge. The Park is managed for recreation.

The CDFG preserves and protects lands between Brawley and North Shore, near Highway 111 in the Imperial Wildlife Area. The Wildlife Area is divided into three units; Wister, Hazard, and Finney-Ramer. The CDFG also has control over the San Felipe Creek Ecological Reserve near the intersection of State Highways 86 and 78. Portions of San Felipe Creek are a BLM Area of Critical Environmental Concern.

Several parks and wilderness areas are in the region including: Joshua Tree National Park; Santa Rosa Mountains Wilderness, North Algodunes Wilderness Area (part of Imperial Sand Dunes Recreation Area), Mt. San Jacinto State Park Cuyamaca Rancho State , and Anza Borrego Desert State Park. The USFWS also has three National Wildlife Refuges in the region in addition to the Salton Sea: the Coachella Valley National Wildlife Refuge near Palm Springs, and the Cibola and Imperial National Wildlife Refuges along the Colorado River. All of these areas are at least 20 miles away from the project.

# LOCAL

## Power Plant Site and Construction Laydown Area

The proposed Salton Sea Unit 6 (SSU6) project site is located on an 80-acre parcel along the northern portion of the block bounded by McKendry Road to the north (where the main entrance will be placed), Severe Road to the west, Peterson Road to the south, and Boyle Road to the east. The immediately surrounding area is still predominantly agriculture and 20-foot high gravel roads (berms) on the north and west boundaries, separate the project site from surrounding areas. In the VISUAL

RESOURCES section, Staff is requesting the power plant northern perimeter be planted with trees to screen the view from the Refuge. The entire SSU6 facility consists of the following major components:

- turbine generating facilities;
- brine/steam handling;
- water treatment;
- heat rejection system (cooling towers);
- solids handling;
- brine ponds;
- service water pond;
- storm water drainage ditches and detention basins;
- control building; and
- parking lot and administrative buildings.

These features can be viewed on PROJECT DESCRIPTION Figure 4 of this FSA.

**Biological Resources Table 2** summarizes temporary and permanent disturbance within the project footprint for the plant site and other features discussed in the following text.

**BIOLOGICAL RESOURCES – Table 2**
**Summary of Affected Acreage (CEOE 2002l, Table 5.5-1DR1; May 29, 2003 Conference Call)**

| Feature | Number of Acres Affected during Project Construction | |
|---|---|---|
| | Temporary | Permanent |
| Power Plant | 0 | 80 |
| Production Wells | 0 | 26.2 |
| Injection Wells | 0 | 15.4 |
| Well Pipelines | 0 | 94.9 |
| Water Supply Line | 0.7 | 0 |
| L-Line Interconnection | 86.3 | 2.7 |
| IID Midway Interconnection | 85.4 | 2.6 |
| Pull sites | 39 | 0 |
| Bannister Switching station | 5.7 | 0.2 to 5.7 |
| T-Line Staging Areas and Access Roads | 48 | 0 |
| TOTAL | 265.1 acres | 222.0 to 227.5 acres |

Note: For Habitat Types impacted see original table

All the plant buildings are single story and pre-engineered. The tallest feature is the gantry crane at 99 feet tall. The site will be surrounded by an 8-foot high perimeter berm for flood control and a chain link security fence. The fence would enclose the brine ponds, and other areas requiring controlled access. The perimeter of the site will be

landscaped with vegetation and there will be some minor landscaping in the interior of the property. Topsoil will be stockpiled during construction to be reused for this purpose.

The proposed brine ponds can hold approximately 4 million gallons. The brine ponds on site collect flows from three different sources: 1) brine overflow from the clarifiers and thickner during upset conditions; 2) condensate from steam vent tanks during upset conditions; and 3) reject water from reverse osmosis system (Cal Energy, Data Adequacy Response BIO-3). Flows during upset conditions would be temporary, and the applicant has indicated the brine would be pumped to a plant injection well in a timely manner. The reject water from reverse osmosis is about 720 gallons per day, and would be left in brine ponds to evaporate.

The site will be accessed during construction and operation from State Highway 86 and Bannister Road or Sinclair Road from Highway 111. During peak construction the project will add 930 vehicle trips per day along McKendry Road and 930 trips to Boyle Road (CEOE 2002a, Table 5.10-8). This number of vehicle trips is an order of magnitude higher than is experienced now (1000% increase). Other local roads may experience about a 30% increase in vehicle trips. The maximum speed on all unpaved roadways in the project area during construction and operation of the project is 15 miles per hour (CEOE 2003s).

## Switching Station

The proposed Salton Sea Unit 6 switching station is located on the west side of State Highway 86 at the intersection of Bannister Road. The station is next to a large wash where signs of coyote (*Canis latrans*), bobcat (*Felis rufus*) and kit fox (*Vulpes macrotis*) were detected in February 2002 (CEOE 2002a, Appendix K, Biological Assessment). The station and towers are both sited well outside of the wash, and a jurisdictional delineation determined there would be no impacts to waters of the U.S. At this point, the work does not require a Nationwide Permit be issued, but if the design changed such that parts of the wash have a potential to be impacted, then one would be issued.

## Linear Facilities

In addition to the power plant site there will also be several linear facilities as described in the following text. All transmission lines would be on steel poles 120 to 125 feet tall (CEOE 2002a, Figure 3.3-13). All brine pipelines would be elevated above the ground and would be encased in insulation (CEOE 2002e, CEC Data Response 10). All well pads would be cleared and graveled (CEOE 2002e, CEC Data Response 11).

### L-Line Transmission Line

The proposed L-Line interconnection is a 16-mile route along existing roads to the point where Bannister Road connects to State Highway 86, and then connects to the switching station. From this point, the transmission line follows an s-shaped route around the southern edge of a sanitary landfill to interconnect on BLM lands with the existing L-Line. Many of the roads have existing distribution and transmission lines in their shoulders, and the southern edge of Salton Sea is a web of drains, laterals, and irrigation canals operated by Imperial Irrigation District.

The applicant performed avian flyover studies in order to determine the need for bird flight diverters on both of the proposed transmission lines. (Bird flight diverters are designed to make the small grounding wire connecting the tops of transmission line poles more visible.) The applicant found bird use of the area varied based on location, and even within a single location, there are a variety of species. In general, shorebirds as a category dominated the data, flocks of cattle egrets (*Bubulcus ibis*) and red-winged black birds (*Agelaius phoeniceus*) were the most frequently encountered species (over 200 individuals of each), western burrowing owls (*Athene cunicularia hypugaea*) were frequently encountered as lone individuals or pairs, and raptors and pelicans were rarely seen and if they were it was rarely a low elevation flight. At the Data Response and Issues Workshop on January 9, 2003 assigned staff from the USFWS stated they have questions about how the avian flyover data was collected and sorted. The Refuge reviewed the data and found the surveys were not conducted during July and September which coincides with the peak use of the Salton Sea by California brown pelicans (USFWS 2003a). CURE has noted in workshops that the surveys were not done at night and so the number of crossings may be higher than shown.

The proposed L-Line route would cross the New River at approximately milepost 5 near Foulds Road and the IID Midway interconnection crosses the Alamo River at approximately milepost 5 near Dewey Road. The project proposes aboveground crossings of the New River and Alamo River. At these crossings mature tamarisk dominates the shoreline, but no sensitive species have been reported from these stands. Surrounding the river crossings are lands used for agriculture and as dairy farms. Avian flyover surveys at New River (data point OBFLY 03) and Alamo River (data point OBFLY 17) show low flights by killdeer (*Charadrius vociferus*), green herons (*Butorides virescens*), black terns (*Chlidonias niger*), northern harriers *(Circus cyaneus*), and groups of cattle egrets and gulls (*Larus* ssp.). Cattle egrets dominated in both locations.

The wetlands near the corner of Lack and Lindsey Road (near L-Line Milepost 2.5) were consistently occupied by California brown pelicans during the summer of 2002, with estimates of 12 to 40 individuals present on any given day (USFWS 2003b). There are currently powerlines along this corner connecting Salton Sea Units 1 and 2 and several water pumps to the electrical grid. The applicant sought out more information on recorded instances of California brown pelican collisions with the transmission lines, but the USFWS did not have any recorded collisions (CURE Data Request 348). There are several recorded accounts of brown pelicans hitting an unmarked distribution line near Desert Shores in late 1992 and early 1993 (CURE 2003). Staff from IID and USFWS indicates the Desert Shores' distribution line has since been marked with twelve-inch orange power line markers and there have been no further casualties.

An alternative transmission line was proposed along State Highway 86. This route would be the same proposed L-Line route up to where Bannister Road crosses State Highway 86. This alternative would connect to the switching station (CEOE 2003d), then follow the highway corridor to where it intersects with the L-Line, about 7.5 miles to the northwest. The alternative would cross both agricultural and residential lands if on the east side, and creosote scrub if on the west side. No significant bird use of this area was found (CEOE 2002a, Section 6.2.2.5).

### IID Midway Transmission Line

The proposed IID Midway transmission line route is 15 miles long, and travels south from the plant site, then east, and then north again along existing roads. The route crosses lands developed in agriculture, dairy farms, and the California State Prison before terminating at the existing Midway substation. The above discussion of avian flyover impacts is relevant to this transmission line as well. No undeveloped lands are crossed by this transmission line. Refuge staff identified wetlands near the corner of Brandt and Lindsey (about 4,000 feet from the milepost 4) that may contain California brown pelicans (January 9, 2003 Data Response and Issues Workshop).

The applicant found one aquaculture farm within one mile of the proposed IID Midway transmission line (CEOE 2003d, CEC Data Response120). This farm raises spirulina as a dietary supplement, and does not raise fish. Thus, the attraction of California brown pelicans is limited.

### Brine Supply and Injection Pipelines and Wellheads

The 100-foot wide brine supply and injection pipelines corridors (plus an additional 10% for expansion joints) traverse primarily agricultural land and are centered on paved and gravel roads. Production well pipelines OB1, OB2, OB4 and OB5 do not cross any wetland or drainage features. The production well pipeline for OB3 crosses a wetland at McKendry Road (discussed earlier in this FSA). Drainage channels would be crossed by the injection well pipelines (OBI1, OBI2, and OBI3). Around 100 acres of agricultural land would be permanently lost during construction of the pipeline corridors.

The brine production well heads OB1 and OB2 would be located within an approximately 60 acre parcel of agricultural lands north of the power plant site. The entire parcel is currently leased to the Refuge on a month-by-month basis. The Refuge has been growing crops on these lands to benefit snow geese (*Chen caerulescens*) and widgeons (*Anus americana*) and to comply with the provisions of the Lea Act which try to reduce agricultural losses from waterfowl. The area also serves as overflow parking during some Refuge events. The areas north, east and west of the plot are freshwater marshland that support Yuma clapper rail. The north wetlands were created by the USACE and CDFG (Union Pond) and are separated from the parcel by a 4-foot berm. The west marshland is part of the Salton Sea shoreline, and is separated from the parcel with a 20-foot berm. When the production wells OB1 and OB2 are directionally drilled they would disturb a footprint of 300 feet by 700 feet and 560 feet by 560 feet respectively (a total of 12 acres). Production well pipelines (100 feet width by 3000 feet length, a total of 7 acres) will also be installed on the property. The USFWS noted that the use of the land by wildlife may change once permanent structures are in place, causing an indirect loss of habitat for a small buffer around the wellhead and pipes (PSA Workshop on May 15, 2003).

The brine production well head OB3 would be located on the southern end of Obsidian Butte. The well pad would disturb a 300 feet by 700 feet area (4.8 acres). Obsidian Butte is a disturbed area used by Imperial Irrigation District for gravel mining. The construction of this well pad will not result in new disturbance. The islands to the southwest of Obsidian Butte, about 1,000 feet from the well head site, have been used as loafing areas by California brown pelicans according to Refuge staff (January 9,

2003 Data Response and Issues Meeting). The production pipeline from well head OB3 will cross a wetland feature on either side of McKendry Road. The applicant has estimated the loss of 0.4 acres of federal jurisdictional features and 0.4 acres of CDFG jurisdictional features.

The brine production well heads OB4 and OB5 would be located on actively farmed land near the power plant facility. No unique resources were identified near these well heads or the associated production pipelines.

The injection well heads for Salton Sea Unit 6 are proposed within agricultural lands to the south and east of the proposed power plant site. Injection well pipelines would cross drainage canals. While these canals occasionally accumulate cattails, which have the potential to support Yuma clapper rails, they are routinely cleared of all vegetation by IID and no birds have been detected to date. Burrowing owl pairs have been found near the injection wellhead locations (CEOE 2002a, Section 5.5.1.2.7).

## IMPACTS

## DIRECT AND INDIRECT IMPACTS

The California Environmental Quality Act (CEQA) Guidelines define direct impacts as those impacts that result from 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. The potential impacts discussed below are those most likely to be associated with construction and operation of the project.

CEQA guidelines provide an environmental checklist to assist lead agencies in their analysis of project impacts. The headings for discussion of impacts presented in this section follow the items in that checklist, as well as items found in the Warren-Alquist Act and recent Presidential (executive) orders relevant to biological resources (e.g., Executive Order 13112 for management of invasive species). Significance is generally determined by compliance with applicable LORS; however, because of the diversity of biological impacts, guidelines adopted by resource agencies may also be used. These are appropriately cited in the text.

## Effect on Sensitive Species

### Power Plant and Construction Laydown Area

Construction of the power plant results in the permanent loss of 80 acres of agricultural habitat. The site is located in an agricultural landscape, which has been farmed since 1901. The temporary loss of this type of habitat for wildlife use is insignificant when considering that over 500,000 acres are farmed in the area and these areas are still available to wildlife. However, permanent degradation and/or destruction of foraging habitat within 300 feet of a burrowing owl's occupied burrow has been considered an impact to the species (CDFG 1995). CDFG recommends 6.5 acres of habitat compensation and the replacement of burrows at 2:1 for burrowing owls losses. Work by URS in 1999 to 2002 found 3 burrowing owl sightings within 300 feet of the power

plant site, so the applicant will likely be responsible for at least 19.5 acres of habitat compensation. Recent work on burrowing owl habitat use in Imperial Valley indicates nocturnal foraging for these owls extends 1,800 feet from the nest (Rosenberg and Haley, in press). This finding makes CDFG's standard mitigation, calculated on a 300 foot foraging radius around the burrow, insufficient to compensate for foraging losses for a species recently petitioned for state listing. To account for the potential use of land over a much larger area than previously identified, staff is requesting 0.5 acres of habitat compensation for every acre of land more than 300 feet, but within 1,800 feet of burrowing owls, that is permanently converted from foraging habitat into unsuitable habitat (e.g, buildings, cement pads, or ponds) (Condition of Certification **BIO-19**). Because of the high number of owls in the local area, the applicant will likely need to compensate for the entire power plant site, or 40 acres of habitat. The final amount will be determined by pre-construction surveys, and the amount compensated for under CDFG guidelines will be subtracted from the total amount (Condition of Certification **BIO-19**).

Noise from construction could mask a call made by a territorial species making the defense of territory more difficult or mask a call of a male seeking a mate, lessening the chances of pairing. At a lesser level, noise may distort the wildlife call or reduce the communication distance making a potential mate less attractive to a female. Research on noise impacts to least Bell's vireo and California gnatcatcher gives us a good starting point for potential impact to birds at the Refuge (CALTRANS 1997). A typical least Bell's vireo song broadcast is predicted to be 30 to 60 dBA and at a frequency of 1.5 to 11 kHz (Hunsaker 2001). The least Bell's vireo song would be completely masked by a 4-ton conventional hammer pile driver, since these occur at the same sound pressure level and frequency and the song would be partially masked by a quieter pile driver (Gill 1983, Hunsacker 2001, BIOLOGICAL RESOURCES **Figure 1**). Note, the frequency and sound pressure of the Yuma clapper rail or California black rail song was not found by staff, but we assumed for this analysis that it is nearly identical to the least Bell's vireo. Supporting this assumption, sound pressure levels for many species of birds ranged from 30 to 105 dBA (Brackenbury 1979, Awbrey 1995, Hunsacker 2001), and bird calls are typically found in the range of 1 to 10 kHz (Dooling et al. 1971, Molles and Vehrencamp 2001, Yamaguchi 1999). There is not a statistically significant correlation between loud and cyclical noise levels (such as aircraft overflights) and avian reproductive effort or success (Hunsaker 2000). Scientists studying the effects of noise speculated that the impacts were insignificant because birds were calling in the early morning and evening hours for feeding and pair bonding when high noise levels were not occurring. They note that "[t]he longer that time of masking continues, the greater the risk is for potential dangers to survival or reproduction of the individual." (Hunsaker 2000, page 48). While some populations of Yuma clapper rail will nest near noise sources (CEOE 2003s), reports on the local population speculate that human influence (e.g., the use of nature trails and roads) may be keeping rail density low in otherwise suitable locations (Burditt 2002). Both of these examples are antidotes, and there is currently no statistically valid data showing either trend is true.

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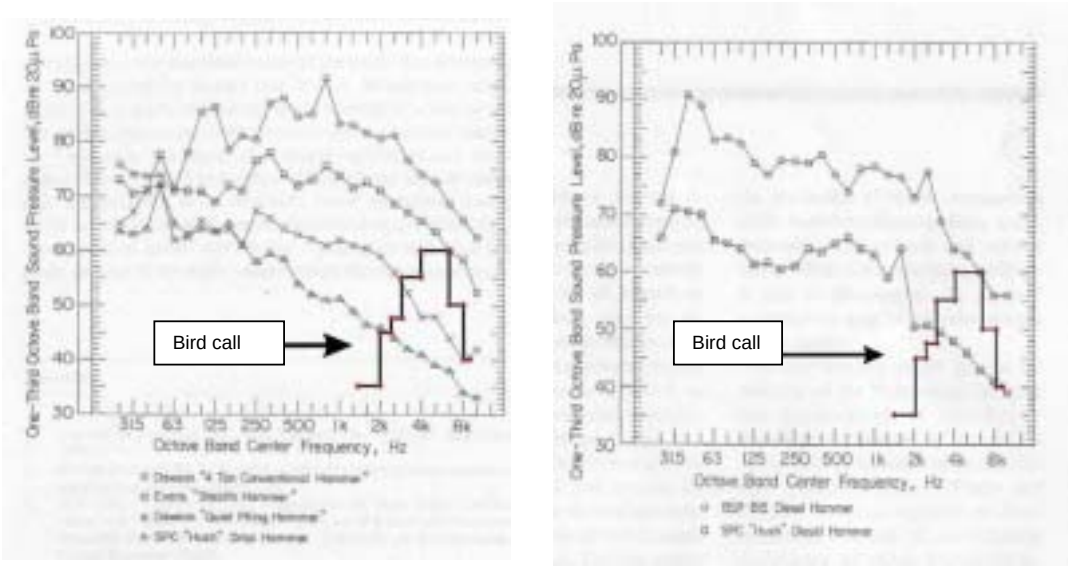


**Figure 1: Example of Call Masking by Pile Driving at 15 meters**: Least Bell's vireo bird call is fully masked by many of the conventional pile drivers used to drive steel piles, but is only partially masked by "hush" pile drivers (Gill 1983, Hunsaker 2001).

Noise can cause the abandonment of critical activities such as nest attendance and feeding. To scare birds to this level, a noise of approximately 85 dBA sound pressure level at the bird's ear is required (Fletcher 1971, Brown 2001). Birds will abandon a food source, even when starved, when a sound at 106 dBA is played (Thiessen et al. 1957). Typical bird hazing uses speakers to produce noises over 100 dBA.

During construction, the noise levels from the power plant to the nearest sensitive receptor, Yuma clapper rail habitat, would range from 47 dBA to 105 dBA and most activities would be done only during daylight hours. The amount of noise is dependant on distance from the habitat (located on the north and northwest from the power plant site), and the type of equipment in use (see BIOLOGICAL RESOURCES **Table 3**). The applicant has proposed that approximately 5 to 10 dBA reductions could be achieved if temporary barriers were constructed that blocked the line-of-sight between the noise source and receiver (CEOE 2002l, CEC Data Response 17). The composite site noise from power plant construction could range from 78 to 89 dBA (CEOE 2002l, CEC Data Response 17; BIOLOGICAL RESOURCES **Table 3**). If there were 8 pieces of each piece of equipment (96 pieces total, not including a pile driver) on the site working at one time, the noise level at 1,000 feet is estimated be 78 dBA (CEOE 2003s), which means noise at the nearest sensitive receptor (650 feet) could be 82 dBA.

**BIOLOGICAL RESOURCES – Table 3: Noise Levels at Yuma Clapper Rail Habitat from Selected Construction Activities**

| Reference Point for Source of Sound | Distance to nearest edge of Union Pond (UP)[a] | Distance to nearest edge of Wetland along McKendry Road (MR)[a] | NOISE LEVELS (dBA) Production Well Drilling (loudest activity is 79 dBA at 100 feet) | Pile Driving (unattenuated is 105 dBA at 50 feet) | Pile Driving (attenuated to 70 dBA at 50 feet) | Steam Blows (attenuated to 74 dBA at 100 feet)<br><br>Composite Construction Noise (highest is 89 DbA at 50 feet) |
|---|---|---|---|---|---|---|
| OB1 | 400 ft | 2500 ft | @ UP=67<br>@ MR=51 | Not applicable | Not applicable | Not applicable |
| OB2 | 2000 ft | 600 ft | @ UP=53<br>@ MR=63 | Not applicable | Not applicable | Not applicable |
| OB3 | 5000 ft | 1000 ft[c] | @ UP=47<br>@ MR=59[c] | Not applicable | Not applicable | Not applicable |
| OB4 | 3000 ft | 1000 ft | @ UP=49<br>@ MR=59 | Not applicable | Not applicable | Not applicable |
| Eastern end of OB3 Pipeline when crossing wetland | 2500 ft | 50 ft | Not applicable | @ UP =71<br>@ MR=105 | @ UP =36<br>@ MR=70 | Not applicable |
| Center of Power Plant Site | 2500 ft | 1500 ft | Not applicable | @ UP =71<br>@ MR=75 | @ UP =34<br>@ MR=40 | @ UP=46<br>@ MR=50[d]<br><br>@UP=55<br>@MR=59 |

a) Based on Figure 1 of Jurisdictional Delineation Report, Appendix K; numbers are rounded to approximate number of feet
b) Based on equation given by the applicant (CEOE 2003f, CURE Data Response 337)
c) This is also the approximate distance and decibel level at the California brown pelican rookeries off of Obsidian Butte.
d) Applicant has calculated steam blows would be 58 dBA (CEOE 2002a) to 67 dBA (CEOE 2003s) at Yuma clapper rail habitat, but did not disclose their assumption for distance from the source. At 600 feet, the steam blow would be 58.4 dBA.

One of the loudest noises expected from project construction is pile driving, which is expected to occur at the power plant site during months 8 through 12 inclusive (CEOE 2003j, CURE Data Response 303). Noise levels during conventional pile driving exceed 60 dBA for the frequencies of 31 Hz to 3 KHz (Gill 1983) and these noise levels are assumed to mask calls of Yuma clapper rail or if present, California black rail (Biological Resources **Figure 1**). Noise levels during conventional pile driving which exceed 85 dBA at any frequency may force these bird species to abandon nests or stop feeding. The only proposed activity that can reach this level is when pile driving equipment is used on McKendry Road, and the applicant is already required by the USFWS to complete this construction outside of the breeding season (USFWS 2002). To mitigate all pile driving noise impacts to a less than significant level, noise from pile-driving must be less than 60 dBA at the nearest Yuma clapper rail site during the daybreak (morning civil twilight) and sunset hours during the mating season (March 1 to May 31) or pile driving must be restricted to outside the mating season. Pile driving must be less than 85 dBA during mating and nesting season (March 1 to August 31).

The applicant shall develop a Noise and Vibration Assessment and Abatement Plan to attenuate construction noise to a level that is acceptable to the agencies (Condition of Certification **BIO-16;** see also the NOISE section of this FSA, Conditions of Certification **NOISE-6 and NOISE-8**). Staff has provided both the applicant and the agencies with examples of pile driving techniques that would create noise less than 60 dBA at the Yuma clapper rail habitat (while still being cost effective). In addition, staff supports the applicant's proposal to use noise barriers that can direct noises away from sensitive receptors.

Pile driving and use of heavy equipment could cause vibrations which can be an annoyance to ground-nesting birds. Pile driving is only anticipated for steam turbine foundations (1,100 feet from the northwest corner of the site), but the cooling towers may also need piles depending on final geotechnical analysis (CEOE 2003s; CEOE 2002a, Appendix J). The vibration from a typical pile driver is estimated to be 72 VdB (vibration level in decibels) at 1,000 feet which is the annoyance criterion for areas where people sleep (CEOE 2003s). Vibrations from heavy equipment would be lower than pile driving, reaching approximately 26 to 55 VdB at 1,000 feet (CEOE 2003s, Table USFWS-9B). The applicant has agreed to schedule pile-driving outside of the shorebird breeding season (March through July), but it would be more appropriate to schedule it outside of the nesting season (June through August; Condition of Certification **BIO-16**). The avoidance of vibration impacts during the nesting period would eliminate concerns about nest-abandonment by federally-listed species such as the Yuma clapper rail, and would protect the many ground-nesting migratory shorebirds that use the shoreline of the Salton Sea.

During plant commissioning, the project owner would push high-pressure steam through the pipe in order to clean and test the system. This test is called a "steam blow" and it can create substantial noise unless a silencer is added. A series of steam blows would take place at the power plant to test the production and injection pipelines. Steam blows can last from one day to one week and three are anticipated for the project (CEOE 2003a, CURE Data Response 231). Steam blows create a constant noise that can last for up to 72 hours. The project proposes to include a silencer on the steam blows such that the resultant sound level is 74 dBA at 100 feet. The closest Yuma clapper rail habitat is 1,500 feet from the location of the steam processing, and sound pressures at 1,500 feet would be around 50 dBA. Because the steam blows could occur at any time of year, and are a constant noise source, a steam-blow attenuated to 74 dBA or lower at 100 feet is required by staff to ensure avoidance of impacts to Yuma clapper rail during the mating and nesting season (Conditions of Certification **BIO-12** and **BIO-16**).

Staff sponsored a Data Response and Issues Workshop with the public and agency staff on January 8, 2003. Several types of pre-construction monitoring were suggested to lessen the impact of project on sensitive species. The applicant had already agreed to pre-construction monitoring for western burrowing owls (Condition of Certification **BIO-19**), but monitoring of other species such as California brown pelicans, Yuma clapper rail, and black rail surveys should also be completed (Condition of Certification **BIO-14**) so avoidance measures can be prescribed by the Designated Biologist. Because of the seasonal abundance of species, the recommendation is to survey when

the species are common to abundant so that a false-negative (assuming absence when really present) would not be expected.

Each of the brine ponds on site are designed hold about 4 million gallons of water (CEOE 2002l, CEC Data Response 85). The emergency brine overflows and condensate would create temporary water accumulation in the brine ponds approximately 18 times per year for 24 hours (CEOE 2002l, CEC Data Response 83). At the time of upset, brine would be at approximately the re-injection temperature of 230-240 degrees Fahrenheit (CEOE 2002a, Section 3.2.2) which is just at the boiling point of water. The rising heat from the brine would discourage wildlife use until cooled to less than boiling, and the heat would kill any plant or invertebrates that may be present along walls or shallow depressions. Other open water sources that are not next to industrial development are readily available, so use of the brine ponds would be unlikely. Supporting this assumption is the fact that there has been no avian mortality associated with the brine ponds operated by the existing geothermal plants (CEOE 2003j, CURE Data Response 341; Joe Brana and John Brooks, personal communication to Natasha Nelson). The applicant has indicated the brine would be re-injected in an expeditious manner, limiting the opportunity for wildlife to find the pond. Therefore no wildlife use during emergency upset conditions is expected and no impact has been identified.

The power plant facility would include a 136,000 square foot (3 acre) service water pond used for dilution water and other process uses and in the reverse osmosis potable water system. The service water pond would be filled using a 500-foot long pipeline which taps into the Vail 4A Lateral (CEOE 2002a, Section 3.3.4.2). The cooling towers, as proposed, are to the south of the brine ponds and to the west and east of the service water pond (PROJECT DESCRIPTION Figure 4 of this FSA). The applicant is proposing to control drift to an efficiency of 0.0006 percent and calculated the maximum cooling tower drift to be approximately 247.1 micrograms per square meter per day (CEOE 2003a, CURE Data Responses 224). Based on water usage, the service water pond has a complete volume exchange 21 times a year (or every other week) (CEOE 2003a, CURE Data Responses 224). Thus chemical constituents from the cooling tower would be unlikely to concentrate to a level that is toxic to wildlife.

Reject reverse osmosis water can be routed to either to the service water pond or to the brine ponds and staff evaluated the potential impacts of both scenarios. The selenium concentrations in the initial water from the nearby canal are about 2 parts per billion (ppb) and the reverse osmosis system would concentrate selenium four times to 8 ppb (CEOE 2003j, CURE Data Response 330). Reject reverse osmosis water would be at such a low flow (720 gallons per day) that all accumulations in the brine ponds would be shallow (1 to 2 feet; CEOE 2003a, CURE Data Response 214) and releases to the service water pond would be diluted to a level that wildlife would not be harmed. The water is nearly equivalent to nearby canal water (CEOE 2002a, Table 5.4-4) so no impact is expected from incidental use by birds or bats when the brine ponds are completely clean, but if there were residue from overflow conditions, the water could become contaminated with other chemicals and salts. All reject reverse osmosis water should be routed to the service water pond in lieu of the brine ponds to avoid potential wildlife contaminant concerns (Condition of Certification **BIO-12**).

VISUAL RESOURCES staff has proposed vegetation be planted along the northern edge of the power plant (Condition of Certification **VISUAL-3**). The Refuge has suggested native plants which are tolerant of salt be used for planting (USFWS 2003d). The USFWS also prefers native plants so long as they are not raptor perches (Carol Roberts, personal correspondence to N. Nelson). The Landscaping Plan will be approved by staff, and reviewed by USFWS and the Refuge (Condition of Certification **VISUAL-3** and **BIO-23**). Staff would support the VISUAL RESOURCES Condition of Certification **VISUAL-3** (if adopted) so long as native trees are part of the planting.

Project traffic to and from the project site, as well as to the construction sites for the linears, will substantially increase traffic levels throughout the area. Several species, including burrowing owls and Yuma clapper rails, have the potential to be struck by project-related traffic. The applicant shall post speed-limit signs showing the maximum speed on unpaved roads and on paved road within 300 feet of occupied sensitive species habitat is 15 miles per hour, and instruct all employees, contractors, and visitors to obey those limits. If wildlife is hit, the Designated Biologist shall be contacted and appropriate actions taken (Condition of Certification **BIO-13**).

**Linear Facilities**

The transmission line right-of-ways will result in the permanent loss of 5.3 acres and temporary disturbance of 171.7 acres of agricultural and ruderal habitat (see BIOLOGICAL RESOURCES **Table 2**). Almost this entire loss is in the shoulder of roads, which are disturbed by the maintenance of the laterals and drains. An additional 39 acres of land would be used for pulling sites, but the applicant has committed to using previously disturbed areas. Staff did not find the temporary habitat loss from transmission lines, outside of BLM lands, to be significant and is not requesting mitigation. However, permanent degradation and/or destruction of foraging habitat within 300 feet of a burrowing owl's occupied burrow is considered an impact to the species (CDFG 1995). Because there were over 50 sightings of burrowing owls within 300 feet of the transmission lines, the applicant shall compensate for the permanent loss of burrowing owl habitat at 0.5:1, or 2.65 acres.

Where the L-Line interconnection crosses BLM lands, there will be some temporary disturbance of creosote scrub habitat (14.2 acres; CEOE 2002e, Table 5.5-1DR1) which is considered potential flat-tailed horned lizard habitat. The applicant will need to pay for the effects on the lizard habitat through a compensation formula developed by the Flat-tailed Horned Lizard Management Oversight Group (Condition of Certification **BIO-22**). The loss of potential lizard habitat will be fully mitigated by paying this fee. The IID does not control access to their roads, therefore some low level of unauthorized use could occur (CEOE 2002l, CEC Data Responses 20 and 21). Staff is not proposing mitigation to regulate the unauthorized use of the access road as the area has already been identified as having high vehicular use.

The proposed switching station near the intersection of State Highway 86 and Bannister Road could result in the build out and enclosure of 0.2 to 5.7 acres of barren area and highly disturbed creosote scrub habitat (Conference call with IID on May 29, 2003). The amount of land fenced will depend on IID's final decision on the need to expand the switching station. The area is used for stockpiling sediments removed by IID maintenance crews, which has resulted in a near total loss of wildlife habitat at the site.

Staff does not propose mitigation for the installation of the switching station because of its highly disturbed nature and the lack of burrowing owl sightings.

Several sensitive bird species were seen flying perpendicular to the transmission line routes during the avian flyover surveys. There is evidence of collision hazards with distribution lines for California brown pelicans (CDFG, personal communication to N. Nelson), but it is unclear if there is a collision hazard from transmission lines (which are much taller and heavier gauge). The proximity of open water to the transmission line will be the best indicator of where the hazard occurs. The segment of L-line interconnection between milepost 1 and milepost 3 is less than 1,000 feet from the shoreline of the Salton Sea. USFWS and Refuge staff met with the applicant at the corner of Lack and Lindsey Road in May 2003. After the meeting, the Refuge suggested the transmission line be installed along the proposed route with bird flight diverters to protect the birds that frequent this wetland (USFWS 2003d). The USFWS felt the area was of concern because of the concentration of California brown pelicans, and if bird flight diverters were found to be ineffective, the project owner must be willing to move the transmission line to a new location (Carol Roberts, personal communication to N. Nelson). The USFWS, in their letter to the Bureau of Land Management, stated that the applicant should consider placing bird flight diverters along the entire length (31 miles) of the new power lines (USFWS 2003) to provide protection to migratory birds.

The project proposes an aboveground transmission line crossing of the New River and Alamo River where mature tamarisk dominates the shoreline. Although this habitat could be used by either least Bell's vireo or southwestern willow flycatcher, there is only one recorded occurrence of southwestern willow flycatcher, near Niland in 1952, and no occurrences of vireo. Avian surveys for the project in 1989, 1994, and 1999 to 2002, did not detect either species at New River or Alamo River. No impacts to these two species are expected from construction or operation of the proposed transmission lines.

The construction of production wells OB1 and OB2 on lands north of the power plant site will place people and equipment within close proximity (200 feet) of wetlands known to contain Yuma Clapper rail, and which may contain black rail. The drill equipment would be from 400 to 2,500 feet from these same wetlands (BIOLOGICAL RESOURCES **Table 3**). The noise levels during the construction (or re-drill) of a wellhead would be expected to be between 75 dBA and 79 dBA at 100 feet from the source (CEOE 2002a, Table 53.11-5) and work is expected to be done around the clock for up to 21 days. The applicant has agreed to do construction at production wells OB1 and OB2 outside of the period when Yuma clapper rails are vocal and defending nest territories (CEOE 2003s), and the County should incorporate this restriction into their permit. The same restriction should be placed on any re-drill activities at these wells.

During operations, the plant operators would inspect the pipelines using graveled roads approximately 3 times per 24-hour period (CEOE 2002l, Data Response 12) and crews may perform scheduled maintenance at the well head (CEOE 2002l, CEC Data Response 18). Noise from approaching vehicles, approximately 86 dBA at 50 feet from the source, could occur during any time of day or season (CEOE 2002l, CEC Data Responses 17 and 18). During shutdown maintenance, typical construction equipment would access the site and sound levels would be expected to be between 70 dBA and 90 dBA at 50 feet from the source (CEOE 2002l, Data Response 13, CEOE 2003s).

The applicant has committed to schedule planned maintenance activities at these well heads outside of March through July (CEOE 2003s). As noted in the discussion of power plant impacts, noise in excess of 60 dBA could mask the calls of Yuma clapper rails which occur at Union Pond and the wetland north of McKendry Road. The County should develop noise abatement measure(s) to attenuate the noise from construction, operations, and maintenance at OB1 and OB2 to less than 60 dBA at all Yuma Clapper rail habitat if maintenance actions take place during Yuma clapper mating and nesting season (March 1 to August 31), or require that all planned maintenance take place outside of this timeframe.

The construction of OB3 well head on Obsidian Butte would place people and equipment near (1000 feet) a California brown pelican loafing area, and an area that has been used for nesting. Refuge staff indicated during Data Response and Issues Workshop (January 9, 2003) that California brown pelicans use the islands to the west of Obsidian Butte in the summer and there may be a noise impact to this species. Construction on Obsidian Butte was estimated to create a noise level of 66 dBA at 600 feet (CEOE 2003s). The applicant agreed to schedule shut-down maintenance of production well OB3 outside of the shore-bird breeding season (CEOE 2002l, Data Response 13) and to monitor noise levels and manage construction activities to ensure noise levels do not exceed 78 dBA in sensitive habitats (CEOE 2003s). The County should adopt pre-construction monitoring of California brown pelican use to establish a baseline condition to allow prescription of avoidance measures, and noise monitoring and surveys during construction to determine the success of the avoidance measures. The County should require that the applicant delay scheduled shut-down maintenance at production well head OB3 or its pipeline until outside of the shorebird breeding season (March to end of July). Emergency repairs to production well OB3 should follow prescribed actions found in an Emergency Response Plan which should be reviewed by a qualified biologist and the interested agencies.

The construction of the production and injection well pads and pipelines (except OB3 and its pipeline) would result in habitat losses to mountain plovers. Mountain plover are mostly found in alfalfa and fallow fields, or in recently burned grass fields. Alfalfa is a widespread crop (hay and pasture comprises about 50% of Imperial Valley agriculture) but mountain plovers are readily using these fields only when they are grazed to a shorter height (Wunder and Knopf 2002). When they are found in what would be termed “barren areas” (idle farmlands), they are only roosting (Wunder and Knopf 2002). Thus, when pipeline construction occurs across the preferred foraging habitat of mountain plover, there will be permanent losses of foraging land in preference to roosting lands for this species. The permanent loss from the proposed project is limited to the footings of the pipelines and the concrete cover on the well pad which removes both types of mountain plover habitat. The County should calculate this loss during well pad and pipeline construction (or as soon as final construction drawings are available) and require the applicant offset these losses with actively managed lands (e.g., grazed or burned periodically) which are suitable for mountain plover. The County should include a buffer around these facilities to account for wildlife avoidance of these features in their impact calculations. The impact to burrowing owls would be the same as noted for the power plant site.

CDFG found 53 desert pupfish individuals south of McKendry Road in August 1994. Subsequent surveys by CDFG in 1998 and 2000 did not detect desert pupfish (CEOE 2002l, Data Response BR-16). The applicant completed surveys for desert pupfish on February 9, 2002 (CEOE 2002l, Data Response BR-16) along the proposed pipeline route from the plant site to OB3, and no pupfish were detected. No impacts to this species are expected from construction of the OB3 brine pipeline and expansion of McKendry Road so long as Best Management Practices are followed (see SOIL AND WATER RESOURCES section in this FSA).

The construction of the production and injection well pads and pipelines (except OB3 and its pipeline) would result in habitat losses to burrowing owls. Several burrowing owls were detected near the injection well heads. The County should require pre-construction surveys and compensation for any losses in a manner that is consistent with Condition of Certification **BIO-19**.

## Effect on Sensitive Habitat

### Wetland Losses

The power plant and laydown areas are not located in or near any surface waters or federally protected wetlands or other jurisdictional waters and therefore, there is no direct loss of this sensitive habitat. There is no change in the open water habitat in Salton Sea as a result of the project (see CEOE 2002l, Data Response 15), and therefore no further review of impacts is necessary. There is no proposed change to the amount of open water in the canals, and therefore no further review of impacts is necessary.

All the jurisdictional wetlands impacted by the project are related to the installation of OB3 pipeline and road expansion (McKendry Road). The pipeline crossing the McKendry Road segment would be designed as a double-walled pipeline, encased in concrete, isolated by block valves at the well head and along the pipeline, and would be monitored both externally by daily visual inspections, and internally by pressure monitors. The 0.4 acres of federal jurisdictional areas affected are broken down by habitat type below (CEOE 2002a, Appendix K, Jurisdictional Delineation Report):

- 0.05 acres of brackish marsh;
- 0.03 acres of other waters of the U.S. in the form of open water;
- 0.02 acres of desert sink scrub; and
- 0.3 acres of tamarisk scrub.

The applicant has submitted an application to obtain a Clean Water Act 404 permit issued by the U.S. Army Corps of Engineers and a 401 water quality certification issued by the Regional Water Quality Control Board for the fill of degraded wetlands. The applicant proposed to the USACE that they would mitigate the impact to jurisdictional wetlands with creation or enhancement of 0.8 acres of habitat (CEOE 2002a, Appendix K) if it was made part of the permit conditions. The applicant has provided a preliminary Wetland Mitigation Plan which proposes to restore or create 0.2 acres of open water and 0.1 acres of brackish marsh, and to offset the impacts to desert scrub and tamarisk scrub with land managed for wildlife use (CEOE 2003s). The USFWS consultation on

the installation of pipeline did not result in any terms and conditions so long as the construction takes place as described and outside of the Yuma clapper rail breeding season (USFWS 2002). A Fish and Game Code 1603 permit may be required from the CDFG, but the CDFG has not made a determination on the project. Construction within the wetland area will be subject to the conditions of the USACE permit, which will incorporate the USFWS request that construction must take place outside of the Yuma clapper rail breeding season. The applicant has agreed to provide the safest (least risk) design possible for the wetland pipeline crossing (CEOE 2002l, CEC Data Response 24). The County should ensure the pipeline is built as described in CEC Data Response 24 and any materials provided to USFWS, and adopt the USFWS measure to construct outside the breeding season as part of their permitting. No impact is expected after implementation of the permit terms and the restoration or creation of wetland habitat. To verify that these measures have been adopted into a permit, staff has requested a copy of the conservation easement (Condition of Certification **BIO-24**).

Of the combined four mile length of production and injection pipelines, only about 0.25 miles crosses areas that are marsh or wetland habitat (CEOE 2003a, CURE Data Response 212). The applicant has agreed to build the portion of pipeline which crosses jurisdictional wetland (see paragraph above) in a double-walled pipe, but the remainder would be in single walled pipe. If either the production or injection pipelines were to rupture and spill, there may be direct or indirect impacts to sensitive aquatic resources depending on size of the spill and location relative to drains, wetlands, or other sensitive habitat. The applicant estimates the amount of brine released during a spill would be 200 to 400 gallons, and would remain within a 20 to 30 foot radius (CEOE 2002l, CEC Data Response 10). The applicant has provided a draft Brine Spill Contingency Plan which covers agency notification and clean-up at the facility and takes into account the sensitive biological resources in the area. A final plan shall be approved prior to operations (Conditions of Certification **BIO-20** and **Soil&Water-10**). Staff recommends the County request a similar plan and require a stringent design where the pipeline crosses wetlands during their permitting of the brine pipelines and well heads, as this would reduce the impact to a less than significant level.

The brine pipelines are made from a specially designed pipe with a concrete liner. During storage and shipping, the pipes are filled with water to prevent drying or cracking of the liner. The applicant has proposed to empty the sections of pipe directly at or near its installed location provided that adequate flat surface is available to safely store the fluid (CEOE 2002l, CEC Data Response 10). During construction of the pipeline between OB3 well head and the power plant site, the pipes will be drained at the power plant site (ibid). No impacts to wetlands are expected when following this strategy (Condition of Certification **BIO-12**).

### Riparian Habitat Losses

There are two major river crossings by the applicant's transmission lines. Both the New River and Alamo River contain riparian habitat and are used by numerous birds for migration corridors. There would be little or no habitat loss from the transmission line towers because they are located on upland areas and no mitigation is requested by staff. The transmission lines would span over the riparian areas at a height of 100 to

125 feet, which is much higher than the present vegetation, and it will not need to be trimmed.

### Impacts to Salton Sea Islands (Rookeries)

Birds are especially sensitive to noise during the breeding season. If they are significantly impacted, they will abandon their nesting position and the nest will fail. Noise levels from the power plant site would be below the threshold of 60 dBA at these islands. Noise levels from construction of OB3 well head may exceed this threshold depending on the equipment used. Staff recommends the County request a pre-construction model of noise levels based on the final design, and adhere to the mitigation recommended in such a plan (see Condition of Certification **BIO-16** for an example measure). In addition, staff recommends the County consider pre-construction monitoring to document levels of California brown pelican use and the prescription of avoidance measures, and construction monitoring to evaluate success of avoidance measures and the need for remedial action. Implementation of these measures would reduce impacts to less than significant levels.

### Impacts to Crop Lands

Migrating birds have become highly dependent on the crop lands in the southern Salton Sea area for forage. A complete loss of crops on Refuge lands (either in ownership or leased) would be a significant impact since it would be counter to the Refuge's management goals and could result in injury to a federally or state listed species. At concentrated levels, many of the emissions from SSU6 are known to cause plant injury or death.

Hydrogen sulfide is one of the non-condensable gases, which would be emitted from the proposed project's cooling towers. The applicant has proposed technologies which control 99.5% of all sulfur emissions before they leave the cooling tower during normal operations (see AIR QUALITY section in this FSA). Impacts from operations will create concentrations of 7.5 micrograms per cubic meter hydrogen sulfide as averaged over a one hour period at ground level (CEOE 2002a, Table 5.1-49). Highest 1-hour hydrogen sulfide concentrations from well flow testing is 36 micrograms per cubic meter and 148 micrograms per cubic meter from plant commissioning (steam blow; CEOE 2002a, Table 5.1-46). These are both short term events and they only occur briefly in the lifetime of the project. Background hydrogen sulfide levels are estimated at 24.6 micrograms per cubic meter averaged over a one-hour basis (CEOE 2002a, Table 5.1-16). Most of the crop species tested have not been injured when exposed to concentrations of less than 120 micrograms per cubic meter (five-hours of fumigation) and some can withstand concentrations of 1,200 micrograms per cubic meter with no injury (EPA 1978). Based on the modeled emission amounts, staff does not expect impacts to crops from hydrogen sulfide concentrations during operations or well-flow testing, but crops may sustain some less than significant impacts (<50% loss of leaves) during commissioning activities.

The emission models estimate that ammonia, in combination with $NO_3$ and $NO_x$ , will deposit at a rate of 0.00198 kg/ha-year. Ammonia emission levels in the form of cooling tower drift above are approximately 0.001 micrograms per cubic meter per year or 0.0037 pounds per hour. The highest concentration from the project would be 25.8

micrograms per cubic meter (37 ppm[5] , annual average; CURE Data Request 299). By comparison moderate application rates of nitrogen fertilizer at 20 pounds per acre is equivalent to 2200 micrograms per cubic meter (CEOE 2003a, CURE Data Response 225 and 226). Concentrations in cities varies between 0.00014 and 0.018 micrograms per cubic meter (EPA 1978), and since this is not a regulated pollutant, data is unlikely to be available close to the proposed project. Concentrations of 38 micrograms per cubic meter require one hour to injure plants such as buckwheat, sunflower and tomato (EPA 1978). Because the project's maximum emission amount is below 38 micrograms per cubic meter, no impacts to crops are expected.

The highest one-hour concentration of sulfur dioxide from the project is 146 micrograms per cubic meter (CEOE 2002a, page 5.5-20). When using alfalfa as the most sensitive of plants, researchers found impacts began when exposed to concentrations of 3,144 micrograms per cubic meter for one hour (EPA 1978). Because the project's emissions are well below this limit, no impacts to crops are expected.

## Impacts to Refuges, Wilderness Areas, and Parks

### Habitat Loss

The installation of production wells OB1 and OB2 will require IID to terminate their month-to-month lease with the Refuge for the 60-acres north of the power plant site. While use of Refuge lands is severely restricted under the Section 25527 of the Public Resources Code[6], the lands will return to private hands once the lease is terminated, and the Energy Commission does not have jurisdiction over production wells. The impact of these production wells and pipelines is discussed further under COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS. At a minimum, some amount of foraging lands under the jurisdiction of the Refuge will be temporarily unavailable to migrating birds during the construction period of OB1 and OB2 and a smaller amount would be permanently lost. There may also be a loss of hunting opportunities once the production pipelines become operational.

### Deposition Effects

Certain national parks and wilderness areas are given special protection under the visibility program and for air impacts from new sources under the Clean Air Act and are referred to as Class I areas. Joshua Tree National Park (Park) contains a Class I wilderness area 35 miles to the north of the power plant. Modeling found the nitrogen deposition rate at the Park was 0.00198 kg/ha-yr. Because this is not a combustion fuel power plant, the amount of nitrogen deposition would be quite low compared to similar siting cases which could also impact the Park [7]. The modeled nitrogen and sulfur deposition rates at all the National Park and Wilderness areas were lower than the deposition analysis thresholds (DAT)[8] used by National Park Service and USFWS to trigger a management concern for deposition from a single source and no impact is

[5] Staff used NIOSH Manual of Analytical Methods, Fourth Edition, 1994

[6] Sections 25500 et seq. of the Public Resources Code encompass the Siting Regulations for the Energy Commission

[7] A >500 MW natural gas fired power plant, over 30 miles distant from Joshua Tree National Park, has a nitrogen deposition of approximately 0.009 kg/ha-yr and sulfur deposition of approximately 0.0001 kg/ha-yr.

[8] The DAT for the western United States is 0.005 for both pollutants.

expected (NPS 2002; CEOE 2002a, Section 5.1.2.7.2 page 5.1-42 and -43;CEOE 2002l, CEC Data Response 29).

## Movement or Migration of Fish and Wildlife

Wildlife will often use areas of dense cover, such as riparian corridors, or major geographical features, such as canyons, as migration corridors. The construction of SSU6 and linear facilities would not remove any areas of dense cover. Brine production and injection pipelines are insulated and would be placed above ground on stilts, allowing free passage of species underneath without harm (Condition of Certification **BIO-12**). Well pads are small features located in agricultural fields and would allow for continued movement of species around them.

The proposed transmission lines cross the New River and Alamo River which have segments of riparian vegetation and are used extensively by migrating birds. The applicant has proposed to place bird flight diverters on any lines where avian collisions are expected, including the New River and Alamo River. No impacts are expected after the installation of bird flight diverters, but the implementation of a bird flight diverter monitoring plan can measure the effectiveness of marking the lines and suggest remedial actions if any unexpected impacts occur (Condition of Certification **BIO-17**).

## Conflict with Adopted Plans

### Coachella Valley Natural Communities Conservation Plan (proposed)

The Coachella Valley Association of Governments has prepared an Administrative Review Draft which reflects the work of the Scientific Advisory Committee, the Implementation Subcommittee, and the Project Advisory Group. After receiving comments from the local, state and federal agencies, a Public Review Draft and Draft EIR/EIS is scheduled for release in 2003. Staff will review the plan, if the material is posted prior to the Commission decision, and make a recommendation on the proposed project's compatibility with the plan.

### California Desert Conservation Act Plan (CDCA)

The CDCA Plan designated utility corridors in its Energy Production and Utility Corridor Element (CDCA 1980, as amended). While the current proposed connection to the L-Line is outside of the existing corridor, the CDCA Plan does allow amendments to reflect changing conditions. If the applicant's proposed transmission line corridor is approved as an amendment to the CDCA, then no conflict with this plan will exist. The applicant will be required to provide copies of the amendment prior to construction (see LAND USE section of this FSA).

### Laws Relating to the National Wildlife Refuge System Lands

The proposed project does not use lands dedicated to the Refuge and does not change public use or access to the Refuge. The Refuge has not published a comprehensive conservation plan. Staff will evaluate the compatibility of the proposed project with the comprehensive conservation plan if it is published prior to the Commission Decision. There are no conflicts identified with the Refuge except as it relates to lands that are under lease to satisfy Lea Act obligations.

### Salton Sea Restoration Act of 1998

As directed in the Salton Sea Restoration Act of 1998, Salton Sea restoration studies are currently under way and will identify a variety of alternatives for stabilizing salinity at the sea in order to protect the area for wildlife (Salton Sea Authority and BOR 1999). Numerous physical and/or chemical engineering and scientific research study initiatives have been implemented. Examples of these research efforts include a 12-acre solar evaporation pond project and a Vertical Tube Evaporation, or VTE, pilot study using geothermal energy, in cooperation with Cal Energy. The proposed project will not disrupt the actions being taken to correct the salinity problems related to Salton Sea, and may benefit the efforts being made if it is determined more electrically-intensive measures are needed to reach salinity goals.

### Flat-tailed Horned Lizard Rangewide Management Strategy

The Flat-tailed Horned Lizard Working Group of the Interagency Coordinating Committee (committee) prepared the Flat-tailed Horned Lizard Rangewide Management Strategy (Management Strategy) to provide guidance for the conservation and management of lands for the lizard. These lands are found in southwestern Arizona, southeastern California, and adjacent portions of Sonora and Baja California Norte, Mexico. The Management Strategy calls for the establishment of five flat-tailed horned lizard management areas where surface disturbing activities would be limited. Land alterations outside of these management areas would not be restricted, but special mitigation and compensation measures would be applied as needed. The closest Management Area is West Mesa, outside the proposed project's footprint. The applicant would need to follow the committee's recommendations (such as having a worker education program) to ensure compliance with the Management Strategy. After incorporation of the relevant portions of the Management Strategy into the BRMIMP (Condition of Certification **BIO-5**) no conflict would remain.

## Effects on Commercial or Recreational Species

The proposed power plant site and construction lay down area are not identified as habitat for commercial or recreational species, and the loss of this habitat is not expected to cause a decrease in these species. The construction of production well pads OB1 and OB3 will take place on lands where snow geese and widgeon hunting is allowed. During the 2002/2003 hunting season there were 103 hunter visits to this field (USFWS 2003c). If the construction were to take place during snow geese and widgeon hunting season, there would be a slight loss of hunting opportunities by hunters. The County should propose alternative parking locations for hunters as mitigation for this impact. If hunting will no longer be allowed on this parcel, in order to protect the proposed production pipeline or wellheads, then the County should propose replacement of this opportunity at an alternative hunting location.

## Effects from Invasive Plant or Wildlife Species

The power plant site and related linears are in an intensively farmed area where the application of pesticides and herbicides is common place. However, weed seeds are long lived, and are prone to germinate under disturbance conditions. Areas that have temporary disturbance shall be contoured and invasive weed species controlled

(Condition of certification **BIO-18**). No impact will remain after implementation of this measure.

## CUMULATIVE IMPACTS

CEQA defines cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." (CEQA Guidelines, Cal. Code Regs., Title 14, §15355). Cumulative impacts can occur when individually minor but collectively significant projects take place at nearly the same time frame or compound over time.

The identification of projects under the cumulative impacts analysis was based on permit records and the Draft Habitat Conservation Plan for the IID Water Conservation and Transfer Project (CEOE 2002a, Sections 5.5.3 and 5.17.2). Two of the projects are linear in nature, the Baja Pipeline and the improvements to State Route 76/111 expressway. The Baja Pipeline was completed in September 2002, so no cumulative impacts from noise, traffic, or lighting are expected. State Route 76/111 does not cross components of the proposed project, and the construction may not occur concurrent with the project, so no cumulative impacts from noise, traffic, or lighting are expected. Active projects related to the improvement of salinity at the Salton Sea are small in scale and isolated from the proposed project, so no cumulative impacts from noise, traffic, or lighting are expected.

The Imperial Irrigation District (IID) is involved in large scale water transfers that may require the fallowing of agricultural lands throughout the area. The area currently contains over 500,000 acres in agriculture and IID is opposed to fallowing because of the impact on the local economy. It is uncertain at this time if IID's proposal will result in fallowing land, but if IID goes forward with fallowing, the loss of the 173 acres from the proposed project would be very small when compared to IID's plan. The remaining agricultural lands would be evaluated in IID's CEQA documents, and IID must determine whether there are adequate agricultural lands for wildlife protected by CDFG and USFWS in the area. At this point, the IID will be considering the loss of agricultural lands from the proposed project when they make their CEQA determination in the future, and staff find that no cumulative losses to wildlife is expected from this proposed project.

## FACILITY CLOSURE

Sometime in the future, the Salton Sea Unit 6 and wells would 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" would be developed by the project owner, and approved by the Energy Commission Compliance Project Manager (CPM). Facility closure mitigation measures will also be included in the Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP) prepared by the applicant.

The surrounding area is predominantly agricultural, including the area proposed for the project. At the plant site and construction laydown areas no sensitive habitats or

vegetation dominated by native species will be cleared or disturbed. Linear facilities (i.e., transmission lines from the plant, brine pipelines) will permanently alter some agricultural lands, and one area of creosote bush scrub.

If the power plant facilities are closed after an anticipated 30-year operational period, the surrounding areas may be still intensively farmed. In this case, restoration of any of the project area to agricultural production would be the most practical. If other land uses or natural communities have developed (such as wetlands), then returning the area to a natural community would ensure the most benefit to biological resources.

While structures are being removed and the area is being stabilized during plant closure, all parties involved should follow measures prescribed for construction in the BRMIMP (Conditions of Certification **BIO-1**, **BIO-13** and **BIO-15**) to address potential impacts to biological resources. The equipment used, traffic, human presence and nature of the disturbance during closure is similar enough, such that application of the same mitigation measures implemented during construction would be appropriate.

## MITIGATION

The applicant has evaluated the impacts of the power plant and all facilities (including the production wells, resource conveyance lines, and other geothermal field development features) and suggested mitigation where appropriate. Staff has evaluated the impacts of the power plant and its related facilities (electric transmission line, water lines)[9] and suggested mitigation where appropriate. Because of the limited nature of the Energy Commission jurisdiction, some mitigation suggested by the applicant has not become a Condition of Certification, but would be part of the permits from other agencies (such as the County).

### Applicant Proposed Mitigation

The applicant has proposed in the AFC, the draft BRMIMP and supplementary biological information several impact avoidance measures to reduce impacts to biological resources in the area (CEOE 2002a, Section 5.5.4 and Appendix K, Biological Assessment). CEOE will:

- submit to the Compliance Program Manager (CPM) a final BRMIMP;
- designate a qualified biologist to manage all biological resource conditions of certification;
- develop and institute a Worker Environmental Awareness Program to inform construction and operations workers about biological resources associated with the project;
- design facilities to avoid impacts from lights and noise;
- perform pre-construction surveys for identified sensitive resources;
- install bird flight diverters along high use portions of the transmission lines;

[9] As defined by the Siting Regulations

- monitor hazardous areas during construction and ensure protection measures are in place;
- compensate for wetland losses;
- prepare a facility closure plan;
- work with agency staff to create monitoring plans;
- avoid disturbance to occupied burrowing owl burrows, and
- model noise and suggest abatement measures.

These measures have been incorporated into staff's Conditions of Certification **BIO-1** to **BIO-4, BIO-6, BIO 12, BIO-14, BIO-15, BIO-17** and **BIO-19** and shall be presented in the applicant's BRMIMP (**BIO-5**).

During their consultation with the USFWS (CEOE 2003s), the applicant stated they could:

- schedule pile-driving outside of the shorebird breeding season (March through July);
- conduct monitoring during construction to ensure noise levels do not exceed 78 dBA in sensitive habitats during the breeding season;
- plan maintenance activities related to well heads (e.g., coil cleaning or redrilling) during daylight hours and outside of the shorebird breeding season (March through July);
- plan maintenance activities related to the power plant (e.g., cleaning of the ponds, cleaning of the northwest re-injection well) when near sensitive habitat outside of the breeding season;
- construct well pads OB1 and OB2 outside the period when Yuma clapper rails are vocal and defending nest territories
- avoid pile driving and steam blows during early morning and late evening hours, and during the sensitive early mating period (March through May);
- evaluate alternatives to impact pile driving;
- restrict maximum speeds on all unpaved roadways in the project area to 15 miles per hour during both construction and operation; and
- to install only one shielded 500-watt fixture at the front of all well pads and to minimize plant site lighting.

CEOE also provided the USFWS with a draft Conceptual Wetland Mitigation Plan (CEOE 2003s). The Conceptual Wetland Mitigation Plan proposed to find a mitigation area at least 0.8 acres in size, located adjacent to existing lands managed by the Refuge, which has similar types and values to the affected project area. The plan is to create or restore at least 0.1 acres of brackish marsh, at least 0.2 acres of open water, and to manage at least 0.5 acres of wildlife-friendly agricultural habitat on the chosen parcel (CEOE 2003s). CEOE would be responsible for all acquisition costs, prepare a

conservation easement transfer, prepare detail enhancement plan, and provide an endowment for long-term management and maintenance.

CEOE has provided a draft Brine Spill Contingency Plan to the USFWS (CEOE 2003s). The plan includes agency notification, procedures to contain the spill, procedures to repair damage to surrounding areas, and a reporting procedure. The plan covers spills at well heads and related geothermal conveyance features.

## Staff's Proposed Mitigation

### Pre-construction Surveys

Because of the dynamic and transient nature of wildlife use in the project area and its proximity to habitat occupied by federal or state listed threatened or endangered species, the applicant should complete biological surveys for the presence of such species prior to initiating mobilization and construction activities (Condition of Certification **BIO-14**). The protocol for such monitoring shall be consistent with USFWS and CDFG guidelines and shall be described in the applicant's BRMIMP (Condition of Certification **BIO-5**). All monitors should have the appropriate permits for performing these tasks.

### Preparation of Monitoring Plans

The discussion with agency staff on January 9, 2003 identified the need for several monitoring plans. Staff has identified the specific plans that will need approval prior to construction and operations of SSU 6. These include:

- Pre-construction and construction noise modeling and monitoring activities (Conditions of Certification **BIO-14, BIO-15** and **BIO-16**); and
- Post-construction transmission line monitoring (Condition of Certification **BIO-17**).

Throughout this text, staff has made recommendations that the County require similar measures on the brine pipelines and at well heads (see section below).

### Purchase of Emission Credits

Staff identified that power plant emissions, if unmitigated, would contribute to the degradation of air quality in the basin and possibly change the composition of Salton Sea's waters. The SSU6 facility will implement BACT, which means that controls at the source will achieve the maximum reduction of nitrogen emissions technically feasible. In addition, emission offset credits will be purchased through a market system at a ratio equal or greater than 1:1 (see AIR QUALITY section in this FSA). The ratio is in part determined by whether the credits are purchased locally (smaller ratio) or regionally (higher ratio) (see AIR QUALITY). Mechanisms are in place to encourage purchase of credits locally. Although this addresses only stationary sources the objective is to ensure that the SSU6 should not significantly deteriorate air quality. For these reasons staff does not propose any conditions of certification related to this impact.

### Reducing Avian Electrocutions and Collisions

Transmission lines located in areas identified as highly sensitive migratory areas will be designed to comply with Avian Power Line Interaction Committee (APLIC) suggested

practices (CEOE 2003a, CURE Data Response 210). Impacts to sensitive birds (such as raptors or brown pelicans) from electrocution are not expected after implementation of this measure (Condition of Certification **BIO-12**). Bird flight diverters shall be placed along the entire length of the two transmission lines to reduce collision impacts to sensitive species (Condition of Certification **BIO-17**). No significant impacts are expected after installation of bird flight diverters, however, monitoring will confirm the success of the diverters measures (Condition of Certification **BIO-17**). If monitoring shows excessive losses, then the project owner will need to implement remedial actions, including the possibility of moving the transmission line to a new alignment.

### Reducing Noise and Vibration Impacts

The applicant has agreed to implement during construction and operation many of the same restrictions on noise and vibration as staff has proposed. The difference in the staff's and CEOE's proposal is related to the criteria for 60 dBA during the mating and nesting season, and the number of months to impose the restrictions. Staff has provided analysis on how noise levels above 60 dBA can mask the call of birds, and the applicant has stated that there is no evidence of lower reproduction rates when birds were exposed to cyclical noises above 60 dBA. Some of the noise levels from construction, such as a steam blow, can last continuously for more than 24 hours, and would not allow for birds to re-establish their territories and pairing bonds. For actions which must be continuous for 24-hours and exceed 60 dBA at a sensitive receptor, staff requires the action take place outside of the breeding season (Condition of Certification **BIO-16**). For noises that are cyclical, but greater than 60 dBA, staff requires the actions take place outside of the hours around dawn and dusk. The extension of the nesting season until August is the result of Refuge and CURE staff opinion that nesting continues into August. The applicant has continued to use the more traditional cut-off time of July. Staff is confident that the production of a Noise and Vibration assessment and abatement plan will allow all parties to reach agreement on the proper noise level restrictions and timelines (Condition of Certification **BIO-16**).

### Reducing Speed Limits

While the applicant has stated they are willing to restrict speeds on unpaved roads, it is the intent of the County that both McKendry Road and Boyle Road be paved (see TRAFFIC AND TRANSPORTATION section of this FSA). The amount of traffic that will result from the project is extremely high in comparison to existing levels. The intent of a lower speed limit is to protect Yuma clapper rail and burrowing owls from collisions with project-related vehicles by allowing enough time for vehicles to stop or safely swerve. The applicant's Designated Biologist will be identifying the areas that are occupied by these species during pre-construction and construction monitoring (Condition of Certification **BIO-2**), and shall also mark these area (paved or unpaved) for reduced speeds (Condition of Certification **BIO-13**).

### Burrowing Owl Mitigation

The finding that burrowing owls forage over 1,800 feet from the nest, makes CDFG's standard mitigation, calculated on a 300 foot foraging radius around the burrow, insufficient to compensate for foraging losses. If a foraging radius of 1,800 feet was used, it would require the applicant purchase 58 acres of land per pair or unpaired resident bird. Requiring 58 acres of land seemed unreasonable in this particular siting

case, because within that large radius there are so many different crop types of various foraging value, and nesting pairs are using the foraging land simultaneously. Instead, staff has requested that when construction occurs within 300 feet of an active burrow, the degredation and destruction of burrowing owl foraging habitat shall be compensated for with the installation of new burrows at a ratio of 2:1, and the purchase of at least 6.5 acres of protected land. In addition, when known foraging habitat is lost (e.g., agricultural fields and grass-forb areas) outside of 300 feet but within 1,800 feet of an active burrow, the applicant shall compensate with foraging habitat in the Salton Sea basin at a ratio of 0.5:1 (Condition of Certification **BIO-19**). This will achieve a balance of replacing any lost nesting sites and foraging habitat within the Salton Sea basin for this species. The estimated direct disturbance to burrowing owls, based on URS surveys from 1999-2002 (CEOE 2002a, Appendix K, Biological Assessment, Figures 4 to 8), is 2 resident burrowing owls (or 2 pairs) at the power plant site, 5 at the transmission lines corner poles, and 10 at spanning transmission line poles, roads or at laydown or pull sites. If 17 burrowing owl sightings are disturbed as expected, the applicant would be responsible for 110.5 acres of habitat. The high number of owls makes it very likely that the applicant will have permanent loss of lands within 1,800 feet from an occupied burrow, and staff estimates and the applicant shall compensate 40 acres for the power plant site (minus any burrowing owl compensation from above, or minus 13 acres in our estimate) and 2.65 acres for transmission line poles. The total amount of land to be protected is estimated at 140.15 acres following these guidelines.

## Mitigation by Other Agencies

The preceding pages identified all the impacts that could arise from the build out of the proposed project. The Energy Commission only has jurisdiction over the power plant facility and the transmission lines. The Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) and Imperial County will be the permitting agencies for the well heads, well pads, and pipelines. Staff has included the suggested mitigation measures for impacts identified, but it is up to the other agencies to impose them. Staff's recommendations regarding the permitting by other agencies are described below (see also **Table 4**).

The DOGGR would be contacted for the notice of intention to commence drilling. Nothing is required beyond the application and prescribed fee. Counties which have adopted geothermal elements may be delegated lead agency responsibilities (per the California Environmental Quality Act) for exploratory geothermal well projects and primary permitting powers for large geothermal plants (Public Resources Code Sections 3715.5 and 25540.5). Imperial County, through the Planning/Building Department, regulates the use of land for geothermal purposes through conditional use permits. Staff assumes the County will be permitting surface disturbances resulting from the well heads and the brine pipeline and their associated noise impacts.

The agency discussion on January 9, 2003 identified many monitoring plans that would need to be performed along the brine pipelines or at well heads. Because of a lack of jurisdiction by the Commission, staff can not require these measures as part of our permitting process. Staff recommends the County should adopt in their permit conditions the following monitoring provisions:

- Observing California brown pelican populations at the islands near Obsidian Butte for comparison of use factors during construction of the OB3 well pad. Data shall be collected on the number of brown pelicans present, the propensity for flight, the observable stimulus which results in flight(s), and any other factors which could help determine the level of impact.
- Observing snow geese, widgeon, and mountain plover populations within the field proposed for OB1 and OB 2 wellheads. Data shall be collected on the number present, the utilization of the area for feeding, and any other factors which could help determine the level of impact.
- Mapping mountain plover habitat within the fields adjacent to proposed brine pipelines just prior to construction and propose mitigation for any permanent losses from construction.
- Mapping occupied burrowing owls burrows along brine pipelines and well heads and propose mitigation for any losses from construction. The number of burrowing owls to be displaced is likely to be 14, and permanent impacts are likely to be 136.5 acres. Under staff proposal, the applicant would be responsible for protecting 159.25 acres (91+68.25).
- Monitoring of the water quality in the wetland north of McKendry Road during construction of the brine pipeline to OB3.
- Ensuring pre-construction monitoring during scheduled well head maintenance or re-drilling for biological resources and notification of agencies prior to commencing.

Staff recommends the County require a biologist work with the well head and pipeline construction crews, and prepare a worker education program (see Conditions of Certification **BIO-1** through **BIO-4** for example measures). Staff recommends the County require the project owner to construct well pad cellars to prevent wildlife entry or entrapment.

Staff recommends the County require the applicant to design the pipelines which must cross wetlands with automatic shutoff valves and double wall construction. Per the USFWS consultation on the project by USACE, the County should require construction in the wetlands north of McKendry Road outside of the Yuma clapper rail breeding season.

The County will need to evaluate the level of impact the well heads and brine pipelines have on Lea Act lands and propose mitigation to the Wildlife Refuge. The applicant should be required to locate and procure a lease of at least 19 acres of agricultural lands to compensate permanent losses from production well pads OB1 and OB3 and their pipelines. To verify that these measures have been adopted into a permit, staff has requested a copy of the County permit, and will request the terms and conditions of the permit become incorporated into the SSU6 BRMIMP (Condition of Certification **BIO-21**).

The BLM, as a federal agency, can require any level of mitigation on its lands which will meet the agency's needs under the National Environmental Policy Act (NEPA). The level of mitigation in NEPA is different than that required in CEQA. The Commission proposes a biologist work with the construction crews and that the project owner prepare and implement a worker education program (see Conditions of Certification

**BIO-1** through **BIO-4** for example measures). Staff also has proposed a review of avian collisions with transmission lines on BLM lands (see **BIO-17**). If burrowing owls exist along the segment of L-line on BLM lands, burrowing owl mitigation is recommended by staff (see **BIO-19**). Staff recommends BLM require these same measures.

Staff recommends that Imperial County and the BLM incorporate the appropriately noted mitigation measures and conditions (or equivalent ones) from BIOLOGICAL RESOURCES **Table 4** into their environmental analyses and decision documents.

**BIOLOGICAL RESOURCES Table 4**
**Recommended Conditions of Certification for Adoption**
**By Imperial County and BLM for Protection of Biological Resources**

| Condition of Certification | Imperial County | BLM |
|---|---|---|
| BIO-1 | X | |
| BIO-2 | X | |
| BIO-3 | X | |
| BIO-4 | X | X |
| BIO-5 | | |
| BIO-6 | | |
| BIO-7 | | |
| BIO-8 | X | |
| BIO-9 | X | |
| BIO-10 | | |
| BIO-11 | X | |
| BIO-12 | | |
| BIO-13 | X | X |
| BIO-14 | X | |
| BIO-15 | X | |
| BIO-16 | X | |
| BIO-17 | | X |
| BIO-18 | X | X |
| BIO-19 | X | X |
| BIO-20 | X | |
| BIO-21 | | |
| BIO-22 | | X |
| BIO-23 | | |
| BIO-24 | | |

## COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

## POWER PLANT AND CONSTRUCTION LAYDOWN AREA

### Federal and State Endangered Species Act

The applicant will need to consult on the impact of construction and operation of the power plant with the USFWS, as well as the CDFG, to ensure compliance with the state

and federal ESA for potential impacts to listed species. The BLM is the federal lead for this consultation, and with issuance of the Biological Opinion and CDFG Conformance Determination, the project owner will understand what actions it will need to take to be in compliance with the state and federal ESA. The terms and conditions of these permits will be incorporated into the BRMIMP to ensure that any related impacts are reduced to levels that are less than significant (Conditions of Certification **BIO- 7** and **BIO-10**).

### Imperial County General Plan: Noise Element

The Noise Element states the noise must not exceed 75 dBA when averaged over 8 hours at the nearest sensitive receptor. For the most part, noise levels during construction are estimated to be below the limits found in the Noise Element so long as steam-blows from pipelines are muffled. However, the site grading and clearing when near the edge of the project are estimated to be 79 (grader) and 82 (dozer) dBA at the nearest sensitive receptor, McKendry Marsh. Staff does not expect conflicts with the Noise Element if there are restrictions on construction during daybreak (civil twilight) and sunset, and if the steam blows are muffled (Conditions of Certification **BIO-12** and **BIO-16**).

## LINEAR FACILITIES

### Federal and State Endangered Species Act

The U.S. Army Corps of Engineers initiated consultation with the USFWS on October 3, 2002 (USACE 2002) for the fill of degraded wetlands to widen McKendry Road. The USFWS concurred that such an action may affect, but is not likely to adversely affect Yuma clapper rail so long as the construction and development of McKendry Road [for well pad OB-3] is scheduled outside of the breeding season (USFWS 2002a). No impact to desert pupfish was anticipated with the construction and development of well pad OB-3. Once the applicant has received the USACE permit, which incorporates all USFWS terms and conditions, then the applicant will be permitted to begin the widening of McKendry Road.

The power plants site, transmission lines, well heads, injection pipelines, and the remainder of the production lines are being reviewed separately by the USFWS. Staff expects the Biological Opinion for the remainder of the project to be completed sometime in November 2003. Once the BLM has issued their Right-of-Way permit in December 2003, which must incorporate all the Terms and Conditions from the USFWS Biological Opinion, the applicant would be in compliance with this Act (see Conditions of Certification **LAND-7**).

### Clean Water Act (404 and 401 permits)

The applicant has proposed to conserve or enhance 0.8 acres of land. The preliminary Wetland Mitigation Plan identifies how impacts will be mitigated, but does not disclose a location (CEOE 2003s). Although the application to the USACE has been submitted, the USACE is delaying issuing the permit until they have more complete details on the wetland plan. This will also delay the Regional Board from issuing the 401 certification. Once the permits have been issued, the project owner will understand the actions it will take to be in compliance with this Act.

### Lea Act

As directed by the Lea Act, the Refuge has rented lands in the local area to reduce the amount of crop losses from waterfowl. The lands north of the power plant site, where production wells OB1 and OB2 are proposed, is current a Lea Act parcel. The Refuge is concerned that the loss of this land would result in them not meeting their Lea Act obligations. While the applicant will need to revoke the lease of the land during the construction phase, there continues to be a commitment by the project owner to return these lands to the Refuge at the end of construction. The size of the well pads will remove from production approximately 12 acres and the production pipeline approximately 7 acres. There may be additional indirect losses from wildlife avoiding the new infrastructure or the loss of hunting opportunities. The loss of this land should be replaced with other agricultural production lands nearby to compensate the loss. Locating and procuring a lease or purchase of at least 19 acres of agricultural lands should be required under the County permits.

### Imperial County General Plan: Conservation and Open Space Element

The applicant has proposed transmission lines across the Alamo River and New River where riparian vegetation is present. The policy of the County is to allow for such a crossing if impacts are minimized and no other alternative is feasible (see Policy 1). County staff has not requested the review of alternative transmission lines, but staff did consider undergrounding the line at Alamo River or moving the line to Sinclair Road as alternatives to the proposed crossings. The applicant found undergounding the lines would require additional facilities be built on each side of the Alamo River (CEOE 2002l, Data Response 118). Undergrounding the transmission line would require the use of a much larger towers near the river crossings in order to take the tension from above ground to below ground and the area would need to be fenced to protect circuits. Grading for these large towers could result in disturbance impacts to riparian habitat. Because these rivers flow from long distances into the Salton Sea, staff could not find a more southerly or northerly route which avoids a river crossing, but did try to consolidate the number of river crossings by placing the proposed IID Interconnection on Sinclair Road as an alternative. The applicant stated the use of Sinclair Road would require additional right of way to widen the path and realign existing circuits (CEOE 2002l, Data Response 118). Such actions could result in additional riparian habitat losses at Sinclair Road. Overall, the alternatives to crossing the Alamo River could cause impacts to riparian vegetation which can be avoided by implementing the proposed project. Therefore, the proposed project is in compliance with Imperial County Conservation and Open Space Policy 1.

## RESPONSES TO PUBLIC AND AGENCY COMMENTS

## AGENCY COMMENTS

### U.S. Fish and Wildlife Service

**USFWS (5-20)-1**: *The location of facilities on the Sonny Bono Salton Sea National Wildlife Refuge (Refuge) is of concern. Based on review of the applicable laws, ordinances, regulations and standards, the California Public Resources Code appears to prohibit the use of the refuge for these facilities.*

*Staff response:* California Public Resources Code Division 15, Chapter 6, Sections 25527, does not apply the moment the Refuge is no longer leasing the land and it becomes private land again. In addition, this Code only applies to facilities that the Energy Commission is permitting, and geothermal production wells are not under our jurisdiction. For the Public Resource Code relating to geothermal production wells, see Division 3, Chapter 4. The Code regulating geothermal wells only restricts where a new well can be located in relation to the parcel edge or a public road in order to prevent the well from being a public nuisance.

**USFWS (5-20)-2**: *The direct loss to [Refuge] facilities will be on the order of 19 acres, but it may be more if the waterfowl using the parcel avoid the facilities once in place. This additional loss should also be considered.*

*Staff response:* Staff has tried to account for the indirect loss by adding a buffer to the pipelines, and suggested the County require the project owner to find more than 19 acres of land for lease or purchase.

**USFWS (5-20)-3**: *There also may be a loss of Refuge functions on the parcel [with OB1 and OB 2 wellheads]. This loss will not be completely offset by the addition of parking areas elsewhere as suggested by the Preliminary Staff Assessment (PSA). The project should include measures to offset all of these losses, and it should be done in such a way as to facilitate management and enforcement requirements.*

*Staff response:* The County permitting of the production wells should adopt mitigation which offsets both the size and functionality of the parcel. Refuge staff correspondence (USFWS 2003c) indicates that this parcel has over 100 visitor hunting days, so it is used for more than just parking. Noting that the number of Refuge staff is limited, we agree that a parcel that facilitates management and enforcement is preferable. We suggest a parcel that meets these needs be purchased and leased to the Refuge for Lea Act use to reduce this impact to less than significant levels.

**USFWS (5-20)-4**: *The PSA includes discussions of noise impacts in the Biological Resources section and the Noise section. These discussions incorporate two issues, but the issues are not addressed as separate issues in all cases. The project should consider as separate issues what is required to address noise at the Refuge residence and what is required to address noise in Yuma clapper rail (Rallus longirostris yumanensis) habitat. Noise evaluations should consider all of the potential sources of noise and provide a cumulative measure of the noise levels anticipated to occur in the habitat…. The evaluation should consider cumulative noise levels relative to the identified threshold of concern (60 dBA) and existing background levels. The background levels have not been quantified adequately to date. This comparison is particularly important for the steam blows which will go 24hours/day and may last up to a week.*

*Staff response:* In some discussions the Refuge residence was incorrectly used as a reference point for impacts to Yuma clapper rail. The text has been changed to present both the noise levels at the Refuge residence and at Yuma clapper rail habitat from project-related sources. A cumulative level of noise was modeled by CEOE in response to the April 3, 2003 letter from the USFWS to the BLM. They found if 8 pieces of each

type of equipment were in use at the same time (96 total pieces) the amount of estimated noise at 1,000 feet would be 78 dBA (CEOE 2003s). This is the same level as the maximum ambient level found at Noise Measurement Location ML10.

**USFWS (5-20)-5**: *Bird flight diverters are to be installed in the areas near the Salton Sea based on fly-over surveys. However, the entire Imperial Valley is used by a wide variety of bird species, and their use of the valley varies depending on agricultural practices. Given the level of use, it would be appropriate to consider the use of bird flight diverters on all of the new transmission line associated with the project.*

*Staff response:* The applicant avian-flyover surveys indicate some areas are not used during the fall and winter months during the daytime. However, there were no nighttime surveys and summer surveys were limited, so there may be a higher avian use than estimated in the surveys. To be conservative, it would be appropriate to mark all transmission lines with an approved marker and to use the existing lines for a control in measuring effectiveness. Staff has recommended that the project have bird flight diverters for the entire length (31 miles) of transmission lines.

**USFWS (5-20)-6**: *The burrowing owls may occur along the pipelines and near well pads in addition to the plant site and transmission line locations. This species should be addressed wherever a project feature might impact them. They are known to use multiple burrows during the breeding season, so any evaluation of impacts and development of a mitigation strategy should consider that it is not just the burrow occupied at a particular time that is of concern, but the entire complex of burrows that a pair may require throughout the year.*

*Staff response:* Pre-construction surveys for all project features would try to find all burrows that have potential use by burrowing owls in the construction zone. The protocol requires that if the owl is nesting, construction activities must stay at least 250 feet away. Such measures would account for the entire complex of burrows which may be in use by the pair or individuals found. The Energy Commission will require this measure for the power plant site and transmission lines, and suggest the County adopt the same measure for the geothermal wells and pipelines.

**USFWS (5-20)-7**: *The Emergency Response Plan should consider the need to address small leaks that result in brine sprays going into wetlands in addition to addressing larger pipeline leaks and ruptures.*

*Staff response:* Small leaks are not anticipated because of the pipeline monitoring to ensure any pipe abnormalities are detected early. In addition, CEOE proposed a double-walled pipe design over wetland areas which would prevent spray if it were to occur.

**Sonny Bono Salton Sea Wildlife Refuge (USFWS)**

**Sonny Bono (05-15)-1:** *[In the previous four years, avian flyover] surveys were not conducted during July, August, and most of September. This summer period coincides with the peak use of the Salton Sea by California brown pelicans, thus, the data collected can not be used to infer impacts to this species.*

*Staff response:* The avian flyover surveys may have underestimated avian use of the area because of the lack of data collection during the night or during the late summer months. Because the potential impact of unmarked powerlines on the area's avian populations, staff will conservatively assume all powerlines are a collision threat and should be marked.

**Sonny Bono (05-15)-2:** *It should be noted that on April 7, 2003, a group of conservation organizations formally petitioned the California Fish and Game Commission to list the western burrowing owl as a state endangered or threatened species under the California Endangered Species Act.*

*Staff response:* Staff has acknowledged the petition and has incorporated the change in the FSA text.

**Sonny Bono (05-15)-3:** *It should be noted that gull-billed terns breed annually at the Salton Sea. However, colony sites do vary on an annual basis. One of the most consistently used colony sites is located near Rock Hill within a wetland impoundment managed by the Salton Sea NWR. It should also be noted that during the spring of 2003, gull-billed terns have established a nesting colony on one of the offshore islands adjacent to Obsidian Butte. As of 5/13/03, there are 27 active nests.*

*It should be noted that [black skimmer] also nests annually on the Salton Sea, typically occupying the same colony sites as gull-billed terns. The colony located near Rock Hill is consistently used by this species.*

*It should be noted that gull-billed tern nesting chronology begins in mid to late April and continues into July. Other shorebirds follow roughly the same schedule.*

*Staff response:* Staff has added the use of Rock Hill and Obsidian Butte by these two species in their analysis. Because these features could be impacted by geothermal production wells and pipeline construction, staff suggests the County adopt mitigation as part of their permit requirements to reduce impacts to these species.

**Sonny Bono (05-15)-4:** *The Salton Sea Refuge staff has concern that the use of avian fly-over survey which did not include surveys during the summer period does not adequately address the impact of the L-line to brown pelicans. Specifically, a wetland adjoining the corner of Lack and Lindsay Roads (between milepost L2 and L3…) was consistently occupied during the summer of 2002 with estimates of 12-40 individuals present on any given day. The proximity of the L-Line to this wetland is felt to be an undue hazard that is easily avoided by rerouting the L-Line south along Grummer Road for an additional mile before the line turns left to follow Lack Road.*

*Staff response:* See staff response to Sonny Bono (05-15)-1, above.

**Sonny Bono (05-15)-5:** *Yuma clapper rail surveys of our Hazard 6 pond (off Sinclair Road) were conducted throughout the spring [of 2003]. During the last of three surveys, a new well was constructed/rehabilitated directly adjacent to the unit. This activity included the erection and dismantling of scaffolding and derrick, drilling and sinking pipe, etc. The survey results are as follows:*

| *Date* | *# rails heard* |
|---|---|
| *3/21* | *4* |
| *4/8* | *6* |
| *5/6* | *11* |

*Although rail numbers increased throughout the period, and birds were present during the construction period, there may be several possible explanations for the numbers counted. First, this increase may simply reflect an overall increase in rail numbers as the breeding season progresses. Second, this increase may reflect that there was no impact from the construction activity. Lastly, this increase may be the result of defensive behavior by the rails responding to the additional noise levels. Based upon the data collected, it is impossible to determine the impact, either positive or negative, that the construction activity has had on the rail population.*

*Staff response:* Staff has considered the data presented. As noted by Refuge staff, several antidotes do not create data. The determination of impact must be correlated and separated from other influences such as time of year and population fluctuations. We also do not have a measurement of noise during this activity so that the assumptions made in the noise analysis could not be validated. However, staff is proposing a Noise Abatement Plan for the site, and has suggested the County do the same for the well head and pipeline installations since noise levels could be between 75 and 79 dBA during construction.

**Sonny Bono (05-15)-6:** *[I]t is understood that the month to month lease from IID to the Refuge would be terminated and that the lands would return to private hands. Clarification is needed to determine if the reference to private land refers to IID, or does it refer to individuals other than the Refuge. Additionally, we are unclear as to why the statement that the Energy Commission does not have jurisdiction over production wells in included here.*

*The [PSA text on page 4.3-24 under the heading] Lea Act, indicates that the portion of the field in question that is not impacted by the wells or pipeline would revert back to refuge management after construction is completed. Again, clarification of this point is needed.*

*Staff response:* The applicant has indicated that the parcel will be returned to the Refuge at the end of construction. During construction, IID will be the owner of the parcel and no other private individuals are involved. It is important to note that California Public Resources Code Division 15, Chapter 6, Sections 25527, only applies to Energy Commission project features (such as the power plant and transmission lines to the point of first interconnect). Since the Energy Commission is not permitting these features, this statute does not apply.

**Sonny Bono (05-15)-7:** *It should be noted that an endangered species permit, issued by the USFWS, is necessary if a callback protocol is used to survey for Yuma clapper rails.*

*Staff response:* The applicant's biologist and monitors are required to be permitted, but it is always helpful to remind the project owners of the importance of hiring qualified and permitted people.

**Sonny Bono (05-15)-8:** *Because burrowing owls are protected under the Migratory Bird Treat Act, notice of survey results [for BIO-19] should also be submitted to the USFWS.*

*Staff response:* Condition of Certification **BIO-19** has been changed for the FSA to state that a copy of results shall be sent to the USFWS and Refuge staff.

**Sonny Bono (05-15)-9:** *It is recommended that percentages of each habitat type be identified in order to avoid qualitative statements related to [Yuma clapper rail] abundance.*

*Staff response:* The amount of land in crop types, but not specific crops, has been identified in the text (e.g., hay and pasture lands). Staff did not find data on the amount of wetland habitat that remains in the project area.

**Sonny Bono (05-15)-10:** *The Refuge staff is unclear what role in controlling tamarisk that CDFG has in the project area. However, Refuge staff spends considerable effort within the project area controlling tamarisk.*

*Staff response:* While control of tamarisk is often pursued by agencies, staff was pointing out that tamarisk can be used by riparian dependant birds. Staff admits that tamarisk is of poor quality when compared to native riparian stands.

**Sonny Bono (05-15)-11:** *Mountain plovers require short grass and/or bare dirt to forage in. Any field that has been burned, grazed, or recently disked can provide mountain plover habitat. Thus, during site preparation activities for lettuce, melons, etc. [these fields] can provide mountain plover habitat.*

*Staff response:* Staff agrees with the comment.

**Sonny Bono (05-15)-12:** *Please incorporate into [Condition of Certification BIO-7] the possibility that an Incidental Take Permit or other permit may be required from the USFWS.*

*Staff response:* This permit is requested under Condition of Certification BIO-10.

**Sonny Bono (05-15)-13:** *The statement [regarding Condition of Certification BIO-14, Verification Bullet 3] that the Yuma clapper rail breeding season for 2003 has already passed is inaccurate. Based on the standardized protocols, the breeding survey period begins March 15 and ends May 31.*

*Staff response:* Staff agrees with this comment. The applicant had an opportunity to survey for these species at the time the PSA was published.

**Imperial County Planning/Building Department**

**Imperial-1:** *The "Biological Resources" section on page 4.2-32 discusses "…locate and procure a lease of 19 acres of agricultural lands to compensate permanent losses from OB1 and OB3 wellpads and pipelines. To verify that these measures have been adopted into a permit, staff has requested a copy of the County permit, and will request the terms and conditions of the permit become incorporated into the BRMIMP (Condition of Certification BIO-21)…" As mentioned above, the County will provide the CEC a copy of the County's CUP and have incorporated by reference the CEC's Conditions of Certification as applicable. The statement mentions compensation for a "permanent" loss of 19 acres agricultural lands from the plant's well pads and pipelines. The site restoration of well pads and pipeline areas is not considered a "permanent" loss in that the underlying land can be restored to agricultural uses once closure of the project occurs, i.e. 30 years or earlier. The County requires that the project proponent provide to the County a site restoration bond to revert the well pad and pipeline areas to their original state, i.e. agricultural lands, upon closure.*

*Staff response:* To a species living 75 years like ourselves, perhaps 30 years is temporary, but to the many bird species that would be using the land during their 3 to 7 year lifespan, there would be a permanent loss of forage opportunities at production well pads OB1 and OB2 (note, OB3 is on a gravel pad and is not considered wildlife habitat). Staff is particularly concerned that the Refuge is actively managing this parcel to attract and feed migratory birds to meet Lea Act obligations, and the 19 acres will now have to be accounted for in another parcel in the area to make up the loss. Staff from the USFWS is also concerned about the indirect habitat loss these structures may cause. Thus, staff recommends that the County require the project owner purchase or lease a minimum of 19 acres of land in the local area to accommodate this loss to the Refuge within their permit requirements.

## UNRESOLVED ISSUES AND CONCLUSIONS

### Federal Biological Opinion

Since the project may impact federally listed species, in particular the California brown pelican and Yuma clapper rail, the applicant must obtain a "take" permit from the USFWS. The "take" of these two species is being pursued on the applicant's behalf by the Bureau of Land Management under Section 7 of the Endangered Species Act. As of June 2003, the Biological Assessment had been deemed adequate and consultation has begun. The USFWS Biological Opinion to the Bureau of Land Management will most likely not be provided until at least November 2003. The Biological Opinion does not go into effect (e.g., the applicant cannot start construction) until the Bureau of Land Management issues its permit conditions to the applicant for construction and operation of the project. The BLM process may take up to one month after the Biological Opinion is issued.

### State Incidental Take Permit

CDFG will require this project to secure a state Incidental Take Permit to comply with the state's Endangered Species Act. This permit is issued about 30 to 60 days after the issuance of the USFWS Biological Opinion. The applicant will not be able to start

construction until after this permit is obtained. Once this permit is secured, the project owner will need to incorporate the take permit's terms and conditions into its BRMIMP prior to any ground disturbance activity and implement the required mitigation measures during project construction and operation.

The CDFG can not issue an authorization for "take" of California brown pelican or Yuma clapper rail. Although these species are state listed as endangered and threatened, which can allow for "take" under specific circumstances, they are both also Fully Protected species under Fish and Game Code 3511 and CDFG can not legally allow "take". (Note, this is a well-known loop-hole in the law that only new state legislation can resolve). Thus, the project must show complete avoidance of injury or death to individuals of these species during project construction and operation.

### BLM Right-of-Way Permit

The BLM is the federal lead on the project and has requested consultation from USFWS on the entire project. During their review of a Right-of-Way application, they require an alternatives analysis of an interconnection which does not cross federal lands. At the end of their permitting review, the BLM can choose the non-federal route as the preferred alternative and deny the application to cross federal lands. If this occurs, the applicant does not have a federal lead to request Section 7 consultation from the USFWS. Thus, if the BLM does not choose the federal land route, the applicant cannot start construction until it has obtained a Section 10 permit from the USFWS (also known as a Habitat Conservation Plan). This could delay the start of construction for years because of the lengthy approval process involved with a Habitat Conservation Plan. Thus, the applicant should provide the Right-of-Way permit and/or CDCA Plan Amendment prior to construction to ensure that federal permitting of this project is possible.

## CONCLUSIONS

Various documents have not been received as mentioned in the Unresolved Issues Section of this document. The issuance of the BLM Right-of-Way permit and CDCA Plan Amendment is the only assurance that the project will be covered for "take" of federally-listed species. Thus, staff recommends delaying construction until it receives this document.

Although, CDFG will not provide the state Incidental Take Permit until the Decision has been issued, it should not hold up certification. Staff has included conditions of certification to address the anticipated requirements of CDFG.

## RECOMMENDATIONS

To make certain that the project complies with all laws, 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

### Designated Biologist and Biological Monitor(s) Selection

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

**Verification:** The project owner shall submit the resume and contact information for the Designated Biologist and Biological Monitor(s) to the CPM at least 60 days prior to the start of any site (or related facilities) mobilization. The Designated Biologist must have a through understanding of the Conditions of Certification, the federal and state permits, and the monitoring procedures established in the BRMIMP. Site and related facility activities shall not commence until an approved Designated Biologist is available to be on site and to train all Biological Monitors. Biological Monitor(s) training shall include familiarity with the Conditions of Certification, the federal and state permits, and the monitoring procedures established in the BRMIMP.

The Designated Biologist must meet the following minimum qualifications:

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

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

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

The Biological Monitor(s) shall have a background in biology and be approved by the CPM.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least ten working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM and submit the qualifications of a short-term replacement. The CPM shall approve the short-term replacement within one business day. The short-term replacement shall have all the duties and rights of a Designated Biologist while a permanent Designated Biologist is proposed to the CPM for consideration.

### Designated Biologist and Biological Monitor(s) Duties

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

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources Conditions of Certification;

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

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

4. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (parking lots) for animals in harms way;

5. Notify the project owner and the CPM of any non-compliance with any biological resources Condition of Certification; and

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

**Verification:** The project owner shall ensure that the Designated Biologist and Biological Monitor(s) maintain written records of the tasks described above, and summaries of these records shall be submitted in the Monthly Compliance Reports (MCR).

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

## Designated Biologist and Biological Monitor(s) Authority

**BIO-3** The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist or Biological Monitor(s) to ensure conformance with the biological resources Conditions of Certification.

If required by the Designated Biologist or Biological Monitor(s), the project owner's Construction/ Operation Manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist as sensitive or which may affect a sensitive area or species.

The Designated Biologist and Biological Monitor(s) shall:

1. Require a halt to all activities in any area when it is determined that there would be an adverse impact to sensitive species if the activities continued;

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

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

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

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

## Worker Environmental Awareness Program

**BIO-4** The project owner shall develop and implement a CPM approved Worker Environmental Awareness Program (WEAP) in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation and closure are informed about sensitive biological resources associated with the project.
The WEAP must:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material is made available to all participants;
2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas. Personnel shall be advised that handling of flat-tailed horned lizards by anyone is prohibited by State law without a permit;
3. Present the reasons for protecting these resources;
4. Present the meaning of various temporary and permanent habitat protection measures;
5. Identify whom to contact if there are further comments and questions about the material discussed in the program; and
6. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

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

**Verification:** At least 60 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM two copies of the WEAP and all supporting written materials prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the MCR the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date.

The signed training acknowledgement forms from construction shall be kept on file by the project owner for a period of at least six months after the start of commercial operation.

During project operation, signed statements for active project operational personnel shall be kept on file for six months following the termination of an individual's employment.

## Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)

**BIO-5** The project owner shall submit two copies of the proposed Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) to the CPM for review and approval, and to California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS) for review and comment, and shall implement the measures identified in the approved BRMIMP.

The final BRMIMP shall identify;

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;
2. All biological resources Conditions of Certification identified in the Commission's Final Decision;
3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion and Bureau of Land Management (BLM) Right-of-Way permit;
4. All biological resources mitigation, monitoring and compliance measures required in other state agency terms and conditions, such as those provided in the CDFG Incidental Take Permit and Streambed Alteration Agreement and Regional Water Quality Control Board permits;
5. All biological resources mitigation, monitoring and compliance measures required in local agency permits, such as site grading and landscaping requirements;
6. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation and closure;
7. All required mitigation measures for each sensitive biological resource;
8. Required habitat compensation strategy, including provisions for acquisition, enhancement, and management for any temporary and permanent loss of sensitive biological resources;
9. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;

10. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;
11. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities - one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography and a description of why times were chosen;
12. Duration for each type of monitoring and a description of monitoring methodologies and frequency;
13. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
14. All performance standards and remedial measures to be implemented if performance standards are not met;
15. A discussion of biological resources related facility closure measures;
16. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval; and
17. A copy of all biological resources permits obtained.

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

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

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

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

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

## Closure Plan Measures

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

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

1. Removal of transmission conductors when they are no longer used and useful;
2. Removal of all power plant site facilities and related facilities;
3. Measures to restore wildlife habitat to promote the re-establishment of native plant and wildlife species; and
4. Revegetation of the plant site and other disturbed areas utilizing appropriate seed mixture.

**Verification:** At least 12 months prior to commencement of closure activities, the project owner shall address all biological resources related issues associated with facility closure, which is incorporated into the BRMIMP, in a Biological Resources Element. The Biological Resources Element shall be incorporated into the Facility Closure Plan and include a complete discussion of the local biological resources and proposed facility closure mitigation measures.

## Incidental Take Permit

**BIO-7** The project owner shall acquire an Incidental Take Permit from the California Department of Fish and Game (CDFG) (per Section 2081(b) of the Fish and Game Code; California Endangered Species Act) if required and incorporate the terms and conditions into the project's BRMIMP.

**Verification:** At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the CDFG Incidental Take Permit (if required).

## Streambed Alteration Agreement

**BIO-8** The project owner shall acquire a Streambed Alteration Agreement from the CDFG (per Section 1600 of the Fish and Game Code) if required, and incorporate the biological resource related terms and conditions into the project's BRMIMP.

**Verification:** At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the CDFG Streambed Alteration Agreement (if required).

## Regional Water Quality Control Board Certification

**BIO-9** The project owner shall acquire the Regional Water Quality Control Board Section 401 state Clean Water Act certification or a waiver if required, and incorporate the biological resource related terms and conditions into the project's BRMIMP.

**Verification:** At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall provide the CPM with a copy of the Regional Water Quality Control Board's certification or waiver.

## Federal Biological Opinion

**BIO-10** The project owner shall provide a copy of the Biological Opinion per Section 7 of the federal Endangered Species Act obtained from the U. S. Fish and

Wildlife Service. The terms and conditions contained in the Biological Opinion shall be incorporated into the project's BRMIMP.

**Verification:** At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the U. S. Fish and Wildlife Service's Biological Opinion.

## U. S. Army Corps of Engineers Section 404 Permit

**BIO-11** The project owner shall provide evidence of compliance with the U.S. Army Corps of Engineers Section 404 program of the federal Clean Water Act. The biological resources related terms and conditions contained in the permit shall be incorporated into the project's BRMIMP.

**Verification:** At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM evidence of compliance with the U.S. Army Corps of Engineers Section 404 program of the federal Clean Water Act.

## Preventative Design Mitigation Features

**BIO-12** The project owner shall modify the project design to incorporate all feasible measures that avoid or minimize impacts to the local biological resources. Protocol:

1. Design, install, and maintain transmission line poles, access roads, pulling sites, and storage and parking areas to avoid identified sensitive resources and preferentially use previous pull sites or already disturbed locations;

2. Avoid wetland loss to the extent possible when placing facility features;

3. Design, install, and maintain facilities to prevent brine spills from endangering adjacent properties and waterways that contain sensitive habitat;

4. Schedule disposal of brine within brine ponds as expeditiously as possible;

5. Design, install, and maintain facility lighting to prevent side casting of light towards wildlife habitat;

6. Insulate production and injection well pipelines and flanges;

7. Prescribe a road sealant that is non-toxic to wildlife and plants and use only fresh water when adjacent to wetlands, rivers, or drainage canals;

8. Equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 74 dBA measured at a distance of 100 feet.

9. Design, install, and maintain transmission lines and all electrical components to reduce the likelihood of electrocutions of large birds by following the latest Avian Power Line Interaction Committee (APLIC) suggested practices; and

10. Route the reject reverse osmosis water to the service water pond in lieu of the brine ponds.

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

## Construction Mitigation Management to Avoid Harassment or Harm

**BIO-13** The project owner shall manage their construction site, and related facilities, in a manner to avoid or minimizes impacts to the local biological resources.

Typical measures are:

1. Install a temporarily fence and provide wildlife escape ramps for construction areas that contain steep walled holes or trenches if outside of an approved, permanent exclusionary fence. The temporary fence shall be constructed of materials that are approved by USFWS and CDFG;
2. Make certain all food-related trash is disposed of in closed containers and removed at least once a week.
3. Prohibit feeding of wildlife by staff or contractors;
4. Prohibit non-security related firearms or weapons from being brought to the site;
5. Prohibit pets from being brought to the site;
6. Minimize use of rodenticides and herbicides in the project area;
7. Advise all employees, contractors, and visitors of the need to adhere to speed limits and to avoid any animals, including burrowing owls, which may be encountered on or crossing the roads to and from the project site. The maximum speed on unpaved roads or on paved roads within 300 feet of occupied sensitive species habitat shall be restricted 15 miles per hour during construction.
8. Inspect all construction pipes, culverts, or similar structures with a diameter of four inches or greater for sensitive species (such as burrowing owls) prior to movement of pipe or pipe burial. Cap all pipes with a diameter of four inches or greater if they are to be left in trenches overnight or in storage areas outside of the construction laydown area;
9. For the section of pipeline between production well OB3 and the power plant site, empty the concrete-lined pipe at the power plant site. For all remaining sections, empty concrete lined pipe into designed evaporation and percolation ponds;
10. Report all inadvertent deaths of sensitive species to the appropriate project representative. Injured animals shall be reported to USFWS and CDFG and the project owner shall follow instructions that are provided by USFWS and CDFG. All incidences of wildlife injury or mortality resulting from project-related vehicle traffic on roads used to access the project shall be reported in the MCR.

11. Implement standard mitigation measures for the flat-tailed horned lizard detailed in the *Flat-tailed Horned Lizard Rangewide Management Strategy-Appendix 3* for work in flat-tailed horned lizard habitat.

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

## Pre-Construction Monitoring to Avoid Harassment or Harm

**BIO-14** Prior to mobilization, the project owner shall conduct baseline surveys for special status species at a level that establishes the occurrence and abundance of species. In addition, mapping of suitable habitat types will be completed for any special status species that potentially occur, but are not present at the time of the baseline survey. Mapping of suitable habitat types will also be completed for any species that can not be surveyed for because of protocol restrictions. The baseline surveys shall cover appropriate habitats within one-mile of the plant site and within 1,000 feet of all linears, unless other areas are deemed more appropriate. If a special-status species is nesting at the time of baseline surveys, then protocol level surveys to establish population sizes will be completed prior to mobilization. The Designated Biologist shall make recommendations to the project owner to avoid or minimize impacts to the special status species based on completed baseline surveys and any protocol level surveys.

**Verification:** The project owner shall provide a baseline survey proposal in the BRMIMP. The baseline survey proposal shall include a list of target species and the survey techniques to be used. The list of target species must, at a minimum, include California brown pelicans, mountain plover, burrowing owl, Yuma clapper rail, California black rail, and flat-tailed horned lizard. In addition, a proposal for mapping suitable habitats shall, at a minimum, include Yuma clapper rail and mountain plover habitat. The baseline survey proposal shall establish indices (e.g., propensity for flight) for comparison with other monitoring efforts. The baseline survey proposal shall include the survey locations and their distance from the site or linears. The baseline survey proposal shall identify actions that can be taken to avoid or minimize impacts to the special status species (such as restricting construction to certain months or marking sensitive areas). The CPM, in consultation with the CDFG, Refuge, the USFWS and any other appropriate agencies, will determine the baseline survey protocol(s) acceptability and the survey area(s).

The project owner shall provide copies of agency-approved survey protocols in the BRMIMP. At a minimum, the project owner shall include a copy of the agency-approved survey protocol for California black rail and Yuma clapper rail in the event that the baseline surveys show these species are nesting. The BRMIMP shall identify at least two southern California or western Arizona biologists that hold a USFWS permit for surveying these species and include their contact information.

Results of the baseline surveys must be submitted to the CPM, USFWS, CDFG and Refuge no later than thirty (30) days prior to the start of mobilization. If protocol-level surveys are required, then the results shall be submitted to the CPM, USFWS, CDFG and Refuge no more than ten (10) days after completion and at least twenty (20) days prior to mobilization.

## Construction Monitoring to Avoid Harassment or Harm

**BIO-15** The project owner shall perform monitoring throughout construction to ensure construction-related impacts remain at or below levels of significance set forth in the BRMIMP. The monitoring results shall be compared to the pre-construction baseline surveys' indices and to other local population values.

**Verification:** The project owner shall provide a monitoring proposal and indices for comparison to pre-construction baseline survey work within the BRMIMP. Monitoring must include any sensitive species located during the pre-construction baseline survey and any areas identified as suitable habitat. If a special status species nesting season begins at any time during the construction period, then protocol level surveys shall be completed for appropriate habitats within one-mile of the plant site and within 1,000 feet of all linears or within specified areas the Salton Sea Basin. The CPM, in consultation with the CDFG, Refuge, the USFWS and any other appropriate agencies, will determine the acceptability of the monitoring protocol(s) and survey area(s).

The project owner shall provide the results of the monitoring in the MCR. Protocol survey results shall be compiled into a separate report and submitted within four (4) weeks of completion. The monitoring results shall be compared by the Designated Biologist in the MCR to pre-construction indices established in the BRMIMP (e.g., increased number of flights) and to other local population values collected by the project owner or other entities.

## Noise and Vibration Management to Avoid Harassment or Harm

**BIO-16** The project owner shall prepare a detailed Noise and Vibration Assessment and Abatement Plan based on the final design of the facility to determine the most practicable measures to reduce/mitigate construction noise and vibration impacts. At a minimum, the Noise and Vibration Assessment and Abatement Plan shall address measures to:

- Reduce site grading and clearing, pile-driving and steam-blow noise levels to less than 85 dBA at the northern and western boundaries of the power plant site during the Yuma clapper rail mating and nesting season (March 1 to August 31);
- Ensure overall noise levels at the power plant site during the mating season of Yuma clapper rails (March 1 to May 31), will not exceeded the threshold of 60 dBA or propose a construction schedule which limits noise levels to less than 60 dBA around daybreak (morning civil twilight) and sunset;
- Ensure site grading and clearing and pile-driving vibrations levels are equal or less than 72 VdB at the northern and western boundaries of the power plant site during the Yuma clapper rail nesting season (June 1 to August 31); and

The project owner shall include a construction noise and vibration monitoring protocol. Other noise and vibration avoidance measures can be considered for approval by the CPM in consultation with involved agencies.

**Verification:** The project owner shall submit two copies of the Noise and Vibration Assessment and Abatement Plan to the CPM for review and approval and one copy to the CDFG, Refuge, USFWS for review and comment 90 days prior to start of any site (or related facilities) mobilization. The Noise and Vibration Assessment and Abatement Plan shall identify all noise and vibration sources by construction phase, the location of all biologically related sensitive receptors, and the noise and vibration levels expected after the implementation of mitigation. The CPM, in consultation with the CDFG, Refuge, USFWS and any other appropriate agencies, will determine the Noise and Vibration Assessment and Abatement Plan's acceptability within 45 days of receipt.

The project owner shall, at a minimum, appoint a person(s) to collect weekly noise measurements at the original Noise Measurement Locations ML2, ML3 and ML4 for a 1-hour period. The results shall be utilized as follows:

- If noise measurement is outside of Yuma clapper rail mating and nesting season (September 1 to February 28) and exceeds 60 dBA, it shall be highlighted in the data table for the MCR and the reasons for the noise level (if known) described.
- If a noise measurement during the Yuma clapper rail mating and nesting season (March 1 to August 31) is 85 dBA or above, then the loudest and nearest noise source(s) shall be immediately shut-down until the noise level is again below 85 dBA. The restriction on noise levels above 85 dBA is in effect for 24-hours a day, 7 days a week from March 1 to August 31. Any incident over 85 dBA shall be highlighted in the data table for the MCR and the reasons for the noise level (if known) described.
- If a noise measurement is within Yuma clapper rail mating season (March 1 to May 31) and is below 85 dBA but exceeds 60 dBA, then pieces of construction equipment shall be stopped, moved, or quieted such that resultant noise levels are less than 60 dBA. Construction work need only be stopped or quieted for 1 hour after morning civil twilight and 1 hour before evening civil twilight. If 24-hour construction is required, everyone on the agency call list shall be notified as to the expected noise level, the equipment in use, and the remedial actions that are recommended (if any). The remedial action(s) should be implemented after approval by agency staff.

The noise measurements and any remedial actions taken shall be described in the MCR.

## Overhead Transmission Line Monitoring to Avoid Harassment or Harm

**BIO-17** The project owner shall install an agency-approved marker on the grounding wire of the proposed transmission lines. These markers shall be placed and maintained for the entire length of the proposed transmission lines. Monitoring of the effectiveness of the markers shall be implemented for the first two years of operation, and may continue for up to ten years (to determine effectiveness of remedies) if impacts are found to be excessive by a working group of interested agency personnel. Remedial actions to address excessive deaths shall be included in a Bird Collision Deterrent Proposal and Monitoring Plan.

**Verification:** The project owner shall submit two copies of a Bird Collision Deterrent Proposal and Monitoring Plan (BCDM Plan) to the CPM for review and approval and one copy to the CDFG, Refuge, USFWS for review and comment 60 days prior to start of transmission line mobilization. The BCDM Plan shall identify all Species of Concern, the threshold used for determining impacts, the proposed type and spacing of markers, the post-construction monitoring plan, and remedial actions. At least one alternative transmission line route shall be proposed as a remedial action. The CPM, in consultation with the CDFG, the Refuge, the USFWS and any other appropriate agencies, will determine the BCDM Plan's acceptability within 30 days of receipt.

## Re-vegetation for Construction Impacts

**BIO-18** The project owner shall contour all temporary disturbance areas and allow them to re-vegetate with pre-disturbance species. Invasive exotic species (as defined by the U.S. Department of Agriculture) shall be precluded from establishing themselves in the temporary disturbance areas through implementation of a three-year post-construction weed removal program.

**Verification:** The project owner shall provide a brief report of temporary disturbance conditions at the end of the project construction in the BRMIMP Closure Report. Annual reporting of weed abatement shall be provided to the CPM in the annual reporting for three years post-construction, or until such time as the CPM determines it is no longer needed.

## Survey and Provide Habitat Compensation for Burrowing Owls

**BIO-19** The project owner shall survey for burrowing owl activities on the 80-acre parcel and along the transmission lines 20 days prior to site mobilization to assess owl presence and need for further mitigation. To avoid impacts, no impacts can occur within 160 feet of an occupied burrow from September 1 to January 31, or no impacts can occur within 250 feet of an occupied burrow from February 1 to August 31. Avoidance also requires monitoring and a minimum of 6.5 acres of foraging habitat be preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls or single unpaired resident bird that abandons the burrow or otherwise reduces reproductive effort.

If impacts to owls are unavoidable, and nesting is not occurring, owls are to be removed per CDFG-approved passive relocation. Passive relocation is recommended from September 1 to January 31, to avoid disruption of breeding activities. If owls are nesting, nest(s) should be avoided from February 1 through August 31 by a minimum of a 250-foot buffer or until fledging has occurred. Following fledging, owls may be passively relocated at least 160 feet from the impact zone and construction can take place within the 250-foot buffer.

If impacts to owls are unavoidable on the site or along the transmission lines, then either on-site or off-site compensation for losses will be required, whichever is feasible. CDFG recommends at least 6.5 acres of protected lands for each pair of owls or unpaired resident bird. Existing unsuitable burrows on the protected lands should be enhanced (e.g., cleared of debris or enlarged) or new burrows installed at a ratio of 2:1. The project owner shall protect 110.5

acres and create 34 new burrows or improve 34 burrows based on pre-construction surveys confirming the presence of 17 occupied burrowing owls burrows within 300 feet of the project impact zone. If off-site compensation is the only option, the mitigation ratios will increase depending on the distance from the site and burrowing presence on or near the mitigation parcel.

Foraging habitat which is permanently disturbed shall be replaced at 0.5:1 (mitigation:impacts) and managed for the protection of burrowing owls. The amount of foraging habitat required will be reduced by 6.5 acres for every burrowing owl found within 300 feet of the project's impact zone. The project owner shall protect 29.65 acres, based on pre-construction surveys confirming the presence of burrowing owls within 1,800 feet of any permanent disturbance and 2 active burrowing owls burrows being found on the power plant site.

The total amount of land to be protected is estimated at 140.15 acres following these compensation guidelines.

**Verification:** At least 15 days prior to the expected start of any project-related ground disturbance activities, the project owner shall provide the CPM, USFWS, Refuge, and CDFG with the burrowing owl survey results. If burrowing owl monitoring is needed, reports shall be completed by the Designated Biologist and included in the MCR. If burrowing owls are present, the project owner shall identify the amount of land they intend to protect 15 days prior to the expected start of any project-related ground disturbance activities. The project owner shall place at least 80% of the estimated total costs to purchase or protect the lands and 80% of the land management funds in a secure account within 15 days after site mobilization. The land protection proposal and management fund(s) shall be approved by the CPM and reviewed by CDFG. The project owner shall propose land for purchase or protection with a description of habitat types and propose a management and monitoring plan within 60 days of site mobilization. Within 30 days after the start of commercial operation, the project owner shall submit to the CPM two copies of the relevant legal paperwork that protects lands in perpetuity (e.g., a conservation easement as filed with the Imperial County Recorder), a final management and monitoring plan, and documents which discuss the types of habitat protected on the parcel. If a private mitigation bank is used, the project owner shall provide a letter from the approved land management organization stating the amount of funds received, the amount of acres purchased and their location, and the amount of funds dedicated to long term monitoring or management. All mitigation measures and their implementation methods shall be included in the BRMIMP.

## Emergency Management to Avoid Harassment or Harm

**BIO-20** The project owner shall prepare and submit an agency notification list for emergency events which involve the rupture or spill of brine fluids at the facility. The project owner shall obtain and then follow the recommendations resulting from the agency notification for avoiding harassment or harm to biological resources.

**Verification:** The project owner shall provide the agency notification list to the CPM for approval at least 60 days prior to start of commercial operation. The agency notification list shall be incorporated into the BRMIMP. The project owner shall report in

the annual compliance report any agency notifications and whether the agency recommendations were followed.

## County Permit for Well heads, Pads and Brine Pipelines

**BIO-21** The project owner shall submit a copy of the Imperial County permit for the wellheads, pads and brine pipelines. The biological resource related terms and conditions contained in the permit shall be incorporated in the project's BRMIMP.

**Verification:** At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the Imperial County permit and any related documents which discuss biological resources.

## Compensation for Impacts to Flat-tailed Horned Lizard Habitat

**BIO-22** The project owner shall provide funding to the Bureau of Land Management (BLM) for impacts to flat-tailed horned lizard as prescribed by the *Flat-tailed Horned Lizard Rangewide Management Strategy - Appendix 4 Compensation Formula*.

**Verification:** At least 30 days prior to the start of any transmission line mobilization activities, the project owner shall submit to the CPM proof of payment to the BLM.

## Landscaping Plan

**BIO-23** The project owner shall develop and submit a Landscaping Plan for the project.

**Verification:** At least 90 days prior to the installing the landscaping, the project owner shall submit a copy of the landscape plan to the CPM for review and approval and to the CDFG, Refuge, and USFWS for review and comment. The landscaping plan shall clearly identify all plant species (and their variety) to be installed and the anticipated irrigation schedule. Preference shall be given to native plants.

## Conservation Easement for Wetland

**BIO-24** The project owner shall submit copies of the conservation easement relating to the restoration and creation of wetland habitat, if required by the U.S. Army Corps of Engineers permit conditions.

**Verification:** Within 30 days after the start of commercial operation, the project owner shall submit to the CPM two copies of the conservation easement, as recorded with the Imperial County Recorder and any related documents which discuss the types of habitat restored or created on the parcel.

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# CULTURAL RESOURCES

Testimony of Roger Mason and Gary Reinoehl

## INTRODUCTION

In this cultural resources section staff identifies potential impacts of the proposed Salton Sea Unit #6 Project (SSU6) on cultural resources, as defined under state and federal law. The primary concern in cultural resources analysis for this project is to ensure that all potential impacts are identified and that conditions are set forth that ensure that impacts are mitigated below a level of significance under the California Environmental Quality Act.

Staff completed cultural overview of the project, as well as analyses of potential impacts from the project using criteria from the California Environmental Quality Act (CEQA) and the National Historic Preservation Act. If cultural resources are identified, staff determines whether there may be a project related impact to identified resources and if the resource is eligible for the California Register of Historic Resources (CRHR) or the National Register of Historic Places (NRHP). If the resources are eligible for either register and may be impacted, staff recommends mitigation that attempts to ensure that no significant impacts would occur and that would reduce impacts to the cultural resource to a less than significant level, if possible.

There is always a potential that a project may impact a previously unidentified resource or may impact an identified historical resource in an unanticipated manner. Staff therefore recommends procedures in the conditions of certification that mitigate these potential impacts.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

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 LORS.

### FEDERAL

- Code of Federal Regulations, 36 CFR Part 61. Federal Guidelines for Historic Preservation Projects: The U.S. 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 mitigation of impacts to cultural resources on public lands in California.
- Code of Federal Regulations, 36 CFR Part 800 et seq., the implementing regulations of Section 106 of the National Historic Preservation Act, 16 U.S.C. § 470 require federal agencies to take into account the effects of their undertakings on historic properties through consultations beginning at the early stages of project planning.

The regulations implementing this act, which were revised in 1997, set forth procedures to be followed for determining eligibility of cultural resources, determining the effect of the undertaking on the historic properties, and how the effect would be taken into account. The eligibility criteria and the process described in these regulations are used by federal agencies. Very similar criteria and procedures are used by the state in identifying cultural resources eligible for listing in the California Register of Historical Resources.

## STATE

- California Code of Regulations, Title 14, section 4852 defines the term "cultural resource" to include buildings, sites, structures, objects, and historic districts.
- Public Resources Code, Section 5000 establishes the California Register of Historic Places (CRHR), establishes criteria for eligibility to the CRHR, and defines eligible resources. It identifies any unauthorized removal or destruction of historic resources on sites located on public land as a misdemeanor. It also prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and establishes the penalty for possession of such artifacts with intent to sell or vandalize them as a felony. This section defines procedures for the notification of discovery of Native American artifacts or remains, and states that it is the policy of the State that Native American remains and associated grave artifacts shall be repatriated.
- The California Environmental Quality Act (CEQA) (Public Resources Code, section 21000 et seq.; Title 14, California Code of Regulations, section 15000 et seq.) requires state agencies to analyze potential environmental impacts of proposed projects and requires application of feasible mitigation measures and consideration of alternatives.
- 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 Environmental Impact Report (EIR) shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, the lead agency may require reasonable steps to preserve the resource in place. Otherwise, mitigation measures shall be required as prescribed in this section. The section discusses excavation as mitigation; limits the Applicant’s cost of mitigation; sets time frames for excavation; defines “unique and non-unique archaeological resources;” and provides for mitigation of unexpected resources. [The California Energy Commission process is a CEQA equivalent process and Staff Assessments replace the CEQA environmental documents.]
- 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(b), prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project’s impact on a historical resource; discusses documentation as a mitigation measure; and discusses mitigation through avoidance of damaging effects on any historical resource of an

archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.

- CEQA Guidelines, section 15064.5 defines the term "historical resources," explains when a project may have a significant effect on historic resources, describes CEQA's applicability to archaeological sites, and specifies the relationship between "historical resources" and "unique archaeological resources." Subsection (f) directs the lead agency to make provisions for historical or unique archeological resources that are accidentally discovered during construction.
- Penal Code, section 622 1/2 states that anyone who willfully damages an object or thing of archaeological or historic interest is guilty of a misdemeanor.
- California Health and Safety Code, section 7050.5 states that if human remains are discovered during construction, the project owner is required to contact the county coroner.

## LOCAL

### Imperial County

The Imperial County General Plan Land Use Element includes the following goal (Goal 9): "Identify and preserve significant natural, cultural, and community character resources and the County's air and water quality." More specifically, Objective 9.1 states: "Preserve as open space those lands containing watersheds, aquifer, recharge areas, floodplains, important natural resources, sensitive vegetation, wildlife habitats, historic and prehistoric sites, or lands which are subject to seismic hazards and establish compatible minimum lot sizes." The Imperial County Planning Department is responsible for implementing this objective, as well as ensuring that projects it regulates through the permitting process comply with the provisions of CEQA.

The Imperial County General Plan Geothermal and Transmission Element contains Appendix B which sets forth the following standard:

> Archaeological/Cultural Impacts. If any unusual specimens of bone, stone, or ceramic are discovered during construction, all construction affecting the discovery site shall cease until a qualified archaeologist, retained by the applicant and approved by the Planning Director, reviews the specimens. The recommendations of the archaeologist related to the discovery shall be complied with prior to resuming construction.

## ENVIRONMENTAL SETTING

The SSU6 plant site, well pads, and associated linear routes for water and brine pipelines and transmission lines are located at the south end of the Salton Sea in Imperial County. The area is almost entirely agricultural, except for the existing geothermal energy facilities and the nearby communities of Niland, Calipatria, and Westmorland. There is almost no topographic relief, except for some gently rising terrain at the west end of the L-Line Transmission Line Interconnection route and the east end of the Imperial Irrigation District (IID) Midway Transmission Line Connector

route. The project area is within the Salton Trough that has elevations between 6 and 80 meters below sea level. Most of the project area is about 70 meters (200 feet) below sea level, although the IID Midway Transmission Line Connector route rises to 90 feet below sea level at its eastern end. The transmission line routes follow paved and unpaved road alignments, except for the west end of the L-Line Transmission Line Interconnection route which crosses undeveloped desert lands administered by the Bureau of Land Management. The project area is crossed by numerous irrigation canals and drains that bring irrigation water from the Colorado River and empty it into the Salton Sea (CEOE 2002d:2-1).

The project area is in the Colorado Desert environmental zone that is bordered on the west by the Peninsular Range and on the north by the higher elevation Mojave Desert. The Colorado Desert extends east across the Colorado River into southern Arizona and northern Mexico. The Salton Trough portion of the Colorado Desert is about 80 miles long and 30 miles wide. At various times during the Holocene (the 10,000 year period after the end of last ice age) the trough filled with waters from the Colorado River forming Lake Cahuilla (the prehistoric equivalent of the Salton Sea). At other times, the trough was dry. Prehistoric occupation of the trough area appears to have coincided with long term stable stands of Lake Cahuilla at the beginning and end of the Holocene. The Colorado Desert is characterized by low rainfall, low humidity, and hot summer temperatures. Native plants include members of the goosefoot family, creosote bush, mesquite, saltbush, and cactus. Animals consist of jackrabbit, bobcat, coyote, rodents, birds, and reptiles (CEOE 2002d:2-1).

The Salton Trough is the landward extension of the Gulf of California Tectonic Zone where the continental crust is being rifted by the Pacific Plate along the San Andreas Fault. Five rhyolite domes along the south edge of the Salton Sea are the result of relatively recent magma eruptions up through the much older sedimentary rocks in the trough (CEOE 2002d:2-1). One of these domes is Obsidian Butte, which served as a source of obsidian for the prehistoric inhabitants of the area when Obsidian Butte was not covered by the waters of Lake Cahuilla. Obsidian from Obsidian Butte was distributed through trade throughout southern California during the Late Prehistoric Period (Ericson et al. 1989).

## PROJECT DESCRIPTION

Power plant's greater than 50-megawatts in the State of California are permitted by the California Energy Commission. For a geothermal power project, the Energy Commission acts as the lead agency, reviews the entire project and permits the primary power plant site, water supply pipelines, transmission lines, and related structures. The permitting of the wells, the well pads, and the geothermal resource transmission lines are reserved to other agencies. Acting as responsible agencies and using the Energy Commission's Final Staff Assessment, the Department of Conservation, Division of Oil, Gas, and Geothermal Resources permits the wells, and Imperial County permits the well pads and the brine production and reinjection pipelines (Public Resources Code section 25120).

In analyzing the complete project, identifying potential impacts and developing mitigation for these, the Energy Commission staff suggests conditions of certification for

incorporation into the license granted to a project owner. For the Salton Sea Unit 6 project, Energy Commission staff have attempted to delineate those conditions of certification which are recommended to the responsible agencies (DOGGR, ICP/B) for incorporation into their respective permits for the project components under their exclusive jurisdiction (See Executive Summary overview of staffs conclusions). Each technical analysis section making these recommendations will identify these in the Conclusions and Recommendations section of the analysis.

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

## PREHISTORIC SETTING

The San Dieguito Complex (a group of artifacts and subsistence remains that are characteristic of a specific period of time and geographic area) was originally thought to represent Early Holocene (12,000 to 8,000 BP [years before present, computed from 1950]) big game hunters who lived around the pluvial lakes in the Great Basin and Colorado Desert (Warren 1967). More recent research indicates these people were likely highly mobile hunter-gatherers who exploited a wider range of animal and plant foods. The San Dieguito Complex is represented in the archaeological record entirely by lithic technology (stone tools), which consists of well-made projectile points, bifacial blades and knives, scrapers, scraper planes, and choppers. San Dieguito sites consist of lithic scatters, rock features, cleared circles, and trails and are usually found on terraces overlooking drainages and along the shorelines of the former pluvial lakes such as Lake Cahuilla (CEOE 2002d:2-3).

Only a small amount of archaeological material is known from the Salton Trough for the long period of time known as the Desert Archaic or Pinto-Amargosa period between about 8,000 BP and about 1500 BP (IID 2003:15). Large bifacial dart points continue in use, but there is also an increasing variety of expedient and formed flaked lithic tools. Milling equipment, indicating use of plant seed resources, also appears during this period (IID 2003:15). Some food storage is indicated by the presence of stone-lined cache pits at Indian Hill Rockshelter and Tahquitz Canyon (IID 2003:15). The sparse occupation during the middle Holocene may be related to extremely arid climatic conditions and fluctuations in the level of Lake Cahuilla.

The Late Prehistoric Period in the Colorado Desert has been the Yuman period and is now more often referred to as the Patayan pattern (IID 2003:16). Patayan I dates from A.D. 500 to A.D. 1050 and is marked by the introduction of the bow and arrow, indicated archaeologically by the presence of small arrow points. Ceramics appear during the end of Patayan I and are the indicator for Patayan II (A.D. 1050 to A.D. 1500). Bands of people used a series of temporary camps in a seasonal round as they moved between the valleys of the Peninsular Ranges to the west and the shores of Lake Cahuilla. Fish and migratory waterfowl were important lake resources. Desert resources included mesquite and saltbush (IID 2003:17). Patayan III after A.D. 1500 is associated with the recession of Lake Cahuilla. Fish was an important resource, as indicated by large amounts of fish bone found in sites along the receding shorelines of Lake Cahuilla. Stone fish traps were used on the west side of Lake Cahuilla during both Patayan II and Patayan III (IID 2003:18).

## ETHNOGRAPHIC BACKGROUND

The study area was within the territory used by the Tipai-Ipai, also known as the Diegueño and the Kumeyaay (Kroeber 1925; Luomala 1978). The Tipai-Ipai language is Diegueño and belongs to the Yuman language family of the Hokan stock. The Tipai-Ipai occupied the coast from the San Luis River south and their territory extended inland from the coast across the Peninsular Range to the Salton Trough (CEOE 2002d:2-4). The eastern boundary was the Chocolate Mountains and sand hills between the Salton Trough and the Colorado River.

Most Tipai-Ipai settlements were campsites occupied during the seasonal round. Bands usually spent the winter together and dispersed in the spring. Winter villages were located in sheltered areas at lower elevations. Most shelters were dome shaped or gable shaped with a pole framework covered with thatch or earth. Windbreaks were used during the summer. Caves and bark-roofed slab huts were used in the mountains. Acorns harvested in the mountains in the fall were a major food source. Other important plants were agave, yucca, cactus fruits, grass seeds, and mesquite pods. Deer, rabbits, rodents, and birds supplemented the diet. Inland groups traded acorns, agave, mesquite and gourds for salt, dried fish and shellfish, and abalone shells from the coast (CEOE 2002d:2-5).

## HISTORIC SETTING

Spanish missionaries began their exploration of California and development of the missions in 1769, starting in San Diego and ending with the missions in San Rafael and Sonoma established in 1823. Mission San Diego was the first mission, founded in 1769. The San Diego Mission later established an *asistencia*, or mission outpost, at Santa Isabel in the Peninsular Range. In 1779, 1,500 Tipai-Ipai lived near the San Diego Mission and in 1821 450 lived near the Santa Ysabel *asistencia*. The Spanish did not establish any permanent outposts in the Imperial Valley. The earliest Spanish exploration of this area occurred in 1774 when Juan Bautista de Anza led an expedition across the Anza Borrego Desert to the California coast to find an overland route to the missions. The next year Anza guided a group of 240 colonists and soldiers from Sonora along this route and founded the Spanish settlement at San Francisco (CEOE 2002d:2-6).

After Mexico became independent from Spain in the early 1830s, the Mexican government closed the missions. Former mission lands were granted to soldiers and other Mexican citizens for use as cattle ranches. However, no Mexican land grants were made in the arid Imperial Valley.

Alta California became part of the United States in 1848 as a result of the Treaty of Guadalupe Hidalgo between Mexico and the United States. Although major intercontinental transportation routes from Los Angles to the east via Yuma passed through the Imperial Valley (the Butterfield Stage Route along the western side of the valley from 1858 to 1861 and the Southern Pacific Railroad along the east side after 1878), the valley remained unsettled during the American Period until a system of irrigation canals was completed to provided water for agriculture in the early twentieth century.

In the 1890s a civil engineer named C. R. Rockwood and George Chaffey, who had previously constructed successful irrigation systems in the Ontario area of San Bernardino County and in Australia, began planning and financing an irrigation system for the Imperial Valley using Colorado River water. The two men formed the California Development Company and the Imperial Land Company, which were financed by investors. These companies bought land and built irrigation canals. Water was diverted from the Colorado River into the canal system in 1901 and, by the end of the year, 1,500 acres were under cultivation around Calexico. As more canals were built, the population increased rising to 12,000 by 1905 (CEOE 2002d:2-7).

The canals soon became full of silt that caused people to open the canals at their lower ends to provide drainage. The combination of the canal openings and a series of Colorado River floods in 1904 and 1905 resulted in a major flow of Colorado River water through the Imperial Valley. By the time the flow was stopped in February 1907, the Salton Sea had been formed. As a result of the floods, 13,000 acres of formerly cultivated land were unusable (CEOE 2002d:2-7).

After the dissolution of the California Development Company in 1909 as a result of financial losses due to the floods, there was no valley-wide organization to finance and develop the irrigation system. Thirteen small water companies existed until 1921 when the valley-wide Imperial Irrigation District was formed. New arrivals during the 1910s purchased land in one of the 13 water districts and extensively altered and leveled the land so that water from the canals would efficiently irrigate their land. The principal agricultural activities during this period were growing alfalfa, raising hogs, and dairying. A series of small towns developed north of Calexico during this period to supply the needs of the newly-arrived farmers. These included Brawley (1908), Westmorland (1910), Niland (1913), and Calipatria (1914) (CEOE 2002d:2-8).

The problem of soil salinity, caused by salts in the irrigation water which remained in the soil as the water evaporated, was solved when the Imperial Irrigation District finished a system of canals that drained water from fields into the Salton Sea in 1929. Risk and uncertainty were further reduced when the Hoover Dam and the All American Canal were completed in the 1930s. The Hoover Dam prevented any further flooding from the Colorado River and the All American Canal, constructed between 1933 and 1938 and opened in 1940, rerouted Colorado River water from an earlier route through Mexico to a route entirely within the United States (CEOE 2002d:2-8). These improvements resulted in a second wave of settlement in the 1930s and 1940s. Many of the farmsteads in the project area were begun at this time. Many more crops were also introduced at this time and included cantaloupes, citrus, grapes, wheat, beets, asparagus, and cotton. Currently, 3,000 miles of irrigation and drainage canals serve 500,000 acres of cultivated land, yielding nearly $1 billion in agricultural products (CEOE 2002d:2-8).

## RESOURCES INVENTORY

### Literature and Records Search

Prior to preparation of the AFC, CE Obsidian Energy, LLC (CEOE) conducted a cultural resources literature search and reviewed site records and maps for the project area at the Southeast Information Center of the California Historic Resources Information

System (CHRIS) located at the Imperial Valley College Desert Museum. The record search included an area extending for one mile around the Unit 6 site and the project linear routes. CEOE also contacted representatives of the Imperial Valley Historical Society and the San Diego Historical Society to identify historical resources in the project area (CEOE 2002d:2-8 to 2-9). CEOE determined that the Imperial County Planning Department does not maintain an inventory of historical resources (CEOE 2002l, Data Response 45).

As a result of the record search, 83 previously recorded sites and 18 isolated prehistoric artifacts were identified as being located between 200 and 1200 meters of the project site and associated linear routes. Of the 83 sites, 75 were prehistoric, seven were historic, and one was prehistoric and historic.

No previously recorded cultural resources are located on the parcel proposed for the SSU6. Previously recorded cultural resources located within 100 feet of the project linear routes, including the alternate L-Line interconnection, consist of three prehistoric artifact scatters (CA-IMP-4931, CA-IMP-6415, and CA-IMP-6416), four trail segments (CA-IMP-900, CA-IMP-902, CA-IMP-903, and CA-IMP-5108) recorded on an 1859 survey carried out by the United States Geological Survey, one canal (the Westside Main Canal) dating to the historic period (CA-IMP-7834; P-13-008303), and one prehistoric isolated artifact (IMP-6436-I). One other prehistoric artifact scatter, CA-IMP-7804, was reported as being located within 100 feet of the L-Line Interconnection route (CEOE 2002d:2-10). However, a subsequent survey completed after the route was staked on the ground showed that this previously recorded site is not within 100 feet of the L-Line Interconnection route. One of the artifact scatters (CA-IMP-4931) and all four trail segments are located along the L-Line Interconnection route. The L-Line Interconnection route and the alternate L-Line Interconnection route cross the Westside Main Canal. The other two artifact scatters (CA-IMP-6415, and CA-IMP-6416), and the isolate are located along the alternate L-Line Interconnection route which runs parallel to this historic canal. A subsequent survey completed after the route was staked on the ground showed that one additional previously recorded site, a campsite (CA-IMP-6549), is within 100 feet of the Alternate L-Line Interconnection route. No previously recorded cultural resources are located along the IID Midway Interconnection route.

## Field Surveys

### Plant Site

CEOE performed an intensive pedestrian archaeological survey of the property proposed for the SSU6 and the associated linear routes in January 2002. The survey of the power plant property was performed by walking parallel 15 meter transects. An area 100 feet wide on each side of the centerline of the linear routes was surveyed (CEOE 2002d:2-8 to 2-9). No cultural resources were identified as a result of the survey of the SSU6 power plant parcel.

The historical survey identified one industrial building near the plant site that was built after 1956. The building is not considered to meet the eligibility requirements for the California Register of Historical Resources and will not be addressed further.

**L-Line Interconnection**

The survey of the L-Line Interconnection route showed that no physical traces of the four trails indicated on the 1859 map remain and they could not be found within the impact area of the project. The two previously recorded lithic scatters along the L-Line Interconnection route were relocated. In 1982, when originally recorded, CA-IMP-4931 consisted of a lithic and ceramic scatter. During the current survey, only three pieces of debitage were observed at the recorded site location. In 2000, when originally recorded, CA-IMP-7804 (also known as P-13-008303) consisted of sherds, debitage, and other materials. During the current survey, a more diffuse scatter of similar artifacts was noted (CEOE 2002d:5-3).

Three new prehistoric sites (designated BB-1, BB-2, and KH-1) were recorded. BB-1 is a small diffuse scatter of debitage with both obsidian and metavolcanic flakes. The site area has been disturbed by erosion from an alluvial wash and by modern earth moving activities. BB-2 is also a diffuse lithic scatter. The site area has been disturbed by erosion from an alluvial wash. KH-1 consists of a scatter of debitage and other materials (CEOE 2002d:5-3).

The Westside Main Canal (CA-IMP-7834; P-13-008334) crosses the L-Line Interconnection route and parallels the alternate L-Line Interconnection. This segment is a concrete lined irrigation canal constructed between 1941 and 1950 that was incorporated into the All American Canal system (CEOE 2002l, Data Response 38). CEOE provided background information on the history of the canal and previous segments of the canal that have been evaluated, including one completed by Jill Hupp with Caltrans.

CEOE recorded and evaluated ten structures from the historic period along the L-Line Interconnection route. These include a possible residence, a railway segment, Calipatria Prison, and a farmstead (Table 1).

The L-Line Interconnection route west of State Route 86 and the Alternate L-Line Interconnection route parallel with State Route 86 and north of Bannister Road were resurveyed by the Imperial Irrigation District (IID) after the transmission line routes were staked on the ground (IID 2003a). This survey showed that CA-IMP-7804 is not outside of the survey area. Two new prehistoric archaeological sites, a hearth (IID-3) and an artifact scatter/campsite (IID-4), were recorded along the L-Line Interconnection route. The IID survey also recorded 15 new isolated artifacts along the L-Line Interconnection route west of State Route 86. The isolates consisted of flakes, cores, a biface, a mano, a mano/hammerstone, and a metate.

The location of the Bannister Switchyard, some of the transmission towers (L14, SB2, and possibly L13), and any additional laydown or construction areas, or access roads that are necessary for construction of these transmission towers are outside of the survey areas covered by URS. The area for the Bannister Switchyard was surveyed and is documented in the inventory and testing report prepared for Imperial Irrigation District by ASM Affiliates. A small site, IID-5, was recorded in this area. The site contains a small hearth and a few scattered artifacts. The site is highly disturbed by grading and there do not appear to be any subsurface components (IID 2002a). However, transmission tower locations L14, SB2, and possibly L13 and any additional

laydown or construction areas, or access roads that are necessary for construction of these transmission towers have not had a cultural resources survey.

### Alternate L-Line Interconnection

The two lithic scatters (CA-IMP-6415, and CA-IMP-6416) along the alternate L-Line interconnection could not be relocated during the survey.

CEOE recorded and evaluated five structures from the historic period along this route. These were mostly farmsteads (Table 1).

The alternate route parallel with State Route 86 and north of Bannister Road was resurveyed by the Imperial Irrigation District (IID) after the transmission line routes were staked on the ground (IID 2003a). Two new prehistoric archaeological sites, a campsite (IID-1) and a hearth feature (IID-2), also were recorded along the alternate route. One additional previously recorded site, a campsite (CA-IMP-6549), is located near the end of this route (IID 2003a, Table 1). The IID survey also recorded one new isolated artifact.

### IID Midway Interconnection

No archaeological sites were identified during the survey of the IID Midway Interconnection route. One isolated artifact, a primary chert flake, was recorded along this route. A feature from the historic period, a portion of the J Lateral Water Conveyance System, consisting of two concrete culverts, was also recorded. Some sections of the culvert are stamped with the date 1949 while other newer sections bear the date 1982.

CEOE recorded and evaluated four structures from the historic period along the L-Line Interconnection route. These include a possible residence, a railway segment, Calipatria Prison, and a farmstead (Table 1).

### Brine Supply and Injection Pipelines and Wellheads

The brine production well head OB3 would be located on the southern end of Obsidian Butte. A large portion of Obsidian Butte is a disturbed area used for gravel mining. The construction of this well pad would not result in new disturbance. The brine pipeline would parallel the south side of the dirt access road from the quarry area to McKendry Road.

Obsidian Butte is a known source of obsidian used by Native Americans to make flaked stone tools throughout southern California during the latter part of the Late Prehistoric period (Ericson et al. 1989). Although two small areas around the base of Obsidian Butte have been recorded as sites (CA-IMP-452 and CA-IMP-6638) (CEOE 2003n:6), Obsidian Butte as a whole has not been recorded as an archaeological site. The Obsidian Butte obsidian source consists of a central dome of rhyolite which rises about 90 feet above the surrounding alluvial valley floor, and a surrounding area of about 40 acres of rhyolite flow with chunks of rhyolitic obsidian covered by a weathered light gray pumice mantle. Soon after obsidian Butte was formed by volcanic activity, it was covered by the waters of Lake Cahuilla, as indicated by rounded pumice clasts and seven wave cut benches on the east slope of the dome (CEOE 2003n:10). Prehistoric

Native Americans only had access to the obsidian source when Lake Cahuilla was low or dry. The most extensive use of the obsidian source appears to have been during the Patayan II and III periods after A.D. 1200 (CEOE 2003n:11).

The southern and eastern slopes of the dome were covered with pumice and ash sand and gravel that has been removed and used as fill material. Currently, Imperial Irrigation District owns Obsidian Butte. There is a large graded area south of the butte and a gravel pit and disturbed area east of the butte. Although some of the obsidian source area has lost integrity, there are still large intact areas of obsidian chunks around the base of the butte. It is likely that if the entire area were surveyed, more quarry areas containing hammerstones and obsidian reduction flakes would be recorded, similar to the two already noted (4-IMP-452 and 4-IMP-6638).

During a visit to Obsidian Butte, CEOE showed staff the proposed location of Well Pad OB-3. Well Pad OB-3 would be built in a portion of the Obsidian Butte area that has already been graded. However, the route of the pipeline that would connect OB-3 to the power plant had not been determined. At staff's request, CEOE surveyed an area 600 meters long by 450 meters wide through which the pipeline route would pass. One small archaeological site, a lithic scatter consisting of 8 obsidian artifacts and measuring 14 meters by 12 meters (40 by 46 feet), was recorded in this survey area (CEOE 2003n). The site is known as the "Obsidian Butte Lithic Scatter." No site number has yet been assigned to this site by the Southeast Information Center.

The 20 evaluated properties are identified in Table 1. Most properties consist of farmstead/ranch structures. Construction dates for the buildings range from the 1920s to the present (CEOE 2002d, CEOE 2003d, CEOE 2003n).

## Native American Contacts

CEOE contacted the Native American Heritage Commission (NAHC) on February 1, 2002 to obtain a list of Native Americans to be contacted for the project area. The NAHC provided names of contacts for Imperial and San Diego Counties appropriate for the project in accordance with their tribal territory maps. On February 27, 2002, CEOE sent letters to these individuals which described the project and asked about concerns. No responses were received. CEOE did not request that the NAHC search its Sacred Lands File (CEOE 2002d: letters in Appendix E).

Telephone calls were made by CEOE to Native American groups on the contact list in February and March 2003. The purpose of these calls was to ask about the importance of Obsidian Butte to these groups. As a result of these calls, Mr. Keith Adkins of the Manzanita Band of Mission Indians stated that "if it was a place where the Indians got obsidian, then it has significant value to the Band" and Mr. Steve Banegas of the Barona Band stated that "Obsidian Butte is important."

In May, 2003, CEC staff made additional calls enquiring about the importance of Obsidian Butte. Mr. Paul Cuero with Kumeyaay Cultural Heritage Preservation stated that Obsidian Butte is significant to the Kumeyaay and obsidian from this source is still used by them. Mr. Desi Velas of the Ewiiaapaayp said that Obsidian Butte is out of their area and not of concern to them.

On June 6, 2003 during discussions about consultation with Native Americans with the Bureau of Land Management (BLM), BLM noted that the contact list being used by the Energy Commission was very limited. They provided a contact list that they typically use and suggested we widen our sphere of consultation. They will also be fulfilling their consultation responsibilities but they have not started their consultation.

Staff requested a new list from the NAHC that included all Native American contacts for Imperial County. On June 11, 2003, Energy Commission staff sent letters to the additional twenty three groups and individuals which described the project and asked about concerns. Telephone calls were made to the contacts to elicit comments about the project and possible impacts to cultural resources.

The Cabazon Band of Mission Indians, Mr. Ron Christman (Kumeyaay), the Inaja Band of Mission Indians, Anthony Andreas, Jr., the Jumal Indian Village, and the Morango Band of Mission Indians either indicated that the project was outside of their traditional area or they had no comments. No further contacts will be made with these groups.

Several calls were made to the Fort Mojave Indian Tribe to speak with Nora McDowell, Chairperson. Messages were left but the calls were not returned.

The Cahuilla Band of Indians requested that staff contact their Environmental Office. The individual in that office was out until June 30 and could not be reached. Jonell John called staff on July 1 and discussed the project. Ms. John said she would like to attend the field trip that is planned for July 3, 2003. Then she would be better able to provide comments. Jonell John was not able to attend the field trip and has not provided additional comments.

The Barona Band of the Capitan Grande referred staff to the Executive Secretary. Messages were left for the Executive Secretary. Staff spoke with her on June 24 and was referred to Councilman Steve Banegas who was out of the office. Mr. Banegas has previously provided comments during the siting case stating that Obsidian Butte is important.

The Mesa Grande Band of Mission Indians referred staff to Darrell Langley and provided his pager number. He returned one page and left a message. Staff has continued to page Mr. Langley and he has not returned the call.

The Ramona Band of Mission Indians said the project is not within their historical area and it would be better to contact the Torres-Martinez Desert Cahuilla Indians. They said that if staff was unable to contact the Torres-Martinez Desert Cahuilla Indians then they would like to be contacted for comments. The Ramona Band of Mission Indians also provided written comments, adding that they are unaware of any Native American religious or sacred sights at the location(s) mentioned. The band would like to be contacted if staff becomes aware of any information about such sites.

Staff was referred to Mary Maxine of the Torres-Martinez Desert Cahuilla Indians. On June 23, staff was informed that she is out all week and was then referred to Ray Torres. Staff was told he would call the next day. On June 24$^{th}$, staff was informed that Mr. Torres was in a meeting and staff left a message. Melissa Carver-Davis attended the site

visit on July 3, 2003, representing both the Agua Caliente Band of Cahuilla Indians and the Torres-Martinez Desert Cahuilla Indians.

Alvino Siva was contacted by staff. He was not familiar with the area, but said he would go look at the area.

The Los Coyotes Band of Mission Indians indicated that they would make sure that the tribal administrator receives staff's messages. They said if she did not call back then she doesn't have any questions. No return call has been received.

The Fort Yuma Indian Reservation – Quechan Tribe indicated that they are interested in the project and would like to attend a field trip so they could provide comments on the project and the impacts. Additional discussions with the Quechan Tribe indicate that the cultural committee is the appropriate committee to contact regarding cultural resources. They have discussed Obsidian Butte in past meetings and expect to provide comments on the project.

Staff discussed the project with Chad Smith of the Fort Mojave Tribe, Ahamakav Cultural Society. He was not familiar with the specific area, but was very interested. He indicated he would contact the Bureau of Land Management archeologist to get specific information about the resources identified in cultural resource surveys. He had to go to meetings in Arizona for a couple of days, but is very interested in the project. Mr. Smith attended the site visit on July 3, 2003.

The Cocopah Tribe indicated that they had no comments at this time, but wanted to be noticed about all meetings and workshops and did not want to foreclose on their opportunity to comment on the project or cultural resources that could be impacted by the project. They would like to attend a site visit, but did not know if they could arrange this on short notice.

Carmen Lucas (Kwaaymii, Laguna Band Mission Indians) was very interested in visiting the site. She indicated that Obsidian Butte was very important as it was used by native people for more than a thousand years. She is very concerned about the destruction to the butte and would like to see it restored and protected. She feels that the distribution of obsidian from this butte helps support the oral history of the travels of the Indians that occupied this part of the desert.

The Augustine Band of Cahuilla Mission Indians provided a letter indicating that they were not aware of any Native American resources or sacred sites located at or near the project at this time. The tribe recommended that other tribes in the area be contacted and that there should be a Native American monitor on site during the ground breaking activities. They also want to be notified of any cultural resource discoveries and that information about any discoveries is submitted to the tribe for further action.

On July 3, 2003, staff met with the applicant and representatives of Native American groups to visit the project site. Chad Smith represented the Fort Mojave Tribe, Ahamakav Cultural Society and Melissa Carver-Davis represented the Agua Caliente Band of Cahuilla Indians and the Torres-Martinez Desert Cahuilla Indians. Ed Collins, archeologist, with the Imperial Irrigation Districts and Margaret Hangan, archeologist, from the Bureau of Land Management El Centro Field Office were also in attendance.

Both Native American representatives said they would like to have an ethnographic study conducted by Lowell Bean. Part of the study would focus on the importance of Obsidian Butte. Both representatives stated that without comments from the Quechan tribe that the input would not be complete. They suggested contacting Mr. Lorey Cachorra. Both Mr. Smith and Ms. Carver-Davis said they considered Obsidian Butte a Traditional Cultural Place.

Mr. Collins indicted that he had met with some of the Quechan tribe including Mr. Cachorra on another project. During the meeting they also discussed Obsidian Butte. The Quechan said that Obsidian Butte was important to them and they considered it a Traditional Cultural Place.

Ed Collins led the group to some of the important features of the butte during the site visit. These features were not within the construction zone for the project elements. Chad Smith expressed a desire that some of the areas of the butte be fenced to limit access to non Native Americans. This would be a protection measure so the tribes can continue to practice their cultural traditions.

Both representatives of Native American groups felt that the widening of the road and construction of the pipeline along the roadway was a minimal disturbance as long as the lithic scatter is avoided or data recovery is accomplished before the ground is disturbed in that area. They were both more interested in protecting the more undisturbed parts of Obsidian Butte.

Subsequent to the site visit, staff received additional information about Obsidian Butte from Preston J. Arrow-Weed. Preston Arrow-Weed indicated that he is a consultant to the Quechan tribal government but does not represent them. He stated that Obsidian Butte is important to the Quechan and the Kumeyaay not only as a source of obsidian but also because it plays a prominent role in the creation story. He said he would provide written comments.

On July 16, 2003, Alvino Siva contacted staff and expressed his concerns about Obsidian Butte. He said he had been out to the butte and thought that the well location was fine, but he was very concerned about seeing the area of the best obsidian preserved.

On July 28, 2003, staff received a letter from Ila Dunzweiler, a Tribal Council Member of the Quechan Tribe. Ms. Dunzweiler stated that Obsidian Butte is important and feels it is very important to protect the remaining portion of the butte that is the obsidian source. This is important to provide continued evidence of their cultural past. She requested that the Quechan be able to provide evidence at on of the Energy Commission hearings.

## CATEGORIZATION OF IDENTIFIED CULTURAL RESOURCES

Various laws apply to the treatment of cultural resources. These laws require the Energy Commission to categorize cultural resources by determining whether they meet sets of specified criteria. These categories then in turn influence the analysis of potential impacts to the cultural resources and the methods and consultation required to mitigate any such impacts. Federal laws apply when a federal agency takes an action. The federal agency would comply with the applicable federal laws. The preferred alignment of the L-Line Interconnection crosses BLM property. This would require an

approval action by this federal agency. The federal agency is responsible for compliance with federal regulations.

Under federal law, only historical or prehistoric sites, objects, or features, or architectural resources that are assessed as “significant” in accordance with federal guidelines need to be considered in analyzing potential impacts. The significance of historical and prehistoric cultural resources is based on the criteria for eligibility for nomination to the NRHP as defined in Title 36 Code of Federal Regulations, section 60.4. If such resources are determined to be significant, and therefore eligible for listing in the NRHP they are afforded certain treatment under the National Historic Preservation Act. If the resources are determined significant, and therefore eligible for the CRHR, then mitigation measures are implemented under CEQA to reduce the impact to less than significant if possible. Federal agencies are responsible for meeting the requirements of NHPA and the Energy Commission is responsible for meeting the requirements of CEQA.

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 that represent a significant and distinguishable entity whose components may lack individual distinction; or
d) that have yielded, or may be likely to yield, information important to history or prehistory.

California has adopted a very similar set of criteria for assessing resources for the California Register of Historical Resources. The CRHR criteria are noted as 1, 2, 3, and 4 while the NRHP criteria are noted as a, b, c, and d.

Under federal law, cultural 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 treatment. 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. Energy Commission staff and involved federal agencies evaluate the survey reports and site records for any known resources located within or adjacent to the project Area of Potential Effects (APE) to determine whether they meet the eligibility criteria.

The record and literature search and the pedestrian surveys of the proposed project area and linears were conducted to identify the presence of any cultural resource sites or materials. Where cultural 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 NRHP or the CRHR. The determination of eligibility is made in compliance with the applicable provisions of the National Historic Preservation Act.

CEQA Guidelines explicitly require the lead agency (in this case, the Energy Commission) to make a determination of whether a proposed project would affect "historical resources." The guidelines provide a definition for historical resources and set forth a listing of criteria for making this determination. These criteria are the eligibility criteria for the CRHR and are essentially the same as the eligibility criteria for the NRHP. In addition, as with the NRHP, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association.

Resources eligible for the CRHR may have less integrity than the resources eligible for the NRHP. If the criteria are met and the resource is determined eligible for the CRHR, the Energy Commission must evaluate whether the project would cause a "substantial adverse change in the significance of the historical resource," which the regulation defines as a significant effect on the environment.

CEQA also contains a section addressing "unique" archeological resources and provides a definition of such resources (Public Resources Code, Section 21083.2). This section establishes limitations on analysis and prohibits imposition of mitigation measures for impacts to archeological resources that are not unique. However, the CEQA Guidelines state that the limitations in this section do not apply when an archeological resource has already met the definition of an historical resource (Title 14, California Code of Regulations, Section 15064.5).

CEOE's architectural historians recorded 20 resources, 5 of which are less than 47 years old (built after 1956) and do not meet the minimum requirements for eligibility to the CRHR. The architectural historians have evaluated 15 resources that are more than 47 years old that are within 100 feet of a transmission line route or that are visible from the power plant site (Table 1). CEOE recommended that none of these resources are eligible for the California Register of Historical Resources (CRHR). Staff agrees that these resources do not meet the CRHR eligibility criteria (Table 1).

Although it was previously stated that one of these resources, the Vail Ranch, is potentially eligible for the California Register of Historical Resources under criterion 2 (CEOE 2002d), further analyses has shown that it is not eligible. The ranch buildings were built beginning in 1925 on land previously patented to Walter Lennox Vail by the U.S. government. However, Vail had died in 1906. Although Vail was an important person in California history, the ranch is not directly associated with his life and was established by his heirs, none of whom lived at this ranch (CEOE 2003n). Therefore, it is not eligible under criterion 2 (association with the lives of persons significant in our past).

**Table 1. Historical Structures Evaluated for the SSU6 Power Plant Project**

| Address | Description | Location | Date of Construction | Appears Eligible | Appears Not Eligible |
|---|---|---|---|---|---|
| Gentry Road | Industrial Building | East of the proposed Plant Site | After 1956 | | X |
| Hoober Road near Railroad | Residence (?) | IID Midway Interconnection Line | After 1956 | | X |
| Southern Pacific Railroad – Niland Branch Line | Railroad (segment) | IID Midway Interconnection | 1903 | | X |
| Hoober Road | Calipatria State Prison buildings | IID Midway Interconnection Line | After 1956 | | X |
| 1205 Hoober Road or 1205 A & B Hoober Rd. | Farmstead | IID Midway Interconnection | ca. 1945 | | X |
| North end of Crummer Road | Industrial Building | L-Line Interconnection | After 1956 | | X |
| Lack Road / Bowles Road | Vail Ranch Headquarters | L-Line Interconnection | 1925-1956 (extant structures) | | X |
| 5697 Lack Road | Farmstead | L-Line Interconnection | 1945-1956 | | X |
| 5897 Lack Road | Farmstead | L-Line Interconnection | 1940s | | X |
| 5905 Lack Road | Farmstead | L-Line Interconnection | 1920s | | X |
| 6005 Lack Road | Farmstead | L-Line Interconnection | 1945-1956 | | X |
| 1804 Bannister Road | Farmstead | L-Line Interconnection | 1940s | | X |
| 5404 Pellet Road | Farmstead | L-Line Interconnection | 1945-1956 | | X |
| 1996 Bannister Road | Farmstead | L-Line Interconnection | 1945-1956 | | X |
| Bridge #58C0101 Lack Road over New River | Timber Trestle Bridge | L-Line Interconnection | Unknown | | X |
| 5908 Poe Road | Shed | Alternate L-Line Interconnection | After 1956 | | X |
| 5980 Highway 86 | Farmstead | Alternative L-Line Interconnection | 1953 | | X |
| Intersection Howenstein Road and SR 86 | Farmstead | Alternate L-Line Interconnection | 1956-present | | X |
| 3104 SR 86 | Elmore Desert Ranch Headquarters | Alternate L-Line Interconnection | 1956-present | | X |
| Intersection of Barth Road and SR 86 | Abandoned Farmstead | Alternate L-Line Interconnection | 1945-1956 | | X |

There are eight prehistoric archaeological sites recorded in the 300-foot wide survey area for the L-Line Interconnection and in the Bannister Switchyard area (Table 2) and four prehistoric archaeological sites recorded in the 300-foot wide survey area for the Alternate L-Line Interconnection (Table 3).

**Table 2. Archaeological Sites Evaluated in the L-Line Interconnection Route Survey Area**

| Site Number | Site Type | Recorder/Date | Investigations | CRHR Eligibility |
|---|---|---|---|---|
| CA-IMP-5108 | Trail (segment) | IVCM 1982 | No evidence of trail found during 2003 survey. | Segment Not Eligible |
| BB-1 | Lithic Scatter | URS 2002 | Tested by ASM with 13 STPs | Not Eligible |
| BB-2 | Artifact Scatter | URS 2002 | Tested by ASM with 15 STPs | Not Eligible |
| CA-IMP-4931 | Campsite | WESTEC 1982 | Site tested and collected in 1982. No evidence of site found during 2003 survey. | Not Eligible |
| KH-1 | Artifact Scatter | URS 2002 | Tested by ASM with 18 STPs | Not Eligible |
| IID-3 | Hearth Feature | ASM 2002 | Tested by ASM by bisecting and excavating hearth, plus 3 STPs | Not Eligible |
| IID-4 | Artifact Scatter /Campsite | ASM 2002 | Tested by ASM with 14 STPs, shovel scrapes, and surface collection | Not Eligible |
| IID-5 | Artifact Scatter /campsite | ASM 2002 | Surface disturbance demonstrated no subsurface deposits | Not Eligible |

**Table 3. Archaeological Sites Evaluated in the Alternate L-Line Interconnection Route Survey Area**

| Site Number | Site Type | Recorder/Date | Investigations | CRHR Eligibility |
|---|---|---|---|---|
| CA-IMP-6415 | Campsite | RECON 1990 | No evidence of site found during 2003 survey.[1] | Not Eligible |
| CA-IMP-6416 | Lithic Scatter | RECON 1990 | No evidence of site found during 2003 survey.[1] | Not Eligible |
| IID-1 | Campsite | ASM 2002 | Tested by ASM with 19 STPs, hearth features bisected and excavated | Not Eligible |
| IID-2 | Hearth Feature | ASM 2002 | Tested by ASM by bisecting and excavating hearth, plus 6 STPs | Not Eligible |
| CA-IMP-6549 | Campsite | ASA 1956 | Site is adjacent to survey area, survey area tested by ASM with 9 STPs, no artifacts found. | Eligible, but not in Project Impact Area |

[1]May have been destroyed during SR-86 widening.

Site IID-5 is heavily disturbed by grading activities. Observation of aspects of the site indicated that there is no subsurface deposit associated with this site. All information values of the site were collected in the recording of the site. IID-5 no longer meets the eligibility requirements for the California Register of Historical Resources. No further discussion of the resource is warranted.

The eight prehistoric archaeological sites for which physical evidence was present were tested to determine whether they have the potential to yield information important in prehistory (CRHR criterion d). Testing consisted of the excavation of shovel test probes (STPs) measuring 30 by 50 centimeters. The STPs were excavated by hand and all material was screened using 1/8$^{th}$ inch mesh. Where hearth features were present, they were bisected and then excavated by hand (IID 2003).

With the exception of one ceramic sherd recovered from BB-1, no artifacts were recovered from any of the STPs. Only a few sherds were recovered from the surface scrape at IID-4. Hearths were seen on the surface at IID-1, IID-2, and IID-3. Excavation of these hearths showed that the hearths at IID-2 and IID-3 are modern and that there are no subsurface hearth components (hearth rocks, charcoal, or artifacts) at IID-1 (IID 2003). Thus, the test program showed that there is no potential for these sites to yield important information from subsurface contexts. Since the information present on the surface has already been recorded, none of the archaeological sites that could be impacted by transmission line construction have the potential to yield important information and therefore are not eligible for the CRHR.

A segment of the Westside Main Canal, outside the project area, has been evaluated by Caltrans as not eligible for the CRHR because of a lack of strong historical associations with significant events or persons and is not an outstanding example of engineering design or function. The SHPO concurred with this evaluation in a letter dated January 29, 2001 (CEOE 2002n: Attachment CR-31R). In the DPR 523 form for the Westside Main Canal provided by CEOE, Hupp states in her evaluation of a segment of the Westside Main Canal that “Caltrans architectural historian Frank Lortie, after an extensive study of the IID system in 1997, concluded that the elements in the IID that retain integrity for the period 1941-1950 could be contributors to a potentially eligible National Register Historic District.” Hupp continues noting that in 1997 and 1998, several segments of the Westside Main Canal were “…found ineligible due to loss of integrity.” She found that the segment of the Westside Main Canal that she investigated did not meet the requirements to contribute to the eligibility of the potential IID district (CEOE 2002d).

The segment of the Westside Main Canal in the SSU6 project area was constructed between 1941 and 1950. It postdates the development of commercial agriculture in the Imperial Valley and is a late example of the irrigation canal systems present throughout the valley. Thus, the segment of the canal in the project area also does not have strong historical associations with significant events or persons and is not an outstanding example of engineering design or function. This canal segment also lacks integrity. The canal as originally built was earthen lined and had a U-shaped cross section. The canal in the project area is presently lined with concrete and has a trapezoidal cross section (CEOE 2002n: Attachment CR-31R).

Based on information provided by CEOE, Obsidian Butte appears to be eligible for the CRHR. Although a portion of the Butte has lost integrity as a result of sand and gravel mining operations, intact portions remain. The Obsidian Butte Lithic Scatter appears to be eligible for its information values (criterion 4) and Obsidian Butte may qualify as a traditional cultural property of importance to Native Americans (criterion 1).

Obsidian from Obsidian Butte is found in archaeological sites throughout southern California. The trace elements present in Obsidian Butte obsidian are known (Hughes 1986) and it can be determined using x-ray fluorescence or neutron activation analysis whether obsidian artifacts found in archaeological sites are made from Obsidian Butte obsidian. During the latter part of the Late Prehistoric period when Obsidian Butte was not submerged below the waters of Lake Cahuilla, Obsidian Butte was the predominant source for obsidian artifacts from Orange County sites where source analysis was undertaken (Koerper et al. 1986; Ericson et al. 1989). The same is true for San Diego, Imperial, and Riverside counties, according to Prof. Steven Shackley, an obsidian expert at University of California Berkeley (personal communication to Jim Bard in CEOE 2003n:11).

Although a complete survey of the Obsidian Butte obsidian source has not been completed, it is likely that numerous obsidian procurement and reduction activity areas are present. These activity areas have the potential to yield important information on procurement and reduction techniques and change in these techniques over time. Reduction techniques that could have been used include core-flake reduction, bifacial reduction to make biface preforms, micro-blade production, and bi-polar reduction. The type of reduction and the amount of reduction completed at the quarry will provide information on the degree of specialization involved in obsidian procurement and trade. The Obsidian Butte source can also provide information about chemical variation in trace elements of the various flows within the overall source. This information could then be used to help determine flow-specific hydration rates for Obsidian Butte obsidian. Hydration rates can then be used to date obsidian artifacts made from Obsidian Butte obsidian found in archaeological sites.

Statements from Native Americans in the area indicate that Obsidian Butte was important to their ancestors and continues to be important to them today. Mr. Keith Adkins of the Manzanita Band of Mission Indians stated that “if it was a place where the Indians got obsidian, then it has significant value to the Band” and Mr. Steve Banegas of the Barona Band stated that “Obsidian Butte is important.” Mr. Paul Cuero with Kumeyaay Cultural Heritage Preservation stated that Obsidian Butte is significant to the Kumeyaay and obsidian from this source is still used by them. Carmen Lucas states that Obsidian Butte is an invaluable cultural resource and is worthy of preservation. Mr. Smith and Ms. Carver-Davis said they considered Obsidian Butte a Traditional Cultural Place. Ed Collins indicated that in his conversations with the Quechan that they consider Obsidian Butte important and a Traditional Cultural Place. Mr. Arrow-Weed says that Obsidian Butte is important to the Quechan and the Kumeyaay not only as a source of obsidian but also because it plays a prominent role in the creation story.

These statements indicate that Obsidian Butte is a very important place to several Native American groups and could be considered a Traditional Cultural Place where obsidian has been procured for at least a thousand years. A Traditional Cultural Place eligible for

the National Register of Historical Places is defined as one which is associated with cultural practices or beliefs of a living community that are rooted in that community's history, and are important in maintaining the continuing cultural identity of the community (National Park Service n.d.:1). Obsidian Butte plays an important role in the creation story for the Quechan and the Kumeyaay and as such is potentially eligible to the inventory of sacred places maintained by the Native American Heritage Commission. Because limited ethnographic research was conducted as part of the siting process, insufficient information was gathered from Native Americans to determine whether Obsidian Butte meets the eligibility requirements to be considered eligible for the CRHR under criterion 1. For the purposes of this analysis, Obsidian Butte will be treated as a Traditional Cultural Place eligible to the CRHR under criterion 1, association with important events.

Access roads around the south and west sides of the dome have changed the natural terrain around the base of the butte. While a portion of the south and east slopes of the dome and areas around the base of the dome to the south and east have been quarried for fill and berm material, the majority of the dome and the flows containing obsidian around the dome remain intact. The obsidian procurement and reduction areas used by prehistoric Native Americans are located in these flow areas. One of these areas (the "Obsidian Butte Lithic Scatter") has been recorded near the proposed pipeline route for this project. Thus, Obsidian Butte retains sufficient integrity to be eligible for the CRHR.

In summary, staff recommends that Obsidian Butte meets the eligibility requirements for the California Register under criteria 4. Obsidian Butte is potentially eligible to the inventory of sacred places. It also retains sufficient integrity to provide important information about prehistory and to function as a Traditional Cultural Place, and will be treated as also eligible for the CRHR under criterion 1 for the purposes of this analysis.

## ANALYSIS AND IMPACTS

Since project development and construction entail surface and subsurface disturbance, the proposed Salton Sea Unit 6 Power Plant Project has the potential to adversely affect both known and unknown cultural resources. Staff has analyzed the potential direct, indirect, and cumulative impacts from the proposed project. 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, excavation or demolition. Indirect impacts are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or vandalism due to improved accessibility. Cumulative impacts to cultural resources may occur if increasing amounts of land are cleared and disturbed for the development of multiple projects in the same vicinity as the proposed project.

The potential for the project to cause impacts to cultural resources is related to the likelihood that such resources are present and whether they are actually encountered during project development and construction activities. Although the existence of known cultural resources increases the potential for additional resources, the absence of known resources does not necessarily mean that unknown resources would not be encountered and that impacts would therefore not occur. In addition, the potential for discovery does not measure the significance of individual artifacts or other cultural

resources present, since it is impossible to accurately predict what specific materials could be encountered. Furthermore, sometimes the full significance of discovered cultural resources can only be determined after they have been collected, prepared, and studied by professional archaeologists.

## PROJECT RELATED IMPACTS

Only impacts to eligible cultural resources sites can be potentially significant. Of the resources that could be impacted by the project, only Obsidian Butte and the "Obsidian Butte Lithic Scatter" meet the CRHR eligibility requirements. Impact to the "Obsidian Butte Lithic Scatter" would consist of construction of a pipeline from Well Pad OB-3 to the power plant to the east of Obsidian Butte. The pipeline will be constructed aboveground and will be supported by 20 pipe supports at 30 foot intervals. Each support will consist of two piles, each 14 inches in diameter, which will be driven into the ground. The pipeline will cross an area that contains the "Obsidian Butte Lithic Scatter," recorded during survey for the SSU6 project. The route for the pipeline would parallel the existing access road. The north edge of the site is about 3 meters (10 feet) south of the existing access road. The widening of the access road and the berm along the south side of the road is expected to materially impair the eligibility of the "Obsidian Butte Lithic Scatter" recommended eligible for the CRHR under criterion 4, unless the pipeline and road can avoid the site.

Energy Commission staff consulted with Native American tribes regarding their concerns. Some groups indicated that there is a Traditional Cultural Place in the vicinity of the project area. Although a Traditional Cultural Place is not within the expansion area, the Native American tribes expressed a concern about impacts. Obsidian Butte would be impacted by diminishing aspects of integrity (setting, feeling, and association) under criterion 1. The power plant is proposed between ¼ and ½ mile of the important portions of Obsidian Butte. Most of Obsidian Butte is elevated, making the proposed plant, well OB-3, and the brine supply pipeline clearly visible. Past development in the area has removed a portion of the butte. Consequently, the construction of the power plant, well OB-3, and the brine supply pipeline would alter the setting, feeling and association of Obsidian Butte in such a way that the integrity of the resource would be diminished. Although there will be a change in setting, feeling, and association, the impact is not expected to materially impair Obsidian Butte's eligibility to the CRHR under crietion 1. The Native America Tribes expressed a desire to have an ethnographic study completed for the project vicinity. Condition of Certification, CUL-10, is proposed by staff to require preparation of an ethnographic study in accordance with the request of Native American representatives to mitigate the impact of the project to the setting, feeling and association of Obsidian Butte as a traditional cultural place and as a sacred place. The ethnographic study would provide the cultural background documenting the importance of Obsidian Butte, a record of the resource including boundaries, and recommendations for eligibility for the CRHR and management of the resource.

Native Americans also requested that access to the Native American quarry area be restricted. This area is outside of the project area and is land owned by Imperial Irrigation District (IID). Staff encourages IID to implement measures to restrict access to this area so that Native Americans can continue to use the area in a traditional manner.

Staff also encourages IID to discuss concerns with the Native American groups and consider additional enhancements of the Obsidian Butte that would assist Native Americans in continuing their traditional practices. Native American individuals and tribes are encouraged to discuss with the Imperial County Planning Department the implementation of the Imperial County General Plan Land Use Element Goal 9 to preserve Obsidian Butte as a significant cultural resource.

The transmission tower locations for L14, SB2 and possibly L13 have not had a cultural resources survey. Without identifying whether resources exist in these areas, impacts can not be identified. If archeological sites exist in these areas and the pole locations can not be modified, then the resources would have to be evaluated for eligibility to the CRHR. If any identified resources are determined to be eligible for the CRHR or if human remains are present, then mitigation would need to be implemented to reduce the impact to less than significant.

Because project-related site development and construction would entail subsurface disturbance of the ground, the proposed project has the potential to adversely affect previously unknown cultural resources. Six archaeological sites were identified in the record search that could not be located during the survey. In addition 28 archeological sites and features, objects, buildings, or structures are known to be located in the vicinity of the proposed project. These include 15 historic-era buildings and structures. Some archeological deposits near the project area contain human remains. This indicates a potential to encounter previously unknown historic and prehistoric resources during project construction. Cultural resources monitoring would ensure identification of resources during construction and would be consistent with the Imperial County General Plan Geothermal and Transmission Element standards.

## CUMULATIVE IMPACTS

Cumulative impacts to cultural resources in the project vicinity may occur if subsurface archaeological deposits are affected by other projects in the same vicinity as the proposed project. There are no other proposed projects in the vicinity of the SSU6 project.

## IMPACTS OF FACILITY CLOSURE

The anticipated lifetime of the Salton Sea Unit 6 Power Plant Project is approximately 30 years. 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 would occur when the plant becomes economically non-competitive.

At the time of planned closure, all then-applicable LORS would be identified and the closure plan required by the Energy Commission would 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 likely to depend upon the final location of project structures in relation to existing resources, and upon the procedures used for the removal of project structures. Since 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. The closure plan, when created, would address impacts to cultural resources.

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

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.

## COMPLIANCE WITH APPLICABLE LORS

Imperial County has policies and goals for the protection of cultural resources, but has no specific procedures for implementation of CEQA that differ from procedures used by the Energy Commission. Implementation of the mitigation measures recommended in the conditions of certification would ensure compliance with state and local LORS.

## MITIGATION

For cultural resources, the preferred method of mitigation is for project construction to avoid areas where cultural resources are known to exist, wherever possible. Often however, avoidance cannot be achieved, and other measures such as surface collection, subsurface testing, and data recovery must be implemented for archaeological resources and documentation must be implemented for historical structures. Mitigation measures are developed to reduce the potential for adverse project impacts on cultural resources to a less than significant level.

Table 4 summarizes proposed conditions of certification and recommendations for applicability for permits issued by Imperial County and BLM. There are no specific recommendations to DOGGR, or other involved agencies. All conditions except CUL-11 are recommended for the Energy Commission's portion of the project.

**CULTURAL RESOURCES Table 4**
**Recommended Conditions of Certification for Adoption**
**By Imperial County and BLM**

| Condition of Certification | Imperial County | BLM |
|---|---|---|
| CUL-1 | X | X |
| CUL-2 | X | X |
| CUL-3 | X | X |
| CUL-4 | X | X |
| CUL-5 | X | X |
| CUL-6 | X | X |
| CUL-7 | X | X |
| CUL-8 | X | |
| CUL-9 | | X |
| CUL-10 | | X |
| CUL-11 | X | |

## APPLICANT'S PROPOSED MITIGATION

### Archaeological Resources

CEOE (2002d) recommends preparation of a Cultural Resource Monitoring and Mitigation Plan (CRMMP) and designation of a qualified cultural resources specialist (CRS). CEOE recommends monitoring where deemed appropriate by the CRS. Any archaeological materials discovered during grading would be evaluated by the CRS and a mitigation plan would be implemented if the resource is evaluated as significant.

CEOE (2002d) recommends a worker education program to ensure that buried archaeological resources are recognized by construction crews. Such a program would include information about the kinds of archaeological material that could be encountered and the procedures to be followed if such material is discovered. Any archaeological materials collected during the construction monitoring and mitigation program would be curated at a qualified curation facility.

CEOE (2002n, p. 13) recommends avoidance of the "Obsidian Butte Lithic Scatter" by pipeline design, or if not feasible, surface collection of the artifacts as data recovery with a technical report and curation in a local repository or museum.

### Historic Architectural Resources

No mitigation measures for historic architectural resources were recommended by CEOE.

## STAFF'S PROPOSED MITIGATION MEASURES

The preceding analysis and the suggested conditions of certification are based upon a review of the entire SSU6 project. Some conditions of certification are suggested for inclusion by responsible agencies in permits for their exclusive jurisdictional areas.

Energy Commission staff concurs with the mitigation measures proposed by CEOE for archaeological resources and agrees that these measures may reduce the impacts to resources identified during construction to less than significant. However, additional mitigation measures for the "Obsidian Butte Lithic Scatter" would be necessary. Staff recommends avoidance of this resource by rerouting the pipeline and access road from well pad OB-3 so that they are at least 25 feet from the resource, but within the 1475 foot (450 meter) by 1970 foot (600 meter) area surveyed for archaeological resources. Fencing would be erected around the closest side of the site to the construction area. The fenced area will be designated as a "Do not enter" area. If this is not feasible, data recovery would be necessary and would consist of surface collection plus excavation to determine whether subsurface cultural material is present. If present, a program of subsurface excavation would be designed and implemented to recover an adequate sample of the subsurface material. A technical report would be prepared and the artifacts would be curated with a qualified curation facility in Imperial or San Diego County.

In addition, cultural resource surveys of transmission tower locations for L13, L14, and SB2 need to be completed prior to any ground disturbance in these areas. If archeological sites exist in these areas and the pole locations can not be modified, then the resources would have to be evaluated for eligibility to the CRHR. If any identified resources are determined to be eligible for the CRHR or if human remains are present, then mitigation would need to be implemented to reduce the impact to less than significant.

Staff proposed conditions, are consistent with CEOE's proposed measures. CEOE's measures are incorporated into staff's proposed Conditions of Certification **CUL-1** through **CUL-7** presented below. The following conditions have been added to the conditions provided in the Preliminary Staff Assessment to ensure compliance with all applicable LORS: **CUL-8** ensures that all federal requirements are fulfilled; **CUL-9** provides mitigation if archeological sites or human remains in the areas of transmission towers L13, L14, and SB2 are identified and can not be avoided; **Cul-10** requires an ethnographic study for the identification of Obsidian Butte as it relates to the traditional cultural use by Native American groups; and **Cul-11** has been added to provide mitigation measures for the "Obsidian Butte Lithic Scatter."

In summary, the conditions require implementation of the following measures. **CUL-1** requires that a qualified cultural resources specialist (CRS) manage cultural resources activities for the project. It also ensures that additional qualified specialists or cultural resources monitors would be retained as needed for the project. To ensure that cultural resources are adequately protected, **CUL-1** requires that the CRS have three years of experience in California. In addition to other relevant types of experience, the condition requires that the CRS have some background in data recovery.

**CUL-2** requires the project owner to provide the CRS with the necessary maps and construction schedule information necessary to schedule monitors and cultural resources activity at the project site. The verification for the condition allows staff to verify that appropriate maps and construction schedule information have been provided to the CRS.

**CUL-3** requires that a Cultural Resources Monitoring and Mitigation Plan (CRMMP) is developed that details all required activities that must be completed in order to reduce the impacts to a level that is less than significant. The CRMMP defines the roles and responsibilities of cultural resources personnel and provides timelines for the completion of the required mitigation. The CRS would also obtain Native American monitors to observe work in areas where Native American artifacts are found. The CRMMP requires a discussion of curation specifications, materials to be transferred to a curation facility, and the responsibility of the owner to pay all curation fees.

**CUL-4** requires that the project owner provide a Cultural Resources Report (CRR) in Archaeological Resource Management Report (ARMR) format. This report would provide information on all field activities and the findings. The CRR would include all Department of Parks and Recreation (DPR) 523 forms and cultural resource reports not previously provided to the California Historic Resource Information System (CHRIS). Copies of the CRR would be provided to the State Historic Preservation Officer (SHPO), the CHRIS and the curating institution (if archaeological materials were collected).

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

**CUL-6** requires monitoring of the ground disturbance for the project, linear facilities, and ancillary areas and a process for reducing monitoring to a level below full time. It also requires monitoring logs and weekly summaries of the monitoring activities. All non-compliance issues have to be reported to the CPM, and a reporting process is required. Any required Native American monitors should be obtained.

**CUL-7** requires notification of staff within 24 hours of a cultural resources find. Timely notification enables staff participation in determinations of significance and the selection of appropriate mitigation to lessen impacts on cultural resources to a level that is less than significant.

It is not possible to determine whether previously undiscovered cultural resources may be potentially significant. It is necessary to discover the cultural resource and assess it in relation to a research design and the criteria that would make a resource eligible to the CRHR or NRHP. In addition, **CUL-6** ensures that unanticipated impacts to cultural resources are identified.

The CRS, alternate CRS and the CRMs have the authority to halt work so that the applicant has flexibility in construction scheduling. The CRS does not have to be at all active areas of construction at the same time. In order to ensure that an impact can be mitigated to less than significant, the individual on site needs to have the ability to stop construction when a discovery is made, not at a later point in time when the CRS has been contacted and informed about the discovery. This condition has been used with these provisions for over four years and has been effective in minimizing impacts to resources.

**CUL-8** requires copies of documents to be provided to the Energy Commission so that the Commission is assured that the requirements of all federal laws have been met.

**CUL-9** requires that cultural resource surveys are completed in transmission tower locations L13, L14, and SB2 prior to ground disturbing activities. If archeological sites or human remains are identified, then mitigation measures would need to be determined if the archeological sites or human remains can not be avoided.

**CUL-10** requires the completion of an ethnographic study to complete the identification of resources that would be impacted by the proposed project.

**CUL-11** is a condition recommended for adoption for Imperial County that requires that the Obsidian Butte Lithic Scatter is either fenced as a "Do not enter" area or that data recovery is completed prior to ground disturbing activities in the area of the Obsidian Butte Lithic Scatter.

## RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA

### IMPERIAL COUNTY PLANNING/BUILDING DEPARTMENT-LETTER DATED MAY 5, 2003

**ICP/B (5-05-03) 10:** *The PSA indicates that there is a significant cultural resource at Obsidian Butte. The property is owned by the Imperial Irrigation District and has been used as a "borrow pit" for many years by the District. The removal of aggregate from this site over the years has more than likely destroyed any cultural or historical evidence of prehistoric resources that may have been on this site.*

**Response:** While a portion of the south and east slopes of the dome and areas around the base of the dome to the south and east have been quarried for fill and berm material, the majority of the dome and the flows containing obsidian around the dome remain intact. The obsidian procurement and reduction areas used by prehistoric Native Americans are located in these flow areas. One of these areas (the "Obsidian Butte Lithic Scatter") has been recorded near the proposed pipeline route for this project. Thus, Obsidian Butte retains sufficient integrity to be eligible for the CRHR.

**ICP/B (5-05-03) 11:** *The County staff does not agree that a significant cultural resource will be destroyed or impacted from any future power plant sited to the south of Obsidian Butte.*

**Response:** Obsidian Butte meets the eligibility requirements for the California Register of Historical Resources because it has the potential to yield information important in prehistory (criterion a). Impacts to one of the activity areas (the "Obsidian Butte Lithic Scatter") within Obsidian Butte would occur. The impact can be reduced to less than significant with implementation of the appropriate mitigation measures.

**ICP/B (5-05-03) 12**: *The county recommends that the need for a Native American review of Obsidian Butte in order to discover Native American artifacts is unnecessary and that the proponent not be required to perform such a study due to the above reasons.*

**Response:** It is Energy Commission policy to consult with Native American groups. The purpose is not to discover Native American artifacts, but to assist in identifying cultural resources and to ascertain whether cultural resources important to the Native American groups and individuals exist in the project area that could be impacted as a result of the project.

## NATIVE AMERICAN COMMENTS

Several letters (Augustine Band of Cahuilla Mission Indians, dated June 17, 2003, Ramona Band of Cahuilla Mission Indians, dated June 26, 2003, Carmen Lucas, dated June 21, 2003) were received and numerous verbal comments were provided by Native American tribes and individuals (CEC 2003f). Although the comments were not specific to the PSA, they are pertinent to the identified resources, impacts and mitigation.

Concerns were expressed about the impacts to Obsidian Butte both as a source of raw stone material used for traditional purposes, and for its importance in the creation story for the Kumeyaay and the Quechan. The following were requested:

1. A Native American monitor be on site during ground breaking activities,
2. An ethnographic study of the project area be completed, focusing on the importance of Obsidian Butte,
3. Either avoid the "Obsidian Butte Lithic Scatter" or conduct data recovery prior to disturbance,
4. Preserve/protect portions of Obsidian Butte, and
5. Restore Obsidian Butte.

**Response:**

1. Condition of certification **Cul-6** requires that a Native American monitor be obtained to monitor ground disturbance in areas where Native American artifacts may be discovered or disturbed.
2. Condition of certification **Cul-10** requires the project owner to obtain the services of a qualified cultural anthropologist to prepare an ethnographic study of the project area focusing on the importance of Obsidian Butte. The applicant indicated that at this time they would not object to completing this study (Raemy 2003, personal communication).
3. The wells and brine pipelines are not regulated by the Energy Commission. Energy Commission staff recommends to Imperial County that they adopt Condition of certification **Cul-11** that requires either avoidance of the "Obsidian Butte Lithic Scatter" or data recovery prior to ground disturbance.
4. Although the construction of the project will diminish some of the aspects of integrity of important portions of Obsidian Butte, preservation or protection of these portions is outside the scope of the project. The property is not owned by the applicant and to require the applicant to provide protection and to preserve a resource that is not on their property or under their control would not be appropriate. Staff encourages Native Americans to work with Imperial Irrigation District to provide some protection to this resource. Staff also encourages Native Americans to work with Imperial County to determine if Obsidian Butte qualifies as a significant cultural resource that

could receive some protection under the goals of the Imperial County General Plan Land Use Element.

5. The restoration of Obsidian Butte is also beyond the scope of the project. Staff understands the importance of Obsidian Butte to Native Americans, but the butte is not owned by the applicant or under the control of the applicant. Staff encourages Native Americans to work with the land owner and Imperial County to establish the significance of the resource and determine the feasibility of restoration of the butte.

## CONCLUSIONS AND RECOMMENDATIONS

The Obsidian Butte Lithic Scatter could be impacted by construction of a pipeline and access road. Changes to the setting, feeling, and association of Obsidian Butte, a potentially eligible Traditional Cultural Place, would occur with the construction of the pipeline and widening of the access road. Staff recommends that the commission adopt the following proposed conditions of certification which incorporate all necessary mitigation measures to reduce the impacts to less than significant. If the conditions of certification are properly implemented, the project would comply with applicable laws, ordinances, regulations, and standards for cultural resources.

## PROPOSED CONDITIONS OF CERTIFICATION

The preceding analysis and the suggested conditions of certification are based upon a review of the entire SSU6 project. Some conditions of certification are suggested for inclusion by responsible agencies in permits for their exclusive jurisdictional areas. Energy Commission staff would provide technical assistance to other jurisdictions if requested.

## ENERGY COMMISSION CONDITIONS OF CERTIFICATION

The following Conditions of Certification are recommended as part of the Energy Commission license for the project.

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

**CULTURAL RESOURCES SPECIALIST**

The resume for the CRS and alternate(s) shall include information demonstrating that the minimum qualifications specified in the U.S. Secretary of Interior Guidelines, as published in the Code of Federal Regulations, 36 CFR Part 61 are met. In addition, the CRS shall have the following qualifications:

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

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

**CULTURAL RESOURCES MONITOR**

CRMs shall have the following qualifications:

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

**CULTURAL RESOURCES TECHNICAL SPECIALISTS**

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

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

At least 10 days prior to a termination or release of the CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval.

At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resource monitoring required by this condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the

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

At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources conditions of certification.

**CUL-2** Prior to the start of ground disturbance, the project owner shall provide the CRS and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting individual artifacts. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review submittals and in consultation with the CRS approve those that are appropriate for use in cultural resources planning activities.

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

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

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

**Verification:** The project owner shall submit the subject maps and drawings at least 40 days prior to the start of ground disturbance. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

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

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

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

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

**CUL-3** Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by the CRS, to the CPM for approval. The CRMMP shall identify general and

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

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

1. A proposed general research design that includes a discussion of research questions and testable hypotheses applicable to the project area. A refined research design will be prepared for any resource where data recovery is required.
2. The following statement shall be added to the Introduction: Any discussion, summary, or paraphrasing of the conditions in this CRMMP is intended as general guidance and as an aid to the user in understanding the conditions and their implementation. If there appears to be a discrepancy between the conditions and the way in which they have been summarized, described, or interpreted in the CRMMP, the conditions, as written in the Final Decision, supercede any interpretation of the conditions in the CRMMP. (The Cultural Resources Conditions of Certification are attached as an appendix to this CRMMP.)
3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during ground disturbance, construction, and post-construction analysis phases of the project.
4. Identification of the person(s) expected to perform each of the tasks, their responsibilities; and the reporting relationships between project construction management and the mitigation and monitoring team.
5. A discussion of the inclusion of Native American observers or monitors, the procedures to be used to select them, and their role and responsibilities.
6. A discussion of all avoidance measures (such as flagging or fencing), to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during construction and/or operation, and identification of areas where these measures are to be implemented. The discussion shall address how these measures would be implemented prior to the start of construction and how long they would be needed to protect the resources from project-related effects.
7. A discussion of the requirement that all cultural resources encountered shall be recorded on a DPR form 523 and mapped (may include photos). In addition, all archaeological materials collected as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with The State Historical Resources Commission's "Guidelines for the Curation of Archaeological Collections," into a retrievable storage collection in a public repository or museum. The public repository or museum must meet the standards and requirements for the

curation of cultural resources set forth at Title 36 of the Federal Code of Regulations, Part 79.

8. A discussion of any requirements, specifications, or funding needed for curation of the materials to be delivered for curation and how requirements, specifications and funding shall be met. If archaeological materials are to be curated, the name and phone number of the contact person at the institution. This shall include information indicating that the project owner will pay all curation fees and state that any agreements concerning curation will be retained and available for audit for the life of the project.
9. A discussion of the availability and the designated specialist's access to equipment and supplies necessary for site mapping, photographing, and recovering any cultural resource materials encountered during construction.
10. A discussion of the proposed Cultural Resource Report (CRR) which shall be prepared according to Archaeological Resource Management Report (ARMR) Guidelines.

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

**CUL-4** The project owner shall submit the Cultural Resources Report (CRR) to the CPM for approval. The CRR shall be written by the CRS and shall be provided in the ARMR format. The CRR shall report on all field activities including dates, times and locations, findings, samplings and analysis. All survey reports, Department of Parks and Recreation (DPR) 523 forms and additional research reports not previously submitted to the California Historic Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as an appendix to the CRR.

**Verification:** The project owner shall submit the subject CRR within 90 days after completion of ground disturbance (including landscaping). Within 10 days after CPM approval, the project owner shall provide documentation to the CPM that copies of the CRR have been provided to the SHPO, the CHRIS and the curating institution (if archaeological materials were collected).

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

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;

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

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

**Verification:** The project owner shall provide in the Monthly Compliance Report the WEAP Certification of Completion form of persons who have completed the training in the prior month and a running total of all persons who have completed training to date.

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

CRMs shall keep a daily log of any monitoring or cultural resource activities and the CRS shall prepare a weekly summary report on the progress or status of cultural resources-related activities. The CRS may informally discuss cultural resource monitoring and mitigation activities with Energy Commission technical staff.

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

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

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts may be discovered or disturbed. Informational lists of concerned Native Americans and Guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area to be monitored.

**Verification:** During the ground disturbance phases of the project, if the CRS wishes to reduce the level of monitoring occurring at the project, a letter or e-mail identifying the area(s) where the CRS recommends the reduction and justifying the reductions in monitoring shall be submitted to the CPM for review and approval. Documentation justifying a reduced level of monitoring shall be submitted to the CPM at least 24 hours prior to the date of planned reduction in monitoring.

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

Within 24 hours of recognition of a non-compliance issue with the conditions of certification and/or applicable LORS, the CRS and the project owner shall notify the CPM by telephone of the problem and of steps being taken to resolve the problem. The telephone call shall be followed by an e-mail or fax detailing the non-compliance issue and the measures necessary to achieve resolution of the issue. Daily logs shall include forms detailing any instances of non-compliance. In the event of any non-compliance issue, a report written no sooner than two weeks after resolution of the issue that describes the issue, resolution of the issue and the effectiveness or the resolution measures, shall be provided in the next MCR.

One week prior to ground disturbance in areas where there is a potential to disturb or discover Native American artifacts, the project owner shall send notification to the CPM identifying the person(s) retained to conduct Native American monitoring. The project owner shall also provide a plan identifying the proposed monitoring schedule and information explaining how Native Americans who wish to provide comments will be allowed to comment. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor.

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

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

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

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

**CUL-8** If a federal action requires Section 106 Compliance, the project owner shall ensure that a copy of the right of way grant and copies of correspondence from the Bureau of Land Management (BLM) to the project owner are provided to the CPM.

**Verification:** Within two weeks of the granting of the right of way by the BLM, copies of the right of way grant shall be provided to the CPM. Within two weeks of the project owner receiving correspondence from the BLM regarding the right of way, the project owner shall provide copies of the correspondence to the CPM.

**CUL-9** Prior to ground disturbance in the affected locations, the project owner shall ensure that a cultural resources survey is completed for proposed transmission tower locations L13, L14, and SB2 and any additional laydown or construction areas, or access roads that are necessary for construction of these transmission towers. The survey shall extend to 50 feet on each side of the center line of proposed linear facilities and shall include a 100 foot circumference around the proposed transmission tower locations.

If archeological deposits or human remains are identified within any of these areas, the project owner shall provide plans that ensure the archaeological deposit or human remains are avoided. If the location of the transmission towers, laydown or construction areas or access roads can not be modified to avoid archeological deposits, then the project owner shall determine whether the deposits are eligible for the CRHR and shall provide a report evaluating the deposit to the CPM for review and approval. If an eligible archeological deposit or human remains are identified in any of these areas, the project owner shall develop and implement prior to ground disturbance, mitigation measures approved by the CPM.

**Verification:** At least 30 days prior to ground disturbance in the area of L13, L14, and SB2 or any associated laydown or construction areas or access roads, the project owner shall submit a cultural resource survey report for the transmission towers and ancillary areas to the CPM for review and approval. If any archeological deposits are identified and the locations of the towers and ancillary areas, then an evaluation report shall be submitted to the CPM for review and approval. If an eligible archeological deposit or human remains are identified in any of these areas, the project owner shall develop and implement CPM approved mitigation measures, prior to ground disturbance.

**CUL-10** The project owner shall ensure that a cultural anthropologist meeting the Secretary of Interior's Standards prepares a study of the ethnographic area that contains the Salton Sea Unit 6 Project for review and approval by the CPM. After permitting, the project owner shall provide a Scope of Work (SOW) to the CPM identifying aspects of the ethnographic study for review and approval. The SOW may identify additional individuals or groups that shall be included in the consultation. The scope of the study will focus on the area of the project with an emphasis on Obsidian Butte. Consultation shall be with the Cahuilla, Fort Mohave, and Quechan Tribes and other interested groups as identified through the consultation with the Native American Heritage Commission. The report shall also provide a cultural background documenting the importance of Obsidian Butte, a record of the resource including boundaries, and recommendations for eligibility for the CRHR and management of the resource, if applicable. Following the start of commercial operation of the power plant, the project owner shall provide a draft copy of the ethnographic study to the CPM for review and approval. The draft will be considered final upon CPM approval. Copies of the final ethnographic study shall be submitted to the CPM and other institutions agreed to by the involved Native American groups.

**Verification:** No later than 30 days after the start of ground disturbance, a copy of the SOW of the ethnographic study shall be submitted to the CPM for review and approval.

Within six months following the start of commercial operation of the power plant, the project owner shall provide a copy of the ethnographic study of the project area (with request for confidentiality, if needed), along with any associated maps, to the CPM for review and approval.

## RECOMMENDED CONDITIONS OF CERTIFICATION FOR IMPERIAL COUNTY

As stated earlier, other agencies have permitting jurisdiction over certain aspects of the project. This analysis finds that Imperial County actions have potential for protecting cultural resources and reducing impacts through their actions. Many of the proposed conditions of certification from this analysis have potential applicability to the Imperial County permits as can be seen in Table 4 but **CUL-11** relates exclusively to the portion of the project subject to the jurisdiction of Imperial County. Staff recommends incorporation of this condition into the County's project-related permits:

**CUL-11** Prior to ground disturbing activities in the area of the Obsidian Butte Lithic Scatter, a protective fence shall be erected between the Obsidian Butte Lithic Scatter and the construction area. The fenced area shall be designated as a

"Do not enter" area. The fence shall be constructed a minimum of 25 feet outside the recorded boundary of the Obsidian Butte Lithic Scatter. During the periods of ground disturbance and construction in this area, the CRS or CRM shall inspect the area to ensure that the fence is maintained in good condition and that no ground disturbing activities occur within the area designated as "Do not enter".

If the Obsidian Butte Lithic Scatter can not be avoided, prior to any ground disturbing activities within the recorded boundaries of the Obsidian Butte Lithic Scatter, the project owner shall ensure that details of the proposed data recovery program are included in the CRMMP or as an addendum to the CRMMP and provided to the Imperial County Planning Department for review and approval and a copy shall be provided to the CPM. The data recovery program shall be implemented and completed prior to ground disturbing activities in the recorded area of the Obsidian Butte Lithic Scatter. The data recovery program shall include surface collection, testing for subsurface deposits, and systematic excavation and collection of samples of subsurface deposits sufficient to recover the information values contained in the site.

**Verification:** If the lithic scatter can not be avoided by fencing pursuant to this condition, at least thirty days prior to ground disturbing activities in the area of the Obsidian Butte Lithic Scatter, the CRMMP or and addendum to the CRMMP with details of the proposed data recovery program shall be provided to the Imperial County Planning Department for review and approval and a copy shall be provided to the CPM.

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# HAZARDOUS MATERIALS

Testimony of Geoff Lesh, P.E. and Rick Tyler

## INTRODUCTION

The purpose of this analysis is to determine if the proposed Salton Sea Unit 6 Project (SSU6) will result in the potential for a significant impact on the public as a result of the use, handling or storage of hazardous materials at the proposed facility. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce impacts to the extent feasible.

This analysis does not address potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and thus employees, in exchange for compensation, accept a higher level of risk than would be acceptable for general public exposure. Workers are therefore not afforded the same level of protection normally provided to the public. Further, workers can be provided with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials (see staff's **Worker Safety and Fire Protection** analysis).

Other hazardous materials stored in smaller quantities, such as mineral and lubricating oils, corrosion inhibitors and water conditioners, will be present at the proposed facility. However, these materials pose no significant potential for off-site impacts as a result of the quantities on site, their relatively low toxicity, and/or their low environmental mobility.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

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

### FEDERAL

The Superfund Amendments and Reauthorization Act of 1986 (Pub. L. 99-499, §301,100 Stat. 1614 [1986]), also known as SARA Title III, contains the Emergency Planning and Community Right To Know Act (EPCRA) as codified in 42 U.S.C. §11001 et seq. This Act requires that certain information about any release to the air, soil, or water of an extremely hazardous material must be reported to state and local agencies.

The Clean Air Act (CAA) of 1990 (42 U.S.C. §7401 et seq. as amended) established a nationwide emergency planning and response program and imposed reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials. The CAA section on Risk Management Plans - codified in 42 U.S.C. §112(r) - requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of the CAA are reflected in the California Health and Safety Code, section 25531 et seq.

## STATE

The California Accidental Release Prevention Program (Cal-ARP) - Health and Safety Code, section 25531 - directs facility owners storing or handling acutely hazardous materials in reportable quantities, to develop a Risk Management Plan (RMP) and submit it to appropriate local authorities, the United States Environmental Protection Agency (EPA), and the designated local Administering Agency for review and approval. The plan must include an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any pre-existing evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This new, recently developed program supersedes the California Risk Management and Prevention Plan (RMPP).

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

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

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

## LOCAL AND REGIONAL

The Uniform Fire Code (UFC) contains provisions regarding the storage and handling of hazardous materials in Articles 79 and 80. The latest revision to Article 80 was adopted in 1997 (Uniform Fire Code, 1997).

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 **Seismic Issues** section of this staff assessment.

If not for Energy Commission jurisdiction, the Imperial County Environmental Management Department would be the issuing agency for the Consolidated Hazardous Materials Permit. The permit review and mitigation authority covers hazardous

materials, hazardous waste, compressed gases and tiered treatment, and the Hazardous Materials Business Plan. In regards to seismic safety issues, the site is located in Seismic Risk Zone 4. Construction and design of buildings and vessels storing hazardous materials must conform to the 1997 Uniform Building Code, the 1998 California Building Code, and the Imperial County Building Code.

## SETTING

## SITE AND VICINITY DESCRIPTION

The project is composed of a geothermal Resource Production Facility (RPF), a Power Generation Facility (PGF), and ancillary facilities. The SSU6 project includes a high efficiency condensing steam turbine with a net plant output of 185 MW with a corresponding brine production rate of 12,815 kilopounds per hour (kph). Normally, the facility will be operated in a base load mode: 8,000 hours per year or more. The design of the RPF is based on crystallizer reactor clarifier technology (CE Obsidian Energy LLC AFC 2002), to process the brine and produce turbine-quality steam.

The RPF includes all the brine and steam handling facilities from the production wellheads, through the crystallizer/clarifier system, to the injection wellheads. It also includes a solids handling system for brine solids processing, a brine pond, steam polishing equipment designed to provide turbine-quality steam to the PGF, and appropriate steam-venting vessels to support operations during startup/shutdown and emergency conditions.

The PGF includes a condensing turbine/generator set, the gas removal and abatement systems, and the heat rejection system. The PGF also includes a 161 kV switchyard and several power-distribution centers. Common facilities include a control building, a service water pond, and other ancillary facilities.

THE PGF will include a multi-casing, triple-pressure, exhaust flow-condensing turbine. Heat rejection for the steam turbines will be accomplished with a counterflow cooling tower. The turbine generator will be nominally rated at 200 MW with a net plant capacity of 185 MW.

The SSU6 site is in the Imperial Valley, southeast of the Salton Sea. The Imperial Valley is the southwest part of the Colorado Desert that merges northwestward into the Coachella Valley near the northern shore of the Salton Sea.

The site is in a region of the Imperial Valley characterized mostly by agriculture and geothermal power production. The surrounding area is dominated by agriculture.

The town of Niland is approximately 7.5 miles northeast, and the town of Calipatria is approximately 6.1 miles southeast of the plant site. The Sonny Bono Wildlife Refuge Headquarters is approximately 4,000 feet from the plant site. The Alamo River and New River are approximately 4.8 miles southwest, and 2.7 miles east of the plant site, respectively. Nine geothermal power plants are within a 2-mile radius of the proposed plant site. Units 1, 2, 3, 4 and 5 Geothermal Power Plants are to the southeast. The

J.J. Elmore and Leathers geothermal power plants are to the northeast. Approximately 80 acres of land will be required to accommodate the plant facilities.

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 (CEOE, 2002a,). This data indicates that wind speeds below 1.5 meter per second and temperatures exceeding 100 degrees F can occur in the project area. Because the geothermal steam contains concentrations of about 3400 ppm $H_2S$, staff suggested that the applicant use 'F'-stability (stagnated air, very little mixing), 1.5 meter/second wind speed and an ambient temperature of 112 degrees 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 geothermal steam release.

## TERRAIN CHARACTERISTICS

The location of elevated terrain (terrain above the power plant stack height) is often an important factor to be considered in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The principal risk of accidental release at this facility is associated with $H_2S$ that is contained in the geothermal steam. However, modeling of an accidental release of geothermal steam (with included $H_2S$) indicates that significant concentrations of $H_2S$ would be confined to the facility property. Thus, elevated terrain is not an important factor affecting the modeled results.

## LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses (Calabrese 1978). Also, the location of the

population in the area surrounding a project site may have a large bearing on health risk. There are no schools, day care facilities, convalescent homes, or hospitals within 3 miles of the plant site. The nearest sensitive receptor location is a residence at the Sonny Bono Wildlife Refuge about 0.75 miles from the proposed facility. Only five sensitive receptors were identified within a 3-mile radius of the plant site, all residences. (CE Obsidian Energy, AFC 2002).

## IMPACTS

A variety of hazardous materials are proposed for storage and use during the construction of the project and for routine plant operation and maintenance. All hazardous materials to be used during operation of the facility are included in the AFC in Table 5.14-1 (see Appendix A). Most of these hazardous materials are stored in small quantities, such as corrosion inhibitors and water conditioners. However, these materials pose no significant potential for off-site impacts as a result of the quantities on-site, their relative toxicity, and/or their environmental mobility.

The potential threats from the other hazardous materials are not significant. In order to ensure the lack of potential for an off-site impact from these other hazardous materials, the applicant will be restricted to the use, strength, and quantity of the hazardous materials identified in the AFC (see condition of certification **HAZ-1**).

No substances are proposed to be stored on site in sufficient quantities to qualify as a regulated substance in either the Cal-ARP Program or a federal-regulated substance under Section 112(r) of the Clean Air Act. Therefore, an offsite consequence analysis is not required for any process at the proposed SSU6 Project site. Because no hazardous materials to be stored at the SSU6 Project site trigger Cal-ARP or Section 112(r) of the Clean Air Act requirements, risk management plans also may not be required for any process at the SSU6 site, unless required by local agencies having the authority to request them.

There is no potential for offsite consequences due to an accidental release of geothermal steam from either the well-head or the steam lines leading from the well-head to the facility due to the fact that the $H_2S$-concentration of the raw steam is 22 ppm, below the toxic endpoint level of 30 ppm. Any unconfined release of this source steam would only become more dilute as it mixed with air and moved downwind.

After the brine/steam is flashed before going to the steam turbine, the $H_2S$ concentration is increased because of the relatively high volatility of the $H_2S$ gas. Thus, there can be a question of the potential for impacts if this post-flash steam is accidentally released. This post-flash steam is present in the steam lines that lead to the $H_2S$ control equipment.

The applicant provided a modeling analysis of an accidental release from a geothermal steam line leading to the $H_2S$ control equipment (where the $H_2S$ concentration is highest, approximately 3400 ppm). That analysis assumed that the automatic sensing–and-shutdown systems would close-off the release within one minute. The results of that analysis indicated that there would be no impacts beyond the facility's fence line.

To address the question of whether it is reasonable to rely on automatic shutdown valves to limit the duration of a release from the post-flash steam line to one-minute duration, staff evaluated the probability that the shutdown system might fail to operate properly if ever called upon.

Failure rates (i.e.: events of spurious valve operation) have been found to be between 0.24 to 3.8 failures per million hours of operation. These data are based upon older valve designs (designed, manufactured, and put into service before 1989). Staff assumes that valves of more recent design, built using newer materials (i.e. stainless steel) would have improved failure rates.

This improvement in functional design combined with the applicants operational plans to perform a weekly test actuation of the valves to ensure they are working properly, should reduce the expected failure rate to a level at least as low as the lower end of the observed data, i.e.: 0.24 failures per million hours of operation.

I that case, to have an unmitigated pipeline rupture, there would have to be a failure of the pipeline combined with a simultaneous failure of the shut-off valve. The probability of pipeline failure is estimated by staff to be $80 \times 10^{-6}$ per year. The probability of failure of the shutoff valve is estimated by staff to be $1.4 \times 10^{-3}$ per year. The simultaneous probability of this combined event is then $1.1 \times 10^{-7}$ per year. For there to be offsite impacts, the above failure would be combined with the worst-case F-stability weather conditions which occur approximately 20% of the time. To reach offsite sensitive receptors, the prevailing wind would have to blow the plume in their particular direction (a probability of approx 0.02). The resulting combined likelihood of all these combined events is $0.5 \times 10^{-12}$, far below the CEC's diminimus criterion of $1 \times 10^{-6}$. Hence, staff concludes that this does not represent a significant risk of off-site impact.

Public safety concerns may arise from the construction and operation of a proposed project, especially with respect to the handling, transportation, and storage of hazardous materials. Therefore, the Commission examines each power plant proposal to determine if the facility is designed to ensure the safe handling and storage of these materials. (Related issues are also addressed in the **Waste Management**, **Worker Safety**, and **Traffic and Transportation** portions of this Preliminary Staff Analysis). A list of hazardous materials and a summary of special handling precautions to be used by Applicant may be found in the AFC.

## CUMULATIVE IMPACTS

Although the presence of the SSU6 will increase the amounts of hazardous materials in the local project area, the quantities present and mitigating measures proposed will result in no expected significant cumulative impacts.

## ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed Salton Sea Unit 6 power plant (please refer to **Socioeconomics** figure 1 in this staff assessment), and census 2000 information that shows the low-income population is less than fifty percent within the same radius. Based on the Hazardous Materials analysis, staff has not

identified significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore, there are no hazardous materials environmental justice issues related to this project.

## MITIGATION

Staff has determined that the proposed mitigation for the SSU6 is adequate to reduce the potential risk of public health impacts associated with hazardous materials accidents to insignificant levels.

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

## CONCLUSIONS AND RECOMMENDATIONS

Staff's evaluation of the proposed project (with staff's proposed mitigation measures) indicates that hazardous materials use will pose no potential for significant impacts on the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations and standards (LORS). In response to Health and Safety Code, section 25531 et seq., the applicant may be required to develop an RMP. The RMP, if required by the Imperial County Department of Public Health, will be submitted to EPA, the Imperial County Department of Public Health, and Energy Commission staff for evaluation. To insure adequacy of the RMP, staff's proposed conditions of certification require that the RMP, if required, be submitted for concurrent review by EPA, the Imperial County Department of Public Health -- Environmental Health Services Division, and staff. In addition, staff's proposed conditions of certification also require Imperial County’s acceptance of the RMP and staff's approval of the RMP prior to delivery of any hazardous materials to the facility. With adoption of staff's proposed conditions of certification, the project will also comply with Health and Safety Code, section 41700, and it will not pose any potential for significant impacts to the public from hazardous materials releases.

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.

## PROPOSED CONDITIONS OF CERTIFICATION

**HAZ-1** The project owner shall not use any hazardous material in any quantity or strength not listed in AFC Table 5.14-1 (see Appendix A) unless approved in advance by the CPM.

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

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

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

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HAZARDOUS MATERIAL MANAGEMENT
Appendix A

Table 5.14-1
ANTICIPATED HAZARDOUS MATERIALS FOR
PROPOSED USE AT THE OPERATIONAL SALTON SEA UNIT 6

| Material | Chemical Constituent(s) and CAS Number(s) | Storage Type | Location/ Application | Hazardous Characteristics | Maximum Quantity On Site | Regulatory Thresholds (lbs) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cal-ARP | Federal RQ | Federal TPQ | Federal TQ |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | | | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | | | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | [illegible] | | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | [illegible] | | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | | | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | | | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | [illegible] | | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | [illegible] | | |

Table 5.14-1 (continued)
ANTICIPATED HAZARDOUS MATERIALS FOR PROPOSED USF
AT THE OPERATIONAL SALTON SEA UNIT 6

| Material | Chemical Constituents and CAS Number(s) | Storage Type | Location Application | Hazardous Characteristics | Maximum Quantity On Site | Regulatory Thresholds (lbs) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cal-AHP | Federal RQ | Federal TPQ | Federal TQ |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | [illegible] | [illegible] | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | | | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | | | |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | | | |
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Table 5.14-1 (continued)
ANTICIPATED HAZARDOUS MATERIALS FOR PROPOSED USE
AT THE OPERATIONAL SALTON SEA UNIT 6

| Material | Chemical Constituent(s) and CAS Number(s) | Storage Type | Location/ Application | Hazardous Characteristics | Maximum Quantity On Site | Regulatory Thresholds (lbs) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cal-ARP | Federal RQ | Federal TPQ | Federal TQ |
| [illegible] | [illegible] | [illegible] | US Aquaculture System, Chemical Application Shed | | 1[illegible] | | | | |
| [illegible] | [illegible] | [illegible] | US Aquaculture System, Chemical Application Shed | | 1[illegible] | | | | |
| [illegible] | [illegible] | [illegible] | US Aquaculture System, Chemical Application Shed | [illegible] | 4[illegible] | | [illegible] | | |

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# LAND USE

Testimony of David Flores

## INTRODUCTION

This land use analysis of the Salton Sea Unit 6 (SSU6) focuses on two main issues: the project's consistency with local land use plans, ordinances and policies; and the project's compatibility with existing and planned land uses. In general, an electric generation project and its related facilities may be incompatible with existing and planned land uses if it creates unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts or when it unduly restricts existing or planned future uses.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

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

### FEDERAL

The United States Bureau of Land Management, California Desert Conservation Area (CDCA) Plan; amended March 1999, addresses the use of public lands in the southeast desert region. It balances the environmental, cultural, and aesthetic values of the desert and its productivity.

### LOCAL

### County of Imperial

#### Imperial County General Plan

Under California State planning law, each incorporated City and County must adopt a comprehensive, long-term General Plan that governs the physical development of all lands under its jurisdiction. The general plan is a broadly scoped planning document and defines large-scale planned development patterns over a relatively long timeframe.

The General Plan consists of a statement of development policies and must include a diagram and text setting forth the objectives, principles, standards and proposals of the document. At a minimum, a General Plan has seven mandatory elements including Land Use; Circulation; Housing; Conservation; Open Space; Noise and Safety.

Imperial County administers the State required general plan as a group of documents organized by geographic areas and subject matter and has included an optional Geothermal and Transmission element in its Plan (Government Code, § 65301 & § 65303). **LAND USE Figure 1** shows the general plan designations in the area of the proposed project site.

### *Land Use Element*

The Land Use Element addresses the types and locations of land uses (e.g., residential, industrial, commercial, infrastructure such as roads, wastewater treatment, and utility facilities) that the County Supervisors consider appropriate for the long-range outlook of the General Plan.

### *Geothermal and Transmission Element*

The Geothermal/Transmission Element, amended in 1993 provides the latest knowledge about local geothermal resources, current development, and transmission of geothermal energy. It also provides a framework for review and approval of geothermal projects in the County.

### Imperial County Land Use Ordinance

The Imperial County Land Use Ordinance (Title 17 of the Imperial County General Code) establishes land use zones in the unincorporated area. In each specific land use zone, the types of development, dimensions for buildings, and open spaces are regulated for the purpose of implementing the general plan of the county. The purposes of these regulations are protecting existing development, encouraging beneficial new development, and preventing overcrowding and congestion. **LAND USE Figure 2** shows the zoning designations in the area of the proposed project site.

## Other Applicable County Policies and Ordinances

### Imperial County Encroachment Permit

Division 1, Chapter 6, Section 90106.00 of the Imperial County Land Use Ordinance requires a written permit for construction of any facility below the minus 227-foot contour along any portion of the Salton Sea. This permit would need to be secured if the County was the permitting agency for the project. In this instance with the Energy Commission being the permitting agency, staff worked with the Imperial County Planning/Building Department staff to incorporate the conditions that it would normally impose. See the Traffic and Transportation section of the AFC for County requirements.

### Development Permit

Imperial County Land Use Ordinance Title 9, Division 16, Chapter 4 requires development permits for special flood hazard areas. Chapter 3, Section 91603.00 establishes this requirement for all areas of special flood hazards (including lands located at or near the Salton Sea and lying at or below the -200 foot elevation contour). The County determined that this permit would be applicable if it was the lead agency. See the Soils and Water section of the FSA for County requirements.

## SETTING

## SITE AND VICINITY DESCRIPTION

The proposed Salton Sea Unit 6 (SSU6) is to be built on a 80-acre portion of an approximately 160-acre parcel located within the block bounded by McKendry Road on the north, Boyle Road on the east, Severe Road on the west, and Peterson Road on the south. The site is 228 feet below sea level, located approximately 7 miles west of State Highway 111 and 10 miles north of State Highway 86.

The parcel is currently being used for row crops and is surrounded by agriculture. The town of Niland is approximately 7.5 miles northeast, and the town of Calipatria is approximately 6.1 miles southeast of the plant site. The Sonny Bono Wildlife Refuge Headquarters is approximately 4,000 feet from the plant site. Nine geothermal power plants are within a 2-mile radius of the proposed plant site. Units 1, 2, 3, 4 and 5 Geothermal Power Plants lie to the southwest, while the Vulcan and Hoch geothermal power plants are to the east. The Elmore and Leathers facilities are to the northwest of the project site.

## SURROUNDING LAND USES

Land uses surrounding the site include large parcel agriculture, open space and recreational uses. Specific surrounding uses are described as follows:

- North: Immediately north of the project site are open space/recreation uses such as fishing and bird viewing (i.e., the Refuge) and a small parking area where Production Well Pad OB2 would be placed. In addition, a residence and office associated with the Refuge is approximately 4,000 feet northeast of the project site. The Salton Sea is north of the open space/ recreational area.
- South: Agricultural land.
- East: Agricultural land.
- West: The Sonny Bono Wildlife Refuge Center/open space.

Other uses in the vicinity of the site include residential, commercial developments, and agriculturally related facilities in the community of Calipatria. The Calipatria State Prison is located east of the community, approximately 7.5 miles from the SSU6 site.

Row crop agriculture exists along the project's electric transmission line route from the project site to the Bannister substation.

The production and injection supply line for the project would cross: irrigated agricultural land, open space/recreational, and industrial areas.

## PROJECT FEATURES

### GENERATING FACILITY

The SSU6 project generating facility would consist of a 185 MW power plant, utilizing steam extracted from hot geothermal brine to drive the turbine and generator unit. Approximately 80-acres of land will be required to accommodate the plant facilities, which are comprised of:

- Turbine/generator area
- Resource Production Facility separator/crystallizer/scrubber/brine clarification area
- Electrical/control building area
- Cooling towers
- Filter press area
- Electrical switchyard
- Brine ponds
- Service water pond
- Stormwater detention pond
- Emissions control equipment area
- Parking area

On the plant site there is an access road for fire equipment and facility maintenance.

In addition to the above features of the generating facility, the overall project requires construction of eight production well/pad sites, and associated production/injection well pipelines which would be located above ground. These secondary features are discussed in the **IMPACTS** section.

### IMPERIAL IRRIGATION DISTRICT (IID) MIDWAY TRANSMISSION INTERCONNECTION

The linear facilities for the project would include a new 16-mile single-circuit 161-kV transmission line set on approximately 85 new steel transmission poles, with a span of approximately 1,000 feet between poles. The transmission line will generally run along Hoober Road going east to the Midway Substation. Existing land uses within 0.5 miles of the IID Midway Interconnection include agricultural, industrial, residential and open space.

The Calipatria State Prison is located on both the north and south sides of Hoober Road. The IID Midway line would run along Hoober Road in an established right-of-way, with no entry into the prison facility.

### L- LINE TRANSMISSION INTERCONNECTION

The SSU6 project will also require the L-Line Interconnection which would be a new 15-mile single-circuit 161-kV transmission line that would include the placement of

approximately 79 new steel transmission poles, with a span of approximately 1,000 feet between poles. This interconnection will tie in to the Imperial Irrigation District's existing line west of the SSU6 plant site. The interconnection line continues approximately 12 miles south along Lack Road and west along Bannister Road, to a new proposed switchyard west of Highway 86. A double circuit line then crosses approximately 2.8 miles of land administered by the BLM to loop into the L-Line southwest of the Bannister/Highway 86 intersection.

If not within a designated corridor, then a CDCA Plan Amendment would be required. The portion of the L-Line that runs through BLM land would not be located within a designated corridor. A condition of certification requirement (**LAND-7**) has been prepared to insure that the applicant secures the necessary right-of-way requirements from BLM through an amendment to the CDCA Plan. This process has been initiated by BLM (BLM 2003).

Existing land uses within 0.5 miles of the transmission route includes agricultural, residential, Highway 86 and open space/recreational and residences.

## ALTERNATIVE TRANSMISSION LINE ROUTE

The applicant has identified an alternative route segment for the L-Line Interconnection. The alternative would avoid use of a 2.8-mile segment running through Bureau of Land Management (BLM) land, through use of a route along State Highway 86 for approximately 7.5 miles to the intersection of State Highway 86 and the L-Line. Existing land uses along this route include agricultural, residential, open space, and State Highway 86.

## WELLS AND WELL PADS

Extraction and injection of the fluids required for plant operation would be provided via 10 new geothermal wells on 5 well pads and seven brine injection wells on three well pads. The well pads are west, north, and south of the SSU6 site. Except for one production well pad, all well pads are adjacent to existing roads. The pad not adjacent to an existing road (OB3) would require construction of a permanent access road. **LAND USE Figure 3** shows the well and pad locations.

The General Plan land use designation for Production Well Pads OB-2 and OB-3 is Recreation/Open Space, while other pads are designated for Agriculture. Well pads OB-1 through OB-3 are zoned Open Space/GOZ (Geothermal Overlay Zone), and well pads OB-2 through OB-5 are zoned Heavy Agriculture/GOZ. Existing land uses within 0.5 miles of the proposed well pad locations include agricultural, open space/recreational and industrial.

## PRODUCTION AND INJECTION PIPELINES

Both production and injection fluid processes associated with the SSU6 facility would require the use of above ground transmission pipelines from the production well pads to the project site, as well as to the injection well pads. The proposed pipeline routes are parallel and adjacent to existing roads.

Existing land uses within 0.5 miles of the production and injection well pipelines include agricultural, open space/recreational, and industrial. Land use designations and zoning for the pipelines are similar to the associated well pads described in the well pad section above.

## WATER SUPPLY PIPELINE

An approximate 500-foot buried 10-inch steel water supply pipeline is required to connect to the service water pond within the facility. Water will piped in directly from the existing Vail 4A laterals (gate 460) on the east side of Boyle Road, adjacent to the berm on the southeastern edge of the facility. A 25-foot right-of-way would be required for construction of the pipeline. Existing land uses within 0.5 miles of the proposed water line include agricultural areas.

## BANNISTER SWITCHING STATION

An approximate 2,500 square foot area of land owned by Imperial Irrigation District (IID) will be used for the siting of a switch yard, control house and communication tower. The site is located on Bannister Road, just west of State Route 86. Existing land uses within 0.05 miles of the switching station include scrub lands and the Safety Kleen Landfill, located approximately .75 miles west of the switching station. The site was previously used as a soils borrow area for levee construction by IID.

# IMPACTS

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

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

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

## CONFORMITY WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Public Resources Code § 25525 states that the Energy Commission shall not certify any facility when it finds "that the facility does not conform with any applicable state, local, or regional standards, ordinances, or laws, unless the [Energy] commission determines that such a facility is required for public convenience and necessity and that there are not more prudent and feasible means of achieving such public convenience and necessity. In making the determination, the commission shall consider the entire record of the proceeding, including, but not limited to the impacts of the facility on the

environment, consumer benefits, and electric system reliability. In no event shall the commission make any finding in conflict with applicable federal law or regulation."

When determining if a project is in conformance with state, local or regional ordinances or regulations, the Energy Commission typically meets and consults with applicable agencies to determine conformity and, when necessary, "to attempt to correct or eliminate any noncompliance" (§ 25523(d)(1)). The laws, ordinances, regulations, standards (LORS) and policies applicable to the project have been analyzed below to determine the extent to which the SSU6 is consistent or at variance with each requirement or standard.

## Project site

### California Land Conservation Act of 1965

The 80-acre parcel containing the site does not have a land conservation contract. Also, the property is not within a Williamson Act preserve or a Farmland Security Zone. The linear facilities do not cross Williamson Act preserve lands or a Farmland Security Zone.

### Imperial County General Plan/Land Use LORS and Policies

#### *Land Use Element*

The General Plan was amended in 1993. It reflects the values and contains the goals of the community regarding development. General Plan policies support the concept that agricultural operations can occur near geothermal development. The following General Plan Land Use policies applicable to the SSU6 project are listed below:

- **Agricultural Standards:** No land shall be removed from the Agriculture category except for annexation to a city, where needed for use by a public agency, or for geothermal purposes.
- **Industrial Standards:** Geothermal plants may be permitted as long as CUP conditions are met, subject to zoning and environmental review. Industrial Standards: Geothermal plants may be permitted as long as Condition Use Permit (CUP) conditions are met, subject to zoning and environmental review. State law provides for certification of a power plant's AFC by the Commission in lieu of any local requirements to obtain a conditional use permit. Therefore, Commission certification of the Project satisfies the County requirements. The Warren-Alquist Act imposes a general "conformity" requirement that a proposed new or modified energy facility meet the local government's zoning standards in order to grant it a license to operate (Section 25525, Warren-Alquist Act). The County of Imperial provided Commission staff with CUP conditions, which are implemented in the various technical areas of the FSA.
- **Recreational/Open Space Standards:** The Recreation/Open Space category includes areas for the conservation and managed production of mineral resources. Under the (S-1) Recreational/Open Space Zone, buildings or structures shall not exceed 35 feet (Title 9, Division 5, Chapter 18). The three well structures shall not exceed 35 feet, and will be a compatible use within this zone. These well pads, as part of the proposed project, are for the purpose of managed production of resources.

### Imperial County Zoning Ordinance

The proposed project site is within an "A-3-G" (Heavy Agricultural, Geothermal Overlay Zone) Zone (County of Imperial, 2001). Agricultural Zones or A zones are established to promote agricultural and other non-urban uses, to conserve and protect existing agricultural uses, and to provide space for and encourage such uses in places where more intensive development is not desirable or necessary for the general welfare (County Zoning Ordinance, Section 17.06.010). Public utility buildings or uses, excluding such uses as a business office, storage garage, repair shop or corporation yard, would require a conditional use permit (Item J, County Zoning Ordinance Section 17.06.060), if Imperial County was the permitting agency.

To ensure that the SSU6 conforms to the Imperial County Land Use Ordinance, staff is recommending that the Commission require the following Conditions of Certification:

- **LAND-1** regarding compliance with the design and performance standards for the A-3-G zoning classification;
- **LAND-2** regarding compliance with the County's parking standards;
- **LAND-3** regarding compliance with the County's outdoor advertising regulations applicable to any SSU6 signs erected (either temporary or permanent);
- **LAND-4** regarding the County's review and comment on descriptions of the final laydown/staging areas identified for construction of the SSU6;
- **LAND-5** regarding compliance with the County's requirements for minimum setbacks from the property line;

### Imperial County Encroachment and Development Permits

Imperial County will be requiring an encroachment permit for roadway improvements, and development permits for the 8-foot berm surrounding the project site. See the TRAFFIC and TRANSPORTATION and SOILS and WATER sections of the AFC for the applicable requirements.

## Linear Facilities

### Bureau of Land Management/California Desert Conservation Area Plan (CDCA)

The placement of transmission lines on BLM land in this region must meet requirements stipulated in the BLM's California Desert Conservation Area (CDCA) Plan. The transmission line route would cross an area identified in the CDCA as Multiple-Use Class M (Moderate Use). This class provides for a variety of present and future uses such as mining, livestock grazing, recreation, **energy**, and **utility development**. New transmission line facilities are an allowed use in the Class M areas, only within designated corridors. The BLM process requires consideration of a non-federal land option.

The BLM permit process is also discussed in the BIOLOGY section. If the applicant chooses its proposed transmission line route over the alternative, condition of certification **LAND-7** will take effect. It requires completion of the BLM right-of-way grant permit process.

**Imperial County General Plan and Zoning Ordinance**

Most of the County General Plan land use designations along the IID Midway and L-Line transmission routes, and the alternative route are agriculture, with Special Purpose Facility where the Calipatria State Prison is located, and some areas designated for geothermal. The SSU6's linear facilities would be consistent with these designations. The County's zoning classifications along the two SSU6 transmission line routes and the alternative route are generally agricultural with some areas designated open space. Transmission lines are permitted uses in these zones, and all other zones in Imperial County.

## Bannister Switching Station

The proposed switching station and communication tower is within a General Agricultural (A-2) Zoning designation. The General Plan land use designation is Agriculture. Both the zoning and General Plan designations allow switching station and communication buildings.

## COMPATIBILITY WITH EXISTING AND PLANNED LAND USES

## Project Site

The project would be constructed on an 80-acre portion of a 160-acre agriculturally designated parcel owned by the applicant.

Of the various zoning districts in the County's Zoning Ordinance, the Heavy Industrial Agriculture, Geothermal "A-3-G" zoning classification in which the project site is located, is the most appropriate zoning for a power plant, which is intended to provide for public utility facilities. Power plants are specifically listed as a compatible use in the "A-3-G" zone classification, subject to a conditional permit, which the County would process if it were the lead agency. The project complies with all of the applicable development standards (lot, and yard requirements) set forth in the Land Use Ordinance for the "A-3-G" Zone. Staff worked with the Imperial County Planning/Building Department in clarifying conditions of certification to insure compliance with local LORS.

Existing land uses in the vicinity of the site consist of large acreage agricultural lands and agricultural related operations, the Sonny Bono Salton Sea National Wildlife Refuge and existing geothermal power plant facilities. Recreational users of the Salton Sea (approximately 1,000 feet from the facility) and the Sonny Bono Salton Sea National Wildlife Refuge (approximately 2,500 feet from the facility), could be affected by air quality impacts and the visual impacts of the potential plume from the proposed facility. As travelers on State Highway 111 and 115 approximately 5 miles from the project site, McKendry Road users could be similarly affected by visual impacts of the facility. These impacts are addressed in greater detail in the AIR QUALITY and VISUAL RESOURCES sections of the PSA.

The SSU6 project's construction and operation phase would not preclude residents and other users of the recreational facilities located in Imperial County from pursuing community activities.

Staff believes that the project is consistent with: 1) the County's land use designation and zoning for the site; 2) the current development pattern for the area established by Imperial County ; 3) the General Plan and Land Use Ordinance, and; 4) the SSU6 is an allowed and compatible use for the area. Staff believes that the proposed geothermal resource development will be compatible with the surrounding agricultural operations, and the open space/recreational activities occurring at the nearby wildlife refuge. Staff believes that the existing geothermal facilities in the vicinity are compatible with surrounding uses, and SSU6 will be similar.

### Agricultural Resources Impact

The project's construction would result in the conversion of 173-acres of land classified "Prime Farmland and Farmlands of Statewide Importances[1] " by the California Department of Conservation. The 173-acres consist of the project site, production/well pad sites, and the production/injection well pipelines, which would be located above ground. Staff considers the loss and conversion of productive agricultural land to be a potentially significant impact under CEQA. In order to help offset the project-related impacts from the loss of irrigated, productive agricultural land, **LAND-6** requires that the applicant, in coordination with Imperial County: 1) mitigate for this impact by contributing funds to Imperial County for a 1:1 purchase of prime agricultural land for permanent farming use and/or easement purchases; 2) establish a local agricultural land trust or 3) contribute funds to a statewide agricultural land trust. Staff believes that with the implementation of **Condition of Certification LAND-6,** the SSU6 is compatible with existing and planned land uses in the Salton Sea area, and impacts would be less than significant.

In a letter dated May 5, 2003, Mr. Jurg Heuberger, Planning Director for Imperial County, referred to a water transfer program being considered by IID, and State and Federal water agencies. Mr. Heuberger recommended that **LAND-6** be deferred until the water transfer has occurred to avoid harming either the agricultural industry or the County's interest. In a recent discussion with the Imperial County Agricultural Commissioner's Office, the Commissioner's staff noted that the agreements between the State and Federal agencies and IID are still in the preliminary stages of discussion, and that it could be some time before an agreement is reached. CEC staff believes that **LAND-6** is the appropriate mitigation at this time to offset the loss of prime agricultural land. The lands are currently clearly irrigated, productive agricultural lands. The possibility that their status might change in the future due to the loss of irrigation water is not relevant to this environmental analysis, which CEQA requires be undertaken on the basis of the status at the time the analysis begins.

## Linear Facilities

### Disruption or Division of an Established Community

The water supply and transmission line alignments would temporarily affect land currently being used in agricultural production. The topsoil in these areas would be removed during the construction period, and temporarily converted to non-agricultural

[1] Under CEQA, conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance are considered significant environmental impacts requiring mitigation.

use by this project. Soil surface would be returned to the original grades and agricultural use upon completion of construction activities. Therefore, no existing farmlands would be permanently converted to non-agricultural use for the SSU6's water supply and transmission line facilities. The impacts would be less than significant.

The production/injection pipelines will be installed above ground and would affect land currently being used in agricultural production. The topsoil in these areas would be graded and compacted and converted to a non-agricultural use by this project. Therefore, existing farmland would be permanently converted to non-agricultural use for the SSU6's production /injection pipelines. The impacts would be significant requiring mitigation for the loss of prime agricultural land. In order to help offset the project's production/injection pipeline impacts, **LAND-6** requires that the applicant mitigate for the loss of prime farmland.

As discussed earlier in this report, both the proposed IID Midway Line transmission line route, the L-Line Interconnection, and the alternative route would be installed within dedicated right-of-ways along local roads and/or State Highway 86. They would not affect adjacent farmland activities.

## RESPONSE TO PUBLIC AND AGENCY COMMENTS

## IMPERIAL COUNTY PLANNING/BUILDING DEPARTMENT

**ICP/B (5-05-03) 1:** The county has two land conservation programs, i.e. the Williamson Act and a proposed Farmland Conservation Program. The proposed well pads and brine pipelines are easily converted back to agricultural use when the geothermal activities cease. Any mitigation for the conversion of agricultural lands within the County's "G Zone"…should be deferred to the local agency. This is particularly true in that there is a significant water transfer of agriculture to an urban area. It is the County's recommendation that the CEC …defer any mitigation of agricultural lands until after the water transfer has occurred in order not to harm either the agricultural industry or the County's interests.

Staff Response: Staff has addressed this issue under the Agricultural Resources Impacts section of this analysis.

**ICP/B (5-05-03) 2:** The County's position is that the conversion of 80-acres of farmland to a power plant site is not a significant environmental impact within the "G Overlay Zone" that permits such land uses.

Staff Response: Staff has addressed this issue under the Agricultural Resources Impacts section of this analysis.

**ICP/B (5-22-03) 5:** The Land Use Section refers to the "Zoning Ordinance", "Land Use Code", "General Code", that should globally be changed to the "Land Use Ordinance", the word "district" should not be used when it refers to a "zone" and also the "Community Development Agency" should be changed to the "County Planning/Building Department", e.g. pages 4.5-1 through 4.5-15;

Staff Response: Staff has made the necessary changes throughout the land use analysis, clarifying the appropriate reference of the county documents.

## CUMULATIVE IMPACTS

The proposed project is consistent with the County of Imperial's (County) long-range land use policies for this geothermal/industrially-designated area as expressed in the General Plan. Conformance with the General Plan is the primary consideration in determining a project's potential to contribute to adverse cumulative land use impacts. Therefore, projects that are consistent with the County's long-range land use policies are not viewed as adverse from a cumulative impact perspective. The General Plan sets forth the County's long-range vision for the physical development of the unincorporated areas, and other plans for infrastructure and public services are based on this long-range vision.

The General Plan envisions both long-term agriculture and continuation of geothermal development in the site vicinity. At this time, there are no other project proposals in the vicinity of the SSU6 project. The project is consistent with the County's long-range planning policies for geothermal development in this area, therefore cumulative land use impacts are not considered significant. Although the project will contribute to the cumulative loss of agricultural land in the County, the applicant will be mitigating for the impact of conversion of prime farmland.

The proposed project is not expected to make a significant contribution to regional impacts related to new development and growth, such as population immigration, the resultant increased demand for public services, and expansion of public infrastructure such as water pipelines to serve residential development.

## ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the Minority population is greater than fifty percent within a six-mile radius of the proposed Salton Sea Unit #6 power plant (please refer to **SOCIOECONOMICS Figure 1** in this Staff Assessment), and Census 2000 information that shows the low-income population is less than fifty percent within the same radius. Based on the land use analysis, staff has not identified significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no land use environmental justice issues related to this project.

## FACILITY CLOSURE

At some point in the future, the proposed facility would cease operation and close down. At that time, it would be necessary to ensure that closure occurs in such a way that public health and safety and the environment are protected from adverse impacts.

The planned lifetime of the SSU6 plant is estimated at thirty years. At least twelve months prior to the initiation of decommissioning, the Applicant would prepare a Facility Closure Plan for Energy Commission review and approval. This review and approval process would be public and allow participation by interested parties and other regulatory agencies.

At the time of closure, all applicable LORS would be identified and the closure plan would discuss conformance of decommissioning, restoration, and remediation activities with these LORS. All of these activities would fall under the authority of the Energy Commission.

There are at least two other circumstances under which a facility closure can occur, unexpected temporary closure and unexpected permanent closure. Staff has not identified any LORS from a land use perspective that the applicant would have to comply with in the event of unexpected temporary closure or unexpected permanent closure of the SSU6.

## CONCLUSIONS

1. Staff believes that the project is consistent with the County's land use designation and zoning for the site.
2. The applicant has met with the County to reach an mitigation agreement regarding the conversion and loss of productive agricultural land, which is a potentially significant impact.,Staff has concluded that in order to reduce the potentially significant impact to a level of insignificance under CEQA, the applicant must comply with **Condition of Certification LAND-6** in providing a mitigation fee for the loss of prime agricultural land.
3. The project would not disrupt or divide the physical arrangement of an established community. The communities of Calpatria and Niland are approximately 6 miles and 7.5 miles away respectively from the subject property.
4. The project would not preclude or unduly restrict existing or planned land uses. The project would not preclude or unduly restrict the conduct of agricultural land uses on neighboring properties.
5. With mitigation, operation of the project would not cause any significant noise, dust, public health, traffic, or visual impacts to nearby land uses, nor would the operation of the SSU6 contribute substantially to any cumulative land use impacts.

   If the project is certified, staff recommends that the Commission adopt the following proposed Conditions of Certification.

## PROPOSED CONDITIONS OF CERTIFICATION

**LAND-1** The project owner shall comply with the minimum design and performance standards for the "A-3-G" Zone set forth in the Imperial County Land Use Ordinance.

**Verification:** At least 30 days prior to the start of construction, the project owner shall submit written documentation, including evidence of review by the Imperial County Planning/Building Department that the project meets the above standards.

**LAND-2** The project owner shall comply with the parking standards established by the Imperial County Land Use Ordinance (Title 9, Division 4).

**Verification**: At least 30 days prior to start of construction, the project owner shall submit to the CPM, written documentation, including evidence of review by Imperial County Planning/Building Department that the project conforms to all applicable parking standards.

**LAND-3** The project owner shall ensure that any signs erected (either permanent or for construction only) comply with the outdoor advertising regulations established by the Imperial County Land Use Ordinance (Title 9, Division 4).

**Verification:** At least 30 days prior to start of construction, the project owner shall submit to the CPM, written documentation, including evidence of review by Imperial County, that all erected signs will conform to the Land Use Ordinance.

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

(a) Assessor's Parcel numbers;

(b) addresses;

(c) land use designations;

(d) zoning;

(e) site plan showing dimensions;

(f) owner's name and address (if leased); and,

(g) duration of lease (if leased); and, if a discretionary permit was required, copies of all discretionary and/or administrative permits necessary for site use as lay down/staging areas.

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

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

**Verification:** Thirty (30) days prior to the start of construction, the project owner shall submit a site plan showing that the project conforms to all applicable yard area requirements as set forth in the Imperial County Land Use Ordinance.

**LAND-6** The project owner shall mitigate for the loss of 173-acres at a one to one ratio for the conversion of prime farmland as classified by the California Department of Conservation, to a non-agricultural use, for the construction of the power generation facility.

**Verification:** The project owner will provide a mitigation fee payment (payment to be determined) to an Imperial County agricultural land trust, or a statewide agricultural land trust, within 30 days following the construction start, as set forth in a prepared Farmlands Mitigation Agreement.

The project owner shall provide in the Monthly Compliance Reports a discussion of any land and/or easements purchased in the preceding month by the trust with the mitigation fee money provided, and the provisions to guarantee that the land managed by the trust will be farmed in perpetuity. This discussion must include the schedule for purchasing 173 acres of prime farmland and/or easements within five years of start of construction as compensation for the 173 acres of prime farmland to be converted by the SSU6.

**LAND-7** The project owner shall provide to the CPM, copies of the BLM Right-of Way grant and Plan Amendment for the CDCA.

**Verification:** Thirty (30) days prior to the start of any project-related construction the project owner shall submit copies of the BLM right-of-way grant and documentation that a Plan Amendment for the CDCA was approved.

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CE Obsidian Energy, LLC Calipatria, California (CEOE) 2002a. Application for Certification for Salton Sea Unit 6, Geothermal Power Plant Project Volume I & II. July 26, 2002.

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California Department of Conservation (DOC), 1998. Farmland Mapping and Monitoring Program Map for Imperial County. Division of Land Resource Protection, Sacramento.

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County of Imperial, 1996. Imperial County General Plan. Imperial County Planning and Building Department.

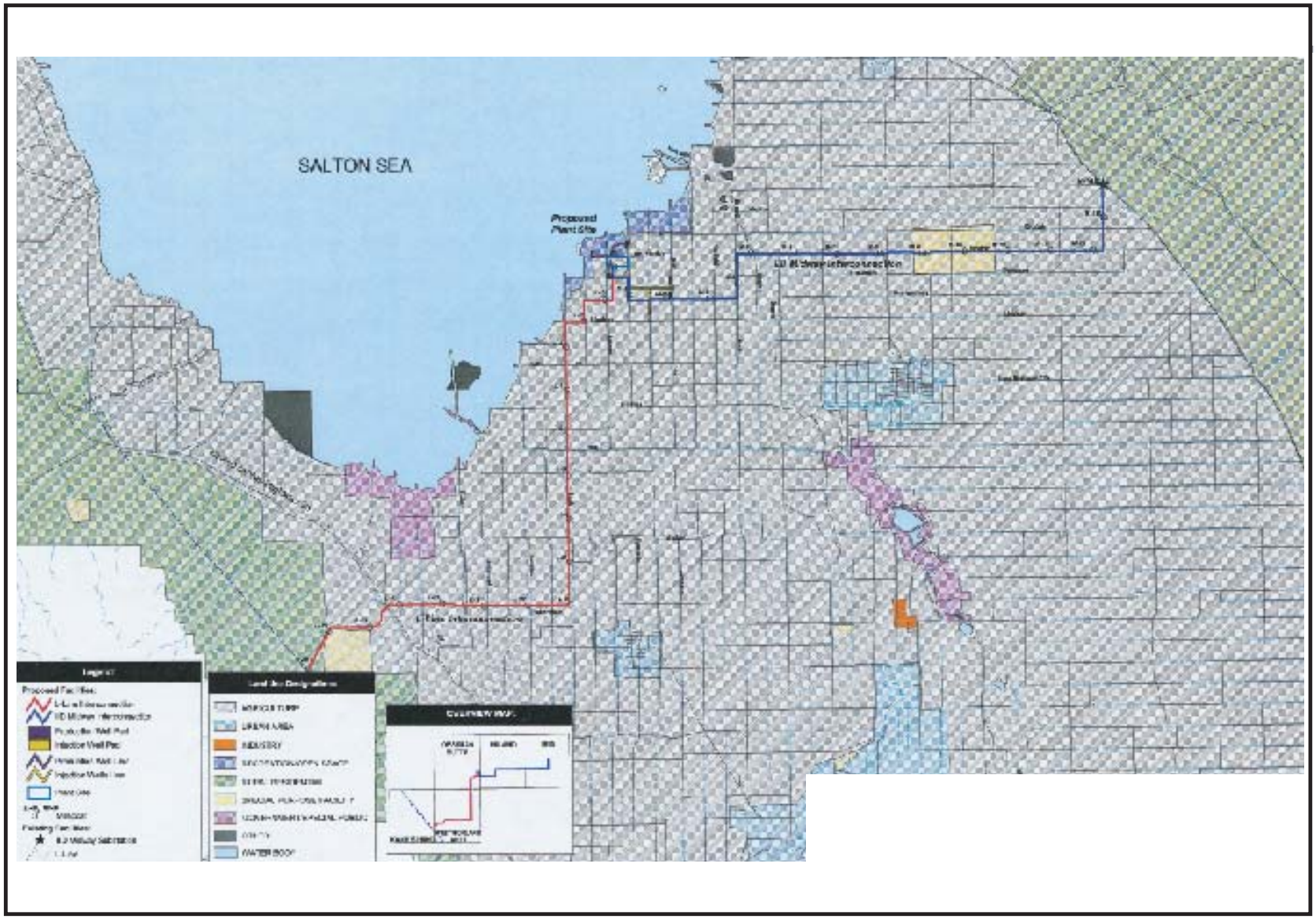
County of Imperial. 1998. Imperial County Land Use Ordinance. [online] http://www.co.imperial.ca.us/planning/planning_div/land_use_ordinance.htm

County of Imperial, Planning Division. Personal conversation with Richard Cabanilla on December 6, 2002

ICP/BD (Imperial County Planning/Building Department), El Centro, California 2003a. Comments on the Salton Sea Preliminary Staff Assessment. May 5, 2003.

**LAND USE - FIGURE 1**

Salton Sea Power Project - General Plan Land Use Map

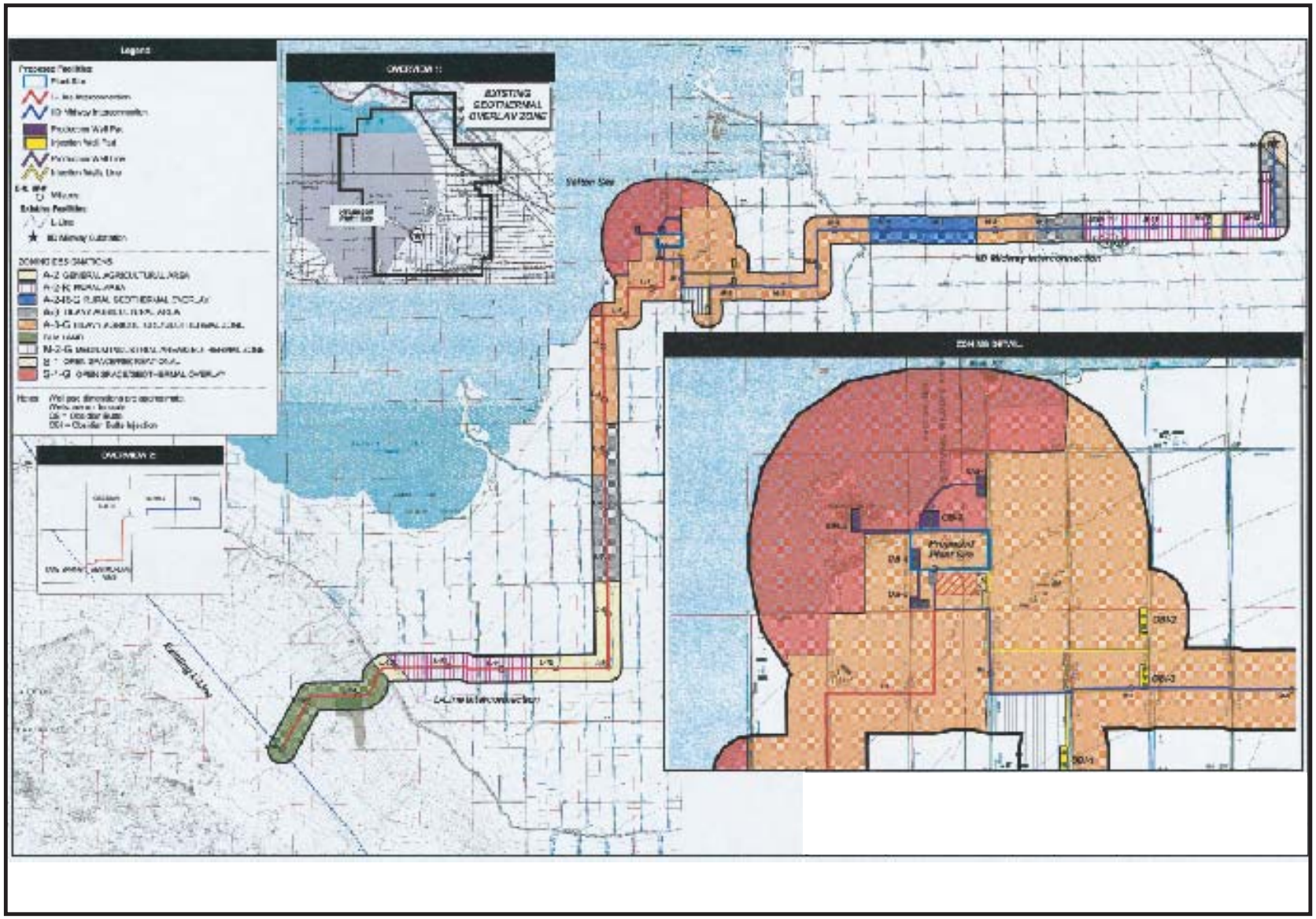



**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION,** AUGUST 2003

SOURCE: AFC Figure 5.8-4

**LAND USE - FIGURE 2**

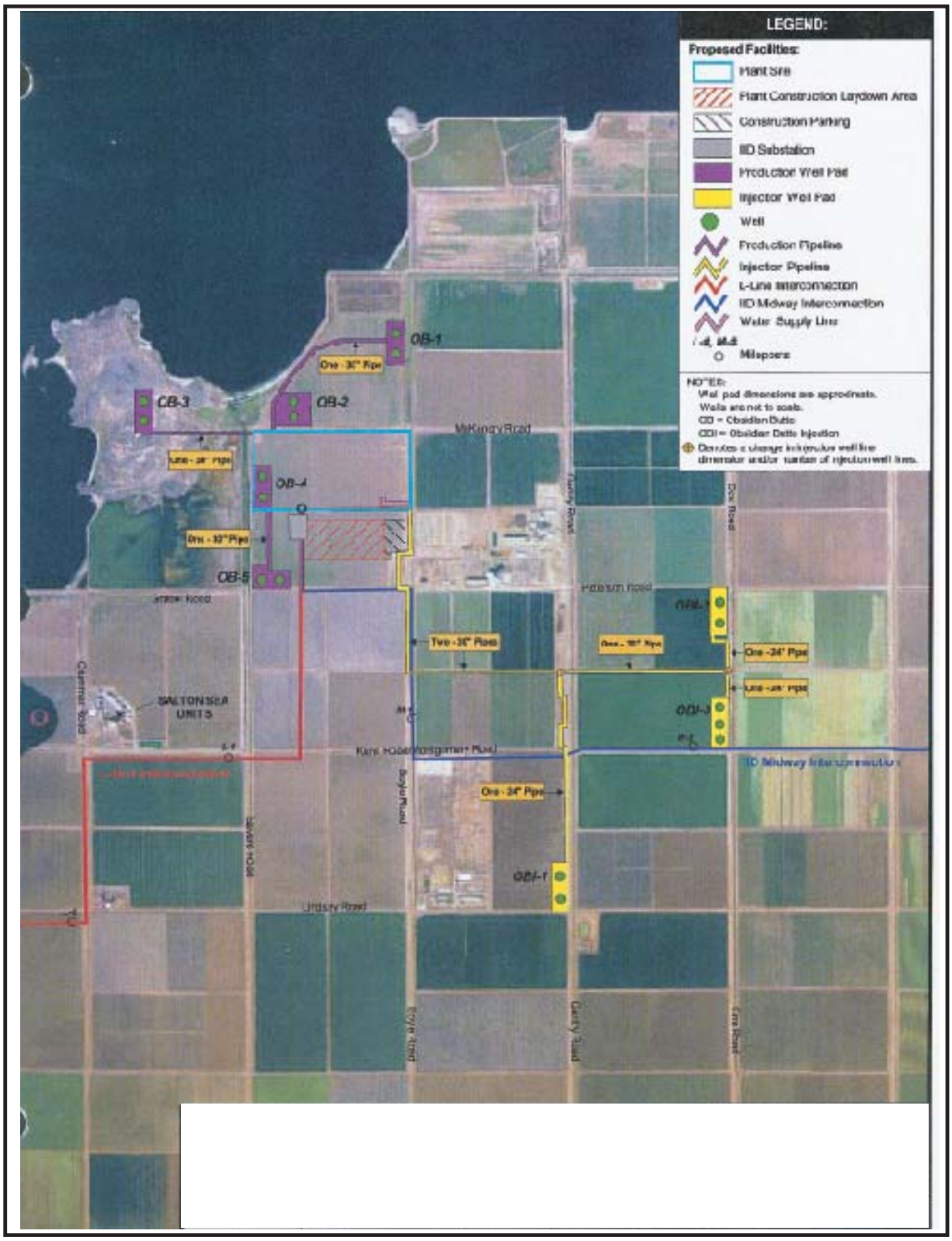
Salton Sea Power Project - Zoning Map




**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION,** AUGUST 2003

SOURCE: AFC Figure 5.8-5

**LAND USE - FIGURE 3**
Salton Sea Power Project - Well and Pad Locations




**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**
SOURCE: AFC Figure 3.1-4

# NOISE AND VIBRATION

Testimony of Steve Baker

## INTRODUCTION

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

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the Salton Sea Unit 6 (SSU6) Project, and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations, and standards (LORS). For an explanation of technical terms employed in this testimony, please refer to **NOISE Appendix A** immediately following.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

### FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **NOISE Appendix A, Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

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

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

## US Fish and Wildlife Service

The USFWS has established a level of 60 dBA $L_{eq}$ as the maximum permissible noise level to which certain riparian birds species may be subjected during the mating and nesting seasons (see **Biological Resources**).

## STATE

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

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

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

## Cal-OSHA

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

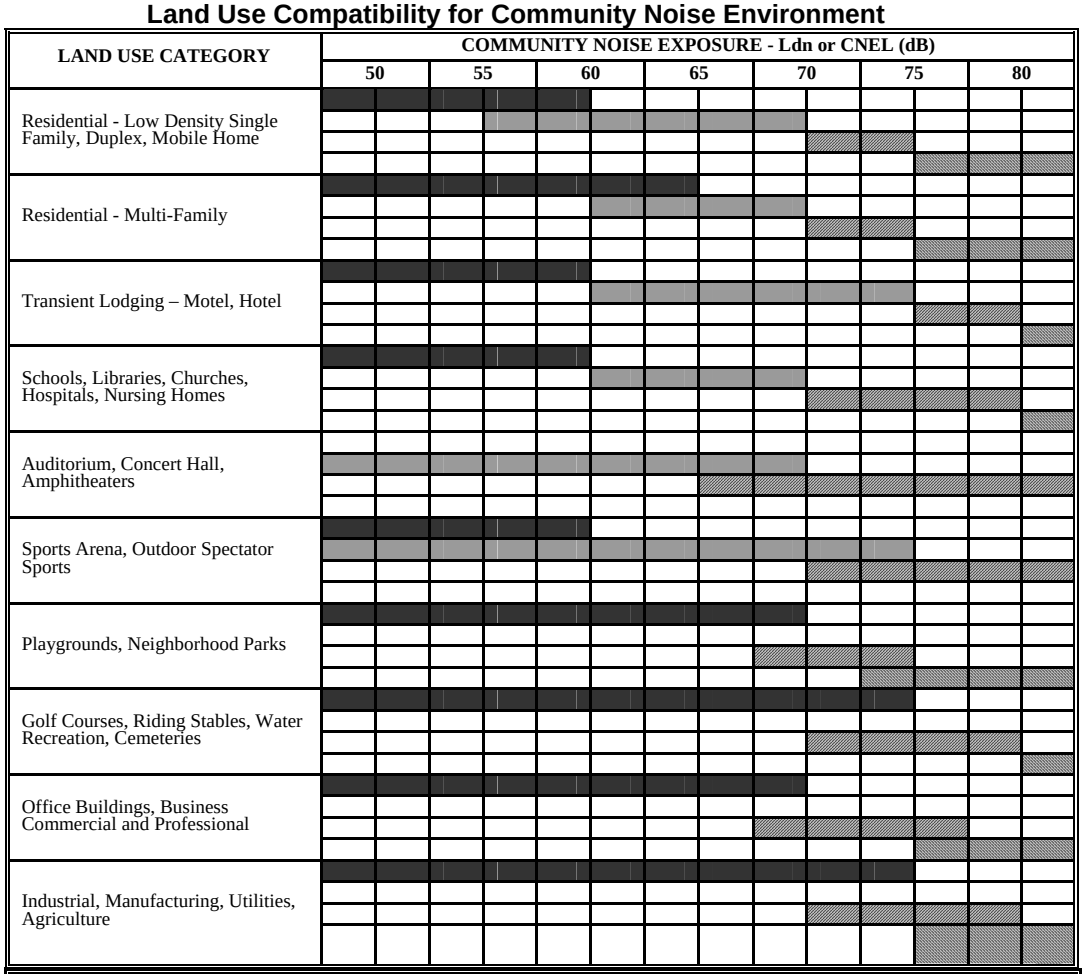
## Local

### Imperial County General Plan Noise Element

The County's General Plan Noise Element sets standards for the control of noise. The Noise Element defines "sensitive receptors" to include residences, schools, hospitals, parks and office buildings; it further states that riparian bird species may also be considered sensitive receptors (Imperial 2001, § II.C). It goes on to present Noise/Land Use Compatibility Guidelines, which can be summarized thus (Imperial 2001, Table 7):

- Residential, Hotels/Motels, Schools, Libraries, Churches, Hospitals and Nursing Homes — 60 dBA CNEL is normally acceptable
- Office Buildings, Business and Commercial — 65 dBA CNEL is normally acceptable
- Playgrounds, Parks, Golf Courses and Water Recreation — 70 dBA CNEL is normally acceptable
- Industrial, Manufacturing, Utilities and Agriculture — 70 dBA CNEL is normally acceptable

**NOISE Table 1**
**Land Use Compatibility for Community Noise Environment**




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

Objectives of the Noise Element include controlling noise at the source where feasible (Imperial 2001, § III.B, Goal 1, Objective 1.3).

The Noise Element sets property line noise limits based on the presence of a sensitive receptor on the property receiving the noise. These limits are summarized in **NOISE Table 2**.

**NOISE Table 2**
**Imperial County General Plan Property Line Noise Limits**

| Zone | Time | 1-hour Average Sound Level, dB |
|---|---|---|
| Residential | 7 a.m. to 10 p.m. | 50 |
| | 10 p.m. to 7 a.m. | 45 |
| Multi-Residential | 7 a.m. to 10 p.m. | 55 |
| | 10 p.m. to 7 a.m. | 50 |
| | 7 a.m. to 10 p.m. | 60 |
| | 10 p.m. to 7 a.m. | 55 |
| Light Industrial and Industrial Park | Anytime | 70 |
| General Industrial | Anytime | 75 |

Source: Imperial 2001, Table 9

The Noise Element further states that construction noise shall not exceed 75 dB $L_{eq}$ at the nearest sensitive receptor, averaged over eight hours. Construction equipment operation shall be limited to the hours of (Imperial 2001 § IV.C.3):

- Monday through Friday 7 a.m. to 7 p.m.
- Saturday 9 a.m. to 5 p.m.
- Sunday and Holidays Not allowed

If the noise level at a receptor, with the project complete, is within the "normally acceptable" range of the Noise/Land Use Compatibility Guidelines cited above, and the project has increased noise levels 5 dB CNEL or more, then the project is deemed to have created a potentially significant noise impact, and mitigation measures must be considered. If the noise level at a receptor, with the project complete, is above the "normally acceptable" range of the Noise/Land Use Compatibility Guidelines, and the project has increased noise levels 3 dB CNEL or more, then the project is also deemed to have created a potentially significant noise impact, and mitigation measures must be considered (Imperial 2001, § IV.C.4.a, IV.C.4.b).

The Noise Element allows the institution of required noise reduction measures either at the source of the noise, along the path of the noise from source to receptor, or at the receptor (Imperial 2001, § IV.D.8). Preference is given to reduction at the source or along the path, but in certain cases, such as there being only one receptor, reduction at the receptor is recognized as most cost effective, and therefore acceptable (Imperial 2001, § IV.D.8.c).

### Imperial County General Plan Geothermal/Transmission Element

The Geothermal/Transmission Element sets limits on noise from geothermal facilities. The maximum continuous noise level, measured at the nearest human receptor outside the parcel boundary, may not exceed 60 dBA CNEL. Further, specific limits are established for noise from geothermal well drilling operations. These limits can be summarized thus (Imperial 2001):

- Drilling noise must be limited to 60 dBA CNEL, measured as described above.

- Diesel-driven drilling equipment operated within 300 feet of any residence must have hospital-type mufflers, and well venting and testing equipment used in such locations must include an effective silencer.
- All drilling preparation work, including racking and/or making up drill pipes, must be done between 7 a.m. and 7 p.m. if within 300 feet of any residence.
- Impulsive noises, such as sudden steam venting, must be controlled by a muffler or other sound attenuating system.

If the above requirements are met, drilling may continue 24 hours per day.

**Imperial County Noise Ordinance**

The County's Noise Ordinance (Imperial 1998) establishes sound level limits, as summarized in **NOISE Table 3**:

**NOISE Table 3**
**Imperial County Noise Ordinance Sound Level Limits**

| Zone | Time of Day | Hourly Limit, dB $L_{eq}$ |
|---|---|---|
| Single Family Residential (R-1) | 7 a.m. to 10 p.m. | 50 |
| | 10 p.m. to 7 a.m. | 45 |
| All Other Residential | 7 a.m. to 10 p.m. | 55 |
| | 10 p.m. to 7 a.m. | 50 |
| Commercial | 7 a.m. to 10 p.m. | 60 |
| | 10 p.m. to 7 a.m. | 55 |
| Manufacturing, Industrial, Agricultural & Extraction | Anytime | 70 |
| General Industrial | Anytime | 75 |

Source: Imperial 1998, § 90702.00 A

## SETTING

## PROJECT BACKGROUND

The SSU6 Project involves the construction and operation of a nominal 185 MW geothermal power plant. The SSU6 Project would include ten geothermal brine production wells; seven brine reinjection wells; brine flash and treatment tanks and vessels; a 200 MW gross triple pressure steam turbine generator with condenser; a heat rejection system incorporating piping, circulating water pumps and two evaporative cooling towers; and three emergency diesel generators (CEOE 2002a, AFC §§ 1.2, 1.3.2.1, 3.1, 3.3.1, 3.3.4.1.4).

The equipment that has the greatest potential to generate significant noise levels includes the steam turbine generator, the cooling towers, and the diesel generators (CEOE 2002a, AFC § 5.11.2.2.2).

### Power Plant Site

The project site is located on the southeast side of the Salton Sea, near Obsidian Butte. The headquarters facilities of the Sonny Bono National Wildlife Refuge lie approximately

4,000 feet NE of the project site, and 2,500 feet NE of the nearest geothermal well pad. Portions of the Sonny Bono Salton Sea Wildlife Refuge (Refuge) lie within 100 feet of the NE corner of the project site, and within 250 feet of wellpads OB1 and OB2 (CEOE 2002a, AFC §§ 1.3.1, 5.11.1.2.1).

## Linear Facilities

Linear facilities included in the project would consist of:

1. two electrical transmission interconnection lines, to an existing transmission line and to the existing Midway substation, 16 and 15 miles in length respectively;
2. piping carrying geothermal brine from the 10 production wells to the power plant;
3. piping conveying spent brine from the power plant to the seven reinjection wells; and
4. a 500-foot long, 10-inch diameter pipeline conveying canal water to the power plant site for use in spent brine dilution and as potable water (CEOE 2002a, AFC §§ 1.3.2.3, 3.1, 3.2.2, 3.2.2.1, 3.3.2.1, 3.3.4.2).

# ANALYSIS

## California Environmental Quality Act

CEQA requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

a. exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;
b. exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
c. a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
d. a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying item c) above to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by five dBA $L_{90}$ or more at the nearest sensitive receptor.

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

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

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

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

1. the construction activity is temporary;
2. use of heavy equipment and noisy activities is limited to daytime hours; and
3. all industry-standard noise abatement measures are implemented for noise-producing equipment.

## EXISTING NOISE LEVELS

In order to predict the likely effects of project noise on adjacent sensitive receptors, CE Obsidian Energy LLC (CEOE, or the applicant) commissioned an ambient noise survey of the area. The survey was conducted at the power plant site and the well pad sites on Thursday, June 7, 2001, and at the residence at the Refuge headquarters on Thursday and Friday, January 10 and 11, 2002, using acceptable equipment and techniques. The survey monitored existing noise levels at the following ten locations, shown on **NOISE Figure 1**:

1. Location ML-1: At the proposed power plant site. Existing noise is chiefly due to farm equipment on nearby agricultural fields, operation of nearby geothermal power plants, traffic on Gentry Road, birds, and an irrigation pump on the NW portion of the property. Measurements here consisted of a one-hour period during the day, and another during the nighttime hours.
2. Locations ML-2 through ML-9: At each of the well pad sites. Noise sources are similar to those at ML-1. Measurements here consisted of a ten-minute period during the day.
3. Location ML-10: At the residence at the headquarters facilities of the Refuge, approximately 4,000 feet NE of the proposed power plant site and 2,500 feet NE of the nearest well pad. Measurements here consisted of 25 consecutive one-hour measurements.

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

**NOISE Table 4** summarizes the ambient noise measurements.

**NOISE Table 4**
**Summary of Measured Noise Levels**

| Measurement Sites | Measured Noise Levels, dBA | | |
|---|---|---|---|
| | Average During Measurement Period | | Community Noise Equivalent Level (CNEL) |
| | $L_{eq}$ | $L_{90}$ | |
| ML1 – Power Plant Site – Daytime | 59.6 | 58.1 | Not Applicable |
| Nighttime | 48.1 | 43.8 | |
| ML2 – Production Well Pad OB-1 | 57.2 | 51.1 | |
| ML3 – Production Well Pad OB-2 | 48.6 | 44.7 | |
| ML4 – Production Well Pad OB-3 | 45.0 | 40.7 | |
| ML5 – Production Well Pad OB-4 | 68.4 | 67.7 | |
| ML6 – Production Well Pad OB-5 | 71.9 | 71.8 | |
| ML7 – Injection Well Pad OBI-3 | 63.0 | 43.7 | |
| ML8 – Injection Well Pad OBI-2 | 52.9 | 44.9 | |
| ML9 – Injection Well Pad OBI-1 | 42.3 | 38.7 | |
| ML10 – Residence at Refuge HQ* | 41.4 | 36.3 | 52.0 |

Source: CEOE 2002a, AFC Tables 5.11-2 and 5.11-3 and staff calculations
* Averages based on four quietest hours, i.e., 2:30 to 6:30 a.m.

In general, the noise regime in the vicinity of the project site is a typical rural environment, dominated by agricultural and wildlife noises.

## IMPACTS

Noise impacts associated with the project can be created by short-term construction activities, and by normal long-term operation of the power plant.

## PROJECT SPECIFIC IMPACTS — CONSTRUCTION

### Community Effects

#### General Construction Noise

Construction noise is usually considered a temporary phenomenon. Construction of the SSU6 Project is expected to last approximately 19 to 20 months (CEOE 2002a, AFC §§ 1.4, 3.4). Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances. The County General Plan Noise Element restricts general construction work to the hours of 7 a.m. to 7 p.m. on weekdays, and 9 a.m. to 5 p.m. on Saturdays; work on Sundays and holidays is prohibited. Construction noise is further limited to 75 dB $L_{eq}$ at the nearest receptor. The General Plan Geothermal/Transmission Element sets limits on the noise that can be created by well drilling activities, but allows drilling to progress 24 hours per day.

The applicant has predicted power plant and wellhead construction noise impacts on the nearest (and most impacted) sensitive human receptor, the residence at the Refuge headquarters (noise measuring location ML-10 on **NOISE Table 4**) (CEOE 2002a, AFC § 5.11.2.2.1; Table 5.11-5). The applicant has further predicted construction noise impacts on the nearest Yuma clapper rail habitat (both on and off the Refuge) (CEOE 2002a, AFC § 5.5.2.1).

### *Power Plant Construction*

Power plant construction noise (excluding steam blows and pile driving) at the residence would vary from 41 to 56 dBA for normal work. (Steam blows and pile driving would be louder; see below). This is considerably quieter than the Noise Element limit of 75 dBA $L_{eq}$. This equals or may slightly exceed the daytime ambient $L_{eq}$ levels at this residence, which range from 45 to 56 dBA (CEOE 2002a, AFC Table 5.11-2. Such noise levels would be barely noticeable under most conditions.

Power plant construction noise (excluding steam blows and pile driving) at the nearest portions of the wildlife refuge would be greater than at the residence. The center of the project site, from which most of the power plant construction noise can be assumed to emanate, lies within 1,500 feet of a wetland north of the intersection of McKendry and Severe Roads, and within 2,500 feet of Union Pond, which is on lands managed by the Refuge.[2] The projected construction noise levels would result in levels at the wetland from 50 to 65 dBA. This is marginally within the 60 dBA limit specified by the USFWS.

### *Well Pad Development*

The residence at the Refuge headquarters is the nearest sensitive human receptor to any well pad; production well pad OB1 lies approximately 2,500 feet SW of this residence. The applicant has predicted the noise that would result from developing the wells at OB1 at 75 to 79 dBA at a distance of 100 feet (CEOE 2002a, AFC Table 5.11-5); at the residence, this would attenuate to 46 to 51 dBA. Translating this to a CNEL value yields approximately 58 dBA, which is less than the limit of 60 dBA CNEL established in the General Plan Geothermal/Transmission Element. Since this work would be short term, no significant adverse impact is expected. Should the work, in fact, prove annoying to residents at the Refuge headquarters, the noise complaint resolution process encompassed in staff's proposed Condition of Certification **NOISE-2** would be used to deal with the situation.

Wellpad OB1 lies approximately 400 feet S of Union Pond, and wellpad OB2 lies approximately 600 feet E of the wetland at McKendry and Severe Roads. The greatest impact on wildlife from well pad development would most likely be on Union Pond. The noise predicted by the applicant would result in levels at Union Pond of roughly 64 to 68 dBA. This exceeds the 60 dBA limit set by the USFWS. However, no adverse noise impacts on wildlife should occur due to wellpad development, since the applicant has committed to limiting construction on wellpads OB1, OB2 and OB3 (those nearest the Refuge) to the non-breeding season of affected species (from September through

[2] Distances estimated by staff from the AFC (CEOE 2002a) Figure 3.3-1A and AFC Appendix K, Jurisdictional Delineation Report, Figure 1.

February) (CEOE 2002a, AFC § 5.5.2.3). Energy Commission staff recommends that Imperial County include this restriction in their permitting of the well drilling work.

### Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the steam system, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale and construction debris such as weld spatter, dropped welding rods and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. High pressure steam is then allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow, is quite effective at cleaning out the steam system. At the end of this procedure, the steam line is connected to the steam turbine, which is then ready for operation. SSU6 steam blows will occur three times, each one lasting from one day to one week (CEOE 2003a, data response 231).

Such steam blows could produce noise as loud as 118 dBA at a distance of 100 feet. In order to reduce disturbance from steam blows, the applicant proposes to equip the steam blow piping with a silencer that would reduce noise levels by 44 dBA. The applicant has predicted steam blow noise levels at the nearest sensitive human receptor of 50 dBA (CEOE 2002a, AFC § 5.11.2.2.1). The ambient $L_{90}$ (background) noise level during the quietest hours of the night averages 36 dBA (see **NOISE Table 4**). The resultant 14 dBA increase due to steam blows would likely be quite annoying to the residents. The applicant therefore proposes to offer to relocate the residents during the three days' duration of the steam blows.

Another concern is steam blow noise impacts on wildlife, specifically protected bird species.[3] It has been determined that subjecting the Yuma clapper rail to noise levels above 60 dBA during mating or nesting seasons can be detrimental to this bird (see **Biological Resources**). The applicant has specifically acknowledged the need to meet this limit (CEOE 2002a, AFC Table 3.7-1, page 3-64). The applicant predicts that the silenced steam blow will subject the nearest habitat to 58 dBA (CEOE 2002a, AFC § 5.5.2.1), resulting in no significant impact.

In order to ensure minimal annoyance due to steam blows, staff proposes Conditions of Certification to limit noise from steam blows by requiring the use of a temporary silencer to achieve the noise level cited above, and to implement a notification process to make neighboring land uses aware of impending steam blows and offer to temporarily relocate them (see proposed Conditions of Certification **NOISE-4** and **NOISE-5** below, and proposed Condition of Certification **BIO-12**; see **Biological Resources**). This should ensure the process is tolerable to residents and adjacent land uses, and is not detrimental to wildlife.

[3] The Imperial County General Plan Noise Element specifically lists riparian birds as potential sensitive receptors (Imperial 2001, § II.C).

### Pile Driving

The applicant predicts that noise from pile driving at the power plant site could reach 71 dBA at the Refuge residence (CEOE 2002a, AFC § 5.11.2.2.1). Pile driving for pipe supports for the brine supply pipeline from well pad OB3 would produce noise impacts at the Refuge residence of 67 dBA (CEOE 2002a, AFC § 5.11.2.6). Noise levels at the nearest Yuma clapper rail nesting site (the wetland at McKendry and Severe Roads) may be as high as 82 dBA.

As discussed above in **Steam Blows**, subjecting the Yuma clapper rail to levels above 60 dBA during the mating and nesting season is not allowable. To avoid unacceptable impacts on this protected species, staff recommends that pile driving be performed using a quieter process, or be avoided during the mating and nesting seasons. Energy Commission staff has identified several commercially-available technologies that reduce pile driving noise by 20 to 40 dBA compared to traditional pile driving techniques. These include padded hammers, “Hush” noise attenuating enclosures, vibratory drivers, and hydraulic techniques that press the piles into the ground instead of hammering them (Eaton; Gill; Ken-Jet; Kessler & Schomer; NCT; WOMA; Yap). This could result in noise levels at the Refuge as low as 45 dBA, low enough to avoid significant disturbance of wildlife.

To ensure this protection, staff proposes Conditions of Certification **NOISE-4** and **BIO-16** (see **Biological Resources**).

### Linear Facilities

New off-site linear facilities would include two electrical interconnection lines to an existing transmission line and an existing substation, piping carrying geothermal brine from the 10 production wells to the power plant, piping conveying spent brine from the power plant to the seven reinjection wells, and a pipeline conveying canal water to the power plant site for use in spent brine dilution and as potable water.

Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than two or three days. To provide reasonable protection from undue noise, the County’s General Plan Noise Element (Imperial 2001) sets a limit for construction noise of 75 dBA (8-hour average) at the nearest sensitive receptor. The Noise Element further restricts construction to certain hours of the day and days of the week; see **NOISE Table 7**.

**NOISE Table 7**
**Restriction of Construction Hours**

| Day | Permissible Hours of Construction |
|---|---|
| Monday – Friday | 7 a.m. to 7 p.m. |
| Saturday | 9 a.m. to 5 p.m. |
| Sunday | Not Allowed |
| Holidays[4] | Not Allowed |

Source: Imperial 2001, § IV.C.3

The sensitive human receptor nearest to the geothermal brine pipelines and the canal water supply pipeline is the residence at the Refuge headquarters. The applicant predicts that noise from construction of these pipelines will reach only 51 dBA at the residence (CEOE 2002a, AFC §§ 5.11.2.6, 5.11.2.7). This is well within the 75 dBA limit described above, and is not significantly greater than the daytime ambient noise level of 45 to 56 dBA at the residence. In addition, the applicant proposes to work on these linears only during daytime hours. Staff believes that construction of these linears is unlikely to produce significant noise impacts on human receptors, and proposes Condition of Certification **NOISE-8** to ensure compliance with these limits.

The brine production pipelines from wellpads OB1, OB2 and OB3 would pass near (sometimes within 50 feet) Yuma clapper rail habitat. Their construction, including the pile driving projected to support the pipeline between the west end of McKendry Road and Obsidian Butte, would likely produce significant adverse impacts on wildlife, if conducted during the breeding season. Pile driving noise levels at the adjacent Yuma clapper rail habitat could be nearly 105 dBA. However, the applicant has committed to schedule this work to avoid the breeding season of affected species (CEOE 2002a, AFC § 5.5.2.4). Energy Commission staff recommends that Imperial County include this restriction in their permitting of the well drilling work.

The electrical transmission interconnection lines would pass near several residences. The IID Midway line would pass within one-half mile of residences along Hoober Road; noise impacts at these residences would range from 35 to 55 dBA, well below the 75 dBA limit specified in the County's Noise Element. The L-Line interconnection line would be routed within 150 feet of several residences along Lack and Bannister Roads, potentially producing intermittent noise levels at these residences from 60 to 80 dBA. Averaged over eight hours, this noise would be less than the 75 dBA limit in the Noise Element, and construction on the line would be limited to daytime hours. Staff believes that these short-term noise impacts will be tolerable to residents, and are thus less than significant. Adoption of staff's proposed Condition of Certification **NOISE-8** would ensure adherence to the above limits.

Since the transmission lines do not cross Yuma clapper rail habitat, no noise or vibration impacts on wildlife are expected from their construction.

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

### Vibration

The only linear construction operation likely to produce vibration that could be perceived off-site would be pile driving during installation of brine production pipelines. The distance to the nearest sensitive human receptor, the residence at the Refuge, is nearly half a mile. This is sufficient to ensure that pile driving vibration will be insignificant, if not imperceptible. As discussed above, impacts on wildlife would be avoided by scheduling work around breeding seasons.

## Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards, and has recognized those applicable LORS that would protect construction workers (CEOE 2002a, AFC § 5.11.2.2.2) To ensure that construction workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-3**.

# PROJECT SPECIFIC IMPACTS — OPERATION

## Community Effects

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

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

In addition, staff analyzes compliance of the projected project noise with applicable LORS, in this case, the Imperial County General Plan and Noise Ordinance.

### Power Plant Operation

During its operating life, the SSU6 Project would represent essentially a steady, continuous noise source day and night. Occasional brief increases in noise levels would occur as steam relief valves open to vent pressure, or during startup or shutdown as the plant transitions to and from steady-state operation. At other times, such as when the plant would be shut down for lack of dispatch or for maintenance, noise levels would decrease.

The primary noise sources of the project will include the steam turbine generator, the evaporative cooling towers, and, occasionally, the emergency diesel generators. The noise emanating from a power plant during normal operation is generally broadband, steady state in nature.

The applicant performed acoustical calculations to determine the project's noise impacts on sensitive receptors, and to identify any necessary mitigation measures. Calculations were based on typical manufacturer noise data for the major equipment (CEOE 2002a, AFC, § 5.11.2.2.2 and Table 5.11-4). Power pant noise at the residence at the Wildlife Refuge headquarters would not exceed 39 dBA $L_{eq}$. This represents an increase of only 3 dBA above the lowest four-hour average background noise level at the residence of 36.3 dBA $L_{90}$, a barely perceptible increase unlikely to draw complaints from residents. The applicant has asked that the project be permitted to produce noise levels at the Refuge Headquarters residence of 41 dBA, an increase of 5 dBA over the average background level; such an increase would not be likely to annoy. Staff agrees that this is a reasonable level.

For a continuous noise source such as a power plant, 41 dBA $L_{eq}$ is equivalent to 47 dBA CNEL, significantly less than the 60 dBA considered in the Noise Element Noise/Land Use Compatibility Guidelines for residential areas (Imperial 2001, Table 7), and thus in compliance with this LORS. This level of 41 dBA is also less than the nighttime residential property line noise limit of 45 dBA specified both in the Noise Element (Imperial 2001, Table 9) and in the County's Noise Ordinance (Imperial 1998, § 90702.00), thus complying with these LORS.

This same noise level, at the wildlife habitat nearest the power plant (the wetland approximately 1,500 feet NW of the power plant), would be approximately 50 dBA. This is significantly less than the 60 dBA threshold set by the USFWS, and represents an insignificant impact on wildlife.

The applicant commits to installing the emergency diesel generators in an acoustical enclosure that will control noise emanations to 70 dBA at a distance of 50 feet (CEOE 2002a, AFC § 5.11.2.2.2). This should result in noise levels at the residence of approximately 38 dBA, an inaudible level. Levels at the wetland would be about 47 dBA, an insignificant impact.

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

### Tonal and Intermittent Noises

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. Intermittent noises would include machinery whine, and steam relief valves venting during startup, shutdown or unplanned unit trips. To ensure that the plant is designed and constructed to produce no annoying tonal noises, staff proposes Condition of Certification **NOISE-6**.

### Linear Facilities

All water and brine piping will be effectively silent during operation. Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line, and will thus be inaudible to any receptors. Noise from the brine production wellheads, caused by fluid flow through the wellhead valves, will not exceed 25 dBA at the residence at the Wildlife Refuge headquarters (CEOE 2002a, AFC § 5.11.2.5); this would be inaudible to human receptors. At the habitat area nearest a wellhead (Union Pond, near wellpad OB1), the wellhead noise level would be approximately 38 dBA, of no concern.

### Vibration

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

The operating components of a geothermal power plant consist of a high-speed steam turbine, and various pumps. All of these pieces of equipment must be carefully balanced in order to operate; permissible vibration levels are typically on the order of 0.06 inches/second. The applicant calculates that, given normal attenuation through the soil, any equipment vibration would be imperceptible at a distance of 300 feet from the plant (CEOE 2002a, AFC § 5.11.2.2.2). Energy Commission staff agrees with this estimate, and agrees with the applicant that groundborne vibration from the SSU6 Project will be undetectable by any likely receptor, human or animal.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves, and can rattle the walls of lightweight structures. The applicant predicts that the SSU6 Project's airborne vibration would be imperceptible at a distance of 1,000 feet from the plant (CEOE 2002a, AFC § 5.11.2.2.2). There would thus be no impact at any likely human receptor. It is unknown what the impacts of such vibration would be on birds nesting nearby (as near as 1,500 feet), but given the low amplitude, staff believes any impact would be inconsequential.

## Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance workers from noise hazards, and has committed to comply with applicable LORS (CEOE 2002a, AFC §§ 5.11.2.2.2). The applicant would implement a comprehensive hearing conservation program in accordance with OSHA and Cal-OSHA LORS. To ensure that plant operating and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-7**.

## CUMULATIVE IMPACTS

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

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

The applicant has identified three nearby projects as potential contributors to cumulative noise impacts:

- the State Route 78/111 Expressway Project (Brawley Bypass);
- the Solar Evaporation Pond Pilot Project; and
- work performed under the IID Water Conservation and Transfer Project/Habitat Conservation Plan.

Because of the significant distances between the SSU6 Project and these other projects, and the distances to the sensitive receptor, staff believes that no cumulative noise impacts are possible.

## ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed SSU6 Project (please refer to **Socioeconomics Figure 1** in this document), and Census 2000 information that shows the low-income population is less than fifty percent within the same radius. Based on this **Noise and Vibration** analysis, staff has identified no significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no Noise and Vibration environmental justice issues related to this project.

## FACILITY CLOSURE

In the future, upon closure of the SSU6 Project, all operational noise from the project would cease, and no further adverse noise impacts from operation of the project would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment, and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction of the project, it can be treated similarly. That is, noisy work could be performed during daytime hours. Any noise LORS that were in existence at that time would apply. Applicable Conditions of Certification included in the Energy Commission Decision would also apply unless modified.

## MITIGATION AND CONDITIONS OF CERTIFICATION

Energy Commission staff, acting as the lead agency for review of power plants 50 megawatts and larger, analyze the entire proposed project and recommend conditions of certification which eliminate project impacts, or reduce them to levels of insignificance. These conditions are recommended to the Energy Commission for

inclusion in its license granted to the project owner. In a geothermal power project, certain elements are not subject to the Energy Commission license, and are reserved for action by other responsible agencies (Public Resources Code Sections 25120). The Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) retains exclusive jurisdiction over the wells and well heads, and Imperial County retains jurisdiction over the well pads and the brine pipelines. Staff recommended conditions of certification directed at the entire project may overlap these jurisdictional divisions. Staff has attempted identify these areas and indicate where proposed conditions are recommended to other responsible agencies. The following table provides a reference to specific conditions that are recommended for inclusion actions taken by Imperial County and DOGGR for the SSU6.

**Conditions of Certification Recommended to Other Agencies**

| Conditions of Certification | Imperial County | DOGGR |
|---|---|---|
| NOISE-1 | X | X |
| NOISE-2 | X | X |
| NOISE-3 | X | X |
| NOISE-4 | | |
| NOISE-5 | | |
| NOISE-6 | X | X |
| NOISE-7 | | |
| NOISE-8 | X | X |

## CONCLUSIONS AND RECOMMENDATIONS

Energy Commission staff concludes that the SSU6 Project, constructed and operated as proposed by the applicant, can be built to comply with all applicable noise laws, ordinances, regulations and standards. Staff further concludes that if the SSU6 Project is built as described above, if steam blows and pile driving are performed as required in proposed Condition of Certification **NOISE-4**, and if noisy construction and pile driving near wildlife habitat areas are not performed during mating and nesting seasons, it is not expected to produce significant adverse noise impacts. Analysis further shows that there will be no cumulative impacts with another project, and no significant direct or cumulative noise impacts to an environmental justice population.

To ensure protection of sensitive wildlife species from noise impacts, staff recommends that Imperial County limit geothermal well development work and subsequent well maintenance activities near Yuma clapper rail habitat, and pile driving associated with installation of geothermal resource pipelines, to the timeframe from September through February.

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

## PROPOSED CONDITIONS OF CERTIFICATION

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

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

### NOISE COMPLAINT PROCESS

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

- Use the Noise Complaint Resolution Form (below), or functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- If the noise is project related, take all feasible measures to reduce the noise at its source; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts; and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

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

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

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

**STEAM BLOW AND PILE DRIVING MANAGEMENT**

**NOISE-4** The project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 74 dBA measured at a distance of 100 feet. The project owner may conduct steam blows continuously, 24 hours per day, until completed.

The project owner shall utilize quiet pile driving techniques, such that noise from this operation, measured at the nearest boundary of the Sonny Bono Salton Sea Wildlife Refuge or any areas containing Yuma clapper rails, does not exceed 60 dBA $L_{eq}$. Alternatively, the project owner may schedule pile driving so that it does not occur during the mating season (from March 1 to August 31).

**Verification:** At least 15 days prior to the first steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer and the noise levels expected, and a description of the steam blow schedule.

At least 15 days prior to first pile driving, the project owner shall submit to the CPM a description of the pile driving technique to be employed, including calculations showing its projected noise impacts at the nearest boundary of the Sonny Bono Salton Sea Wildlife Refuge or any areas containing Yuma clapper rails. Alternatively, this submittal may entail a description of the pile driving schedule, demonstrating that it does not occur between March 1 and August 31.

**STEAM BLOW NOTIFICATION**

**NOISE-5** Prior to the first steam blow, the project owner shall notify the occupants of the residence at the Sonny Bono National Wildlife Refuge headquarters facility. The project owner shall offer to temporarily relocate the occupants of that residence for the duration of the steam blows, and shall perform this relocation upon their acceptance.

The notification may be in the form of a letter to the residence, a telephone call, a flier or other effective means. The notification shall include a description of the purpose and nature of the steam blow, the proposed schedule, the expected sound levels, and the explanation that it is a one-time operation and not a part of normal plant operations.

**Verification:** The project owner shall notify the occupants of the residence at the Sonny Bono National Wildlife Refuge headquarters facility at least 15 days prior to the first steam blow, and extend the offer to temporarily relocate them. Within five days of notifying these entities, the project owner shall send a letter to the CPM confirming that

they have been notified of the planned steam blow activities, including a description of the method(s) of that notification. This letter shall also include evidence of an offer to temporarily relocate the residents of the residence described above, and evidence of their acceptance or refusal.

**NOISE RESTRICTIONS**

**NOISE-6** The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause noise levels due to plant operation to exceed 41 dBA $L_{eq}$ measured at the residence at the Sonny Bono National Wildlife Refuge headquarters.

No new pure-tone components may be introduced. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints. Steam relief valves shall be adequately muffled to preclude noise that draws legitimate complaints.

A. When the project first achieves a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at the monitoring site near the residence at the Sonny Bono National Wildlife Refuge headquarters. This survey during power plant operation shall also include measurement of one-third octave band sound pressure levels at each of the above locations to ensure that no new pure-tone noise components have been introduced.

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

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

**Verification:** The survey shall take place within 30 days of the project first achieving a sustained output of 80 percent or greater of rated capacity. Within 30 days after completing the survey, the project owner shall submit a summary report of the survey to the Imperial County Planning Department, and to the CPM. Included in the survey report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

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

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

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099

(Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

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

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

**CONSTRUCTION TIME RESTRICTIONS**

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

| | |
|---|---|
| Monday through Friday | 7 a.m. to 7 p.m. |
| Saturday | 9 a.m. to 5 p.m. |
| Sunday and Holidays | Not allowed |

Heavy equipment operation and noisy construction work relating to any project features that would cause noise levels at any area occupied by sensitive avian species (including the Yuma clapper rail) to exceed 60 dBA $L_{eq}$ shall be restricted to the times of day delineated below:

From March 1 through May 31:

One hour after morning civil twilight to one hour prior to sunset (as defined by U.S. Naval Observatory for Calipatria, CA)

From June 1 through February 28:

| | |
|---|---|
| Monday through Friday | 7 a.m. to 7 p.m. |
| Saturday | 9 a.m. to 5 p.m. |
| Sunday and Holidays | Not allowed |

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

**Verification:** Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

**EXHIBIT 1**
**NOISE COMPLAINT RESOLUTION FORM**

| |
|---|
| Salton Sea Unit 6 Project<br>(02-AFC-2) |
| **NOISE COMPLAINT LOG NUMBER** _____<br><br>Complainant's name and address:<br><br>Phone number: _____ |
| Date complaint received: _____<br>Time complaint received: _____ |
| Nature of noise complaint: |
| Definition of problem after investigation by plant personnel:<br><br>Date complainant first contacted: _____ |
| Initial noise levels at 3 feet from noise source _____ dBA Date: _____<br>Initial noise levels at complainant's property: _____ dBA Date: _____<br><br>Final noise levels at 3 feet from noise source: _____ dBA Date: _____<br>Final noise levels at complainant's property: _____ dBA Date: _____ |
| Description of corrective measures taken:<br><br>Complainant's signature: _____ Date: _____ |
| Approximate installed cost of corrective measures: $ _____<br>Date installation completed: _____<br>Date first letter sent to complainant: _____ (copy attached)<br>Date final letter sent to complainant: _____ (copy attached) |
| This information is certified to be correct:<br><br>Plant Manager's Signature: _____ |

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

## REFERENCES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## NOISE APPENDIX A
## FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

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

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

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

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

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

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

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

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

## Subjective Response to Noise

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

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

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

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

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

1. Except under special conditions, a change in sound level of one dB cannot be perceived.
2. Outside of the laboratory, a three dB change is considered a barely noticeable difference.
3. A change in level of at least five dB is required before any noticeable change in community response would be expected.
4. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, 1970)

## Combination of Sound Levels

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

**Noise Table A3**
**Addition of Decibel Values**

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

Source: Architectural Acoustics, M. David Egan, 1988

## Sound and Distance

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

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

## Worker Protection

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

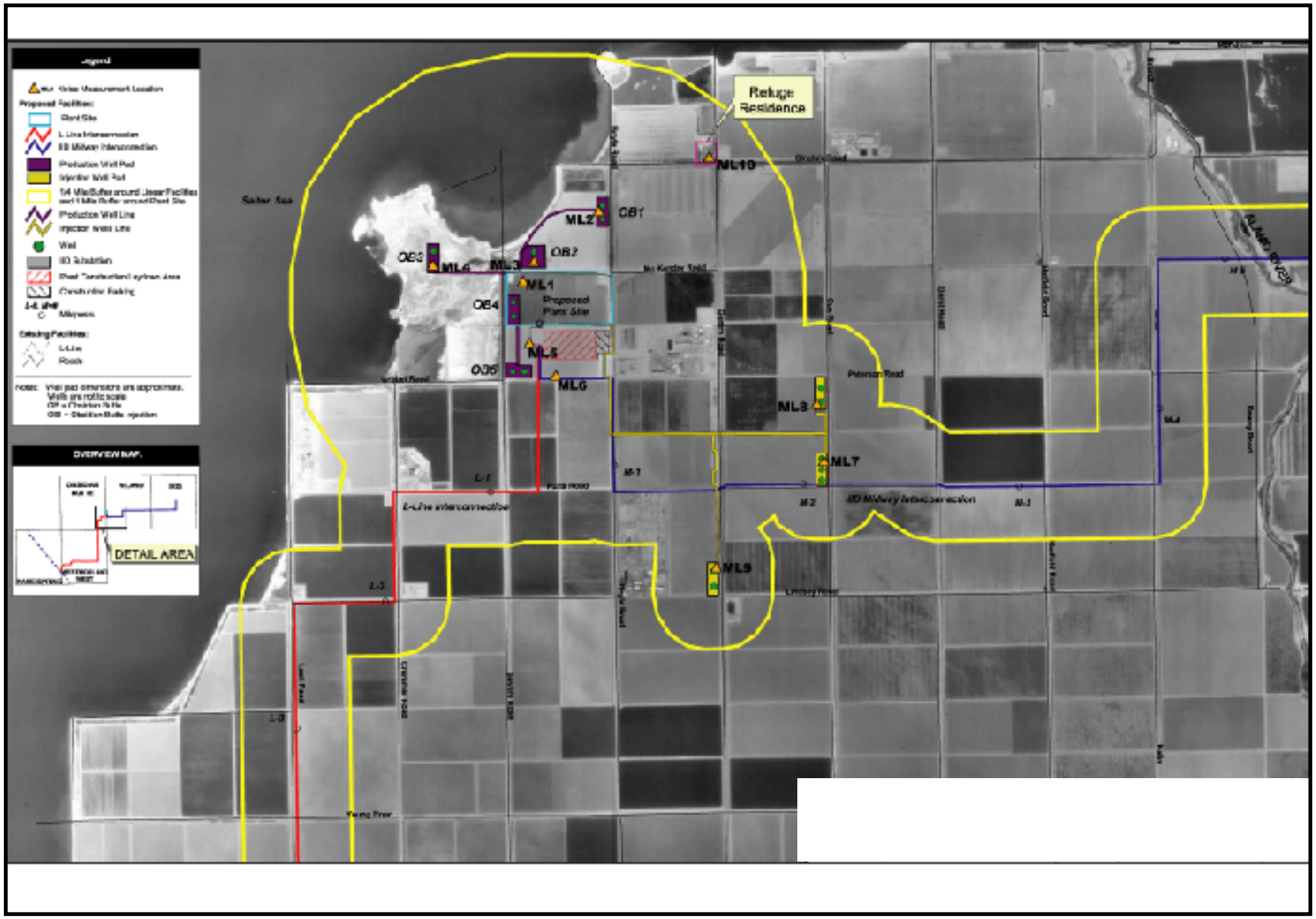
**Noise Table A4**
**OSHA Worker Noise Exposure Standards**

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

Source: 29 C.F.R. § 1910.95

**NOISE AND VIBRATION - FIGURE 1**

Salton Sea Power Project - Noise Measurement Locations








SOURCE: AFC Figure 5.11-1

# PUBLIC HEALTH

Testimony of Ramesh Sundareswaran

## INTRODUCTION

The purpose of this analysis is to determine if toxic air contaminants from the proposed Salton Sea Unit 6 Power Plant Project (SSU6) will have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

Although staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section of this Final Staff Assessment (FSA), attachment A at the end of this section provides information focussing on the health effects of such pollutants. Impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section. Health effects from electromagnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams are discussed in the **Soil and Water Resources** section. Plant releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

The following sections describe staff's method of analyzing potential health impacts and the criteria used to determine their significance.

## METHOD OF ANALYSIS

Staff's analysis addresses toxic air contaminants to which the public could be exposed during the SSU6 Project's construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal (skin) contact, or ingestion via contaminated food or water.

Air pollutants or contaminants for which no air quality standards have been set are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, hydrogen sulfide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no state or national ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a four-step process known as health risk assessment is used to estimate the increased risk of health problems in people who are exposed to different amounts of the pollutants. The risk assessment procedure consists of the following steps:

1. identify the types and amounts of hazardous substances that the SSU6 could emit to the environment;
2. estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
3. estimate amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact; and

4. characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks, which are estimated by the screening level assessment. This is accomplished by examining conditions that would lead to the highest, or worst-case risks, and then using those in the study. Such conditions include:

- using the highest levels of pollutants that could be emitted from the plant;
- assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- using the type of air quality computer model which predicts the greatest plausible impacts;
- calculating health risks at the location where the pollutant concentrations are calculated (predicted) to be the highest;
- using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses); and
- assuming that an individual's exposure to all pollutants occurs for 70 years.

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances which could present a health hazard from noninhalation pathways of exposure (see CAPCOA 1993, Table III-5). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (CAPCOA 1993, p. III-19).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer effects, and cancer risk (also long-term). Acute health effects result from short-term (1-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature, and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those which arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from ten to one hundred percent of a lifetime (from seven to seventy years). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called "reference exposure levels" or RELs. These are amounts of toxic substances to which even sensitive people can be exposed for a lifetime and suffer no adverse health effects (CAPCOA 1993, p. III-36). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease that makes them more sensitive to the effects of toxic substance exposure. The RELs are based on the most sensitive

adverse health effect reported in the medical and toxicological literature, and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available when the standard was developed and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformance with California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (CAPCOA 1993, p. III-37). In those cases where the actions may be synergistic (where the effects are greater than the sum), this approach may underestimate the health impact.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions. In reality, the risk is generally too small to actually be measured. For example, the one in one million risk level represents a one in one million increase in the normal risk of developing cancer over a lifetime, at whatever location is estimated to have the worst-case risk.

Cancer risk is expressed in chances per million, and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called “potency factors”, and established by the California Office of Environmental Health Hazard Assessment), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks are likely to be lower, or even considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks were above the significance level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks.

## SIGNIFICANCE CRITERIA

Energy Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a hypothetical person who lives in the place where the highest air concentration of chemicals is located. Staff

estimates how much exposure this individual has by making “worst-case” assumptions about how this person lives and works. By estimating exposure to this individual, it can be determined if there is any potential for health concerns.

As described earlier, non-criteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as cancer (long-term) health effects. Significance of project health impacts is determined separately for each of the three categories.

## Acute and Chronic Noncancer Health Effects

Staff assesses the significance of non-cancer health effects by calculating a “hazard index”. A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than one signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance, which has the same type of health effect, is added to yield a total hazard index. The total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that cumulative worst-case exposures are less than the reference exposure levels (safe levels). Under these conditions, health protection is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant non-cancer project-related public health impacts.

## Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, § 25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations, § 12703(b) states that “the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure”. This level of risk is equivalent to a cancer risk of ten in one million, or $10 \times 10^{-6}$. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that which applies to Proposition 65.

The significant risk level of ten in one million is consistent with the level of significance adopted by the various Air Boards in California pursuant to Health and Safety Code section 44362(b), which requires notification of nearby residents when an air district determines that there is a significant health risk from a facility.

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. When a screening analysis shows cancer risks above the significance level refined assumptions would likely result in a lower, more realistic risk estimate. If facility risk, based on refined assumptions, exceeds the significance level of ten in one million, staff would require appropriate measures to reduce risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than ten in one million, staff would deem such risk to be significant, and would not recommend project approval.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

### FEDERAL

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

Section 112 requires new sources, which emit more than ten tons per year of any specified hazardous air pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology (MACT).

### STATE

#### California Health and Safety Code sections 39650 ET seq.

These sections mandate the California Air Resources Board (CARB) and the Department of Health Services to establish safe exposure limits for toxic air pollutants and identify pertinent best available control technologies. They also require that the new source review rule for each air pollution control district include regulations that require new or modified procedures for controlling the emission of toxic air contaminants.

#### California Health and Safety Code section 41700

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

### LOCAL

Imperial County Air Pollution Control District (ICAPCD) rules 216, 1001, 1002, 1003 pertain to the regulations concerning implementation of New Source Review, NESHAP, California Airborne Toxic Control and limitations of hexavalent chromium from cooling towers.

## SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project’s potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas, due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn, affects public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

## SITE AND VICINITY DESCRIPTION

The proposed site is located on approximately 80 acres of a 160-acre parcel in the unincorporated area of Imperial County. The site lies west of State Highway 111 and north of State Highway 86. It will be within the block bounded by McKendry Road on the north, Boyle Road on the east, Severe Road on the west, and Peterson Road to the south. The entire parcel is being used for row crops currently. The site is at an elevation of approximately 220-227 feet below sea level with terrain that rises slightly away from the site.

The project area is designated as Heavy Agriculture, Geothermal Overlay Zone in the Imperial County General Plan. Existing land uses surrounding the site include agriculture, open space, industrial and residential.

The nearest residence is about 4000 feet northeast of the project site. The next closest residence is about 2 miles to the east. As mentioned above, the location of sensitive receptors near the proposed site is an important factor in considering potential public health impacts. No schools, day care facilities, convalescent homes, or hospitals exist within a 3-mile radius of the site. There are, however, five residences within a 3-mile radius of the site.

## METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

Imperial County has a distinct desert climate, which is reflected by low rainfall, hot summers, mild winters, low humidity, and robust temperature inversions. In the summertime, temperatures may reach 106 degrees F. Daytime winter temperatures are milder, around 70 degrees F. Wind direction is predominately from the west to east throughout the year. It does, however, shift with a southeast component during the fall season.

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents more detailed meteorological data.

## EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the ICAPCD. By examining average toxic concentration levels from representative air monitoring sites in California with cancer risk factors specific to each contaminant, lifetime cancer risk can usually be calculated to provide a background risk level for inhalation of ambient air. However, the ICAPCD does not have a program to measure levels of toxic air contaminants at such monitoring

sites. The air monitoring station closest to the SSU6 project is in Niland, approximately 5 miles northeast of the project site, but only measures criteria pollutants. Consequently, background cancer risk levels at the station are currently unavailable. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual in the USA is about 1 in 4, or 250,000 in one million.

## SITE CONTAMINATION

Site disturbances will occur during facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off-site through soil erosion, and uncovering buried hazardous substances.

On behalf of the applicant, CE Obsidian Energy, LLC (CEOE), a Phase I Environmental Site Assessment (ESA) was conducted by URS Corporation in accordance with American Society for Testing and Materials Standard E 1527-00, Standard Practice for Environmental Site Assessments (CEOE 2002a, Appendix O). The purpose of an ESA is to determine the potential for the presence or likely presence of any hazardous substances or petroleum products under conditions that may indicate a release or threat of a release from present or past activities. The results of the ESA are summarized in staff's **Waste Management** section.

## IMPACTS

## CONSTRUCTION

### Emissions Sources

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, as well as from heavy equipment operation both during site preparation and well drilling, and well flow testing. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis. AFC table 5.1-21 refers to criteria emissions and table 5.1-20 refers to the noncriteria pollutants anticipated during the construction of the SSU6 project. Section 5.1.2.2 of the AFC provides a detailed discussion of the emission sources during construction of the SSU6 project.

As described in the **Waste Management** section, a Phase I Environmental Site Assessment (ESA) has been performed. There is no inherent onsite contamination that warrants further action as discussed in the **Waste Management** section.

The operation of off-road construction equipment will result in air emissions from diesel-fueled engines. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. EPA as hazardous air pollutants and by the California Air Resources Board (CARB) as toxic air contaminants.

Exposure to diesel exhaust causes both short- and long-term adverse health effects. Short-term effects can include increased coughing, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel on Toxic Air Contaminants (SRP) recommended a chronic REL (see REL discussion in Method of Analysis section above) for diesel exhaust particulate matter of 5 $\mu g/m^3$ and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6). The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, the ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of the SSU6 is anticipated to take place over a period of twenty months. As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from seven to seventy years. However, the risk of cancer is proportional to the length of exposure and can be calculated by adjusting for the relatively short construction period. This risk is presented below.

AFC Section 5.15.2.1.2 and Appendix G present estimates of diesel exhaust emissions from construction activities. The two contributory sources of diesel are the plant construction equipment and well drilling (CEOE 2002a). Equipment that can be expected to generate diesel emissions includes drill rigs, cranes, trucks, graders, generators, welding equipment, compressors and water pumps. The maximum annual sum of these two categories results in an impact exposure of 0.35 micrograms per cubic meters, north and east of the site. The lifetime cancer risk per individual based on the combination of this exposure and a diesel particulate unit risk factor of $3.0x10^{-4}$ is estimated to be 2.5 in one million (CEOE 2002l). The conservative nature of the screening assumptions used means that the estimated risk is overstated and the actual cancer risks are likely to be lower or even considerably lower than the estimate.

In order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, **Air Quality** staff recommends the use of ultra low sulfur diesel fuel and the use of either CARB certified 1996 diesel engines or the installation of soot filters on diesel equipment. The catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is in the range of approximately 85-92 percent. Such filters will reduce diesel emissions during construction and further reduce any potential health impacts. These mitigation measures are required by Condition of Certification **AQ-C3** in the **Air Quality** section of this FSA.

## OPERATION

### Emissions Sources

Sources of air emissions at the SSU6 plant include cooling towers, steam vent tanks, emergency generators, fire pumps, filter cakes, miscellaneous operation and maintenance equipment and steam blow lines. Most of the emissions are expected from the cooling towers and are to be emitted as offgases, drift and dispersed noncondensible gases. AFC section 5.1.2.3 provides a detailed discussion of the various emission sources.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility.

Table 5.15-8 of the AFC lists non-criteria pollutants that may be emitted from the project along with their anticipated amounts. Pollutants include but are not limited to ammonia, arsenic, benzene, ethylbenzene, hydrogen sulfide, mercury, radon, diesel particulates and xylenes. Table 5.15-3 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include reference exposure levels, which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the California Air Pollution Control Officers Association (CAPCOA) Guidelines (CAPCOA 1993). **Public Health Table 1** lists toxic emissions and shows how each contributes to the health risk analysis. For example, the first row shows that ammonia is not a carcinogen, but if inhaled, may have chronic (long-term) noncancer health effects and acute (short-term) noncancer effects.

**Public Health Table 1**
**Types of Health Impacts Attributed to Toxic Emissions**

| Substance | Cancer | Noncancer (Chronic) | Noncancer (Acute) |
|---|---|---|---|
| Ammonia | | ✔ | ✔ |
| Arsenic | ✔ | ✔ | ✔ |
| Benzene | ✔ | ✔ | ✔ |
| Beryllium | ✔ | ✔ | |
| Cadmium | ✔ | ✔ | |
| Chromium | ✔ | ✔ | |
| Copper | | ✔ | ✔ |
| Ethylbenzene | | ✔ | |
| Hydrogen sulfide | | ✔ | ✔ |
| Lead | ✔ | ✔ | |
| Mercury | | ✔ | ✔ |
| Manganese | | ✔ | |
| Nickel | ✔ | ✔ | ✔ |
| Diesel-PM10 | ✔ | ✔ | |
| Selenium | | ✔ | |

| | | | |
|---|---|---|---|
| Radon | ✔ | | |
| Toluene | | ✔ | ✔ |
| Xylene | | ✔ | ✔ |
| Zinc | | ✔ | |

Source: AFC Table 5.15-2 using reference exposure levels and cancer unit risks from CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993 and SRP 1998.

## Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a "worst case" analysis. Maximum hourly emissions are required to calculate acute (one-hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

AFC Tables 5.15-8 and 5.15-9 show annual and maximum hourly emissions for the routine operations of the SSU6 project.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The screening analysis was performed using the U.S. EPA approved ISCST3 dispersion modeling program and the ACE 2588 model. The ACE 2588 model uses ISCST3 output in conjunction with source emission rates and toxicity factors, to estimate human health effects. This method of assessing health effects is consistent with the CAPCOA Air Toxics "Hot Spot" Program Revised 1992 Risk Assessment Guidelines (October 1993) referred to earlier, and results in the following health risk estimates.

## Impacts

The screening health risk assessment for the project resulted in a maximum acute hazard index of 0.881 at the eastern boundary of the SSU6 facility (the point of maximum impact, or PMI). The maximum acute hazard index at a sensitive receptor (the maximum exposed individual, or MEI) is 0.310. The chronic hazard index at the PMI is 0.156. The maximum chronic hazard index to occur at the MEI is 0.0604. As **Public Health Table 2** shows, both acute and chronic hazard indices are below the REL of 1.0, indicating that no short- or long-term adverse health effects are expected.

### Cancer Risk

As shown in **Public Health Table 2**, the maximum incremental lifetime cancer risk (PMI) was estimated to be 2.88 in one million, approximately 0.3 miles east of the SSU6 project site. The total worst case individual cancer risk (MEI) is calculated to be 1.07 in one million at a location approximately 2 miles east of the project site.

**Public Health Table 2**
**Operation Hazard/Risk**

| Type of Hazard/Risk | Hazard Index/Risk | Significance Level | Significant? |
|---|---|---|---|
| **ACUTE NONCANCER** | 0.881 | 1.0 | No |
| **CHRONIC NONCANCER** | 0.156 | 1.0 | No |
| **INDIVIDUAL CANCER** | $2.88 \times 10^{-6}$ | $10.0 \times 10^{-6}$ | No |

Source: CEOE 2002a, Section 5.15.2.1.4

### Cooling Tower

In addition to toxic air contaminants, the possibility exists for bacterial growth to occur in the cooling tower, including Legionella. Legionella is a type of bacteria that grows in water (optimal temperature of 37° C) and causes Legionellosis, otherwise known as Legionnaires' disease. Untreated or inadequately treated cooling systems in the United States have been correlated with outbreaks of Legionellosis. These outbreaks are usually associated with building heating, ventilating, and air conditioning (HVAC) systems but it is possible for growth to occur in industrial cooling towers. In fact, Legionella bacteria have been found in drift droplets. The U.S. Environmental Protection Agency (U.S. EPA) published an extensive review of Legionella in a human health criteria document (EPA 1999). The U.S. EPA noted that Legionella survival is enhanced by symbiotic relationships with other microorganisms, particularly in biofilms and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. Numerous outbreaks of Legionellosis have been linked to cooling towers and evaporative condensers in hospitals, hotels, and public buildings, clearly establishing these water sources as habitats for Legionella. Kool et al (2000) found that Legionella was detected in water systems of 11 of 12 hospitals in San Antonio, Texas. Interestingly, the number of legionnaires' disease cases in each hospital correlated better with the proportion of water-system sites that tested positive for Legionella ($p=0.07$) than with the concentration of Legionella bacteria in water systems ($p=0.23$). According to the EPA, in most cases, disease outbreaks resulting from Legionella aerosolizations have involved indoor exposure or outdoor exposure within approximately 650 feet of the source. The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

The U.S. EPA also published a Legionella Drinking Water Health Advisory (EPA 2001) noting that there are several control methods for disinfecting water in cooling systems, including thermal (super heat and flush), hyperchlorination, copper-silver ionization, ultraviolet light sterilization, ozonation, and instantaneous steam heating systems

One technical paper (Addiss, David, et al. 1989) describes cases of Legionnaires' Disease due to cooling tower drift in a town in Wisconsin in the summer of 1986. The authors noted that of five cooling towers in the area, the tower associated with the Legionnaires' disease was the only one that did not use chemical biocides. Furthermore, the cooling tower was "old" (built before 1986) and the water temperature

was 41°C, which is in the middle of the “active growth” range of 25-55°C for Legionella. There were no problems caused by the other four cooling towers, which treated their cooling water. Another technical paper (Bhopal, R.S., et al. 1991) addressed the relative risk of contacting Legionnaires’ Disease when living in the proximity of cooling towers. The relative risk of 3.0 within approximately 1700 feet of the cooling tower drops to a risk of 1.19 at distances of approximately 1700-2500 feet of the cooling tower. Placed into context of the proposed SSU6 project, the distance to the nearest residential receptor is about 4000 feet. In conclusion, these two articles provide evidence that older cooling towers with untreated water can be a source of Legionella, but that if chemical biocides are used or residences are located further than approximately 2500 feet away, the risks of contracting Legionnaires’ disease would be very low.

A paper presented at the 1978 annual meeting of the Cooling Technology Institute (CTI) notes that aerosol particles or droplets larger than 600 micrometers would be expected to fall to the surface within a few hundred meters of the cooling tower (Adams, Paul A. and Lewis, Barbara 1978). Drift eliminators would remove these larger aerosol particles down to a size of about 100 - 200 micrometers. These small particles may be expected to travel long distances downwind in the diffusing cooling tower plume. Bacterial aerosol concentrations in the vicinity of and downwind of cooling towers are affected by: quality of makeup water, type of biofouling control, effect of biological oxygen demand (BOD) in makeup water, wind speed, height of tower, speed and efficiency of the vent fans, stability of the atmosphere and temperature differential between exit and ambient air. The potential public health hazard from microbial aerosols within a cooling tower plume is difficult to estimate.

Another paper presented at the 1982 CTI annual meeting (Tyndall R.L. 1982) discussed the profiles and infectivity of Legionella bacteria populations in cooling towers. A survey of both industrial and air conditioning cooling towers was conducted for the presence of this bacterium which showed that while the majority of cooling water tested contained more than 10,000 bacteria per liter of water, chlorine can be effective in controlling Legionella concentrations in some cooling towers. The authors concluded that generalizations concerning the content and serotypic profiles of Legionella in cooling towers at any given site cannot be made and that each cooling tower needs to be individually assessed. It also appears that some biocides routinely used to control bacteria in cooling tower waters are not always effective against Legionella.

In 2000, the CTI issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60 percent of industrial cooling towers tested were found to contain Legionella. It estimated that more than 4,000 deaths per year are believed to occur from Legionellosis (from all sources, not limited to industrial cooling towers), but only about 1,000 are reported. The CTI listed no reference or supportive data for this assertion, however. It also noted that continuous chlorine- or bromine-based biocide free residuals of 0.5 to 1.0 ppm in the cooling tower hot return water have been recommended by many agencies and that biodispersants and biodetergents may aid in the penetration, removal, and dispersion of the biofilm which often builds up on the inside of pipes. Furthermore, the use of these dispersants and detergents often increases the efficacy of the biocide.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Nalepa, et al (2002) researched the effectiveness of bromine-based biocides on microbial biofilms and biofilm-associated Legionella Pneumophila. Biofilms in cooling systems contribute to a reduction in heat transfer, increase in energy consumption, increase in corrosion, and an increase in health risk. The authors noted that world-wide, deadly outbreaks of Legionnaires' disease continue to take place with regularity despite a growing list of published guidelines and recommended practices by CTI and other industry groups and governmental agencies. The results of studies indicate that the bromine-based biocides may be more effective than chlorine-based biocides against aged, more difficult to kill biofilms. However, the authors concluded that when properly applied, oxidizing biocides could be part of an overall water treatment program that incorporates effective microbiological control, scale, and corrosion inhibition strategies together with regular maintenance practices.

Good preventive maintenance is important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate; maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling and not to control Legionella.

In summary, the scientific and technical trade literature are replete with examples of Legionella bacterium present in industrial cooling towers, other building HVAC systems, and indeed, surface waters throughout the world. Health experts have not found a concentration of this bacterium which would not present some risk of infection to the public, that is, a concentration in water below which would be deemed totally "safe". Evidence supports the fact that despite water temperature and biocide control, a thin "bio-film" can form on the inside walls of piping and serve to protect the bacteria from the biocide and temperature variations. Additional chemical additives, mechanical removal, and/or "back-flushing" of the system can be used to remove this bio-film.

The following management strategies are directed at minimizing colonization, amplification within the equipment, or both (ASHRAE 1998 and 2000):

- Avoid piping that is capped and has no flow (dead legs).
- Control input water temperature to avoid temperature ranges where Legionella grow. Keep cold water below 25° C (77° F) and hot water above 55° C (131° F).
- Apply biocides in accordance with label dosages to control growth of other bacteria, algae, and protozoa that may contribute to nutritional needs of Legionella. Rotating biocides and using different control methods is recommended. These include thermal shock, oxidizing biocides, chlorine-based oxidants and ozone treatment.

- Conduct routine periodic “back-flushes” to remove bio-film buildup on the inside walls of the pipes.

In order to ensure that Legionella growth is kept to a minimum, staff has proposed Condition of Certification **Public Health-1**. The condition would require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. Staff believes that with the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growing and dispersing would be reduced to insignificance.

## CUMULATIVE IMPACTS

The maximum impact location occurs where pollutant concentrations from the SSU6 project would theoretically be the highest. Even at this location, staff does not expect any significant change in lifetime risk to any person, and the increase of 2.88 in one million does not represent any real contribution to the average lifetime cancer risk of 250,000 in one million. Modeled facility-related residential risks are lower at more distant locations, and actual risks are expected to be much lower, since worst-case estimates are based on conservative assumptions, and overstate the true magnitude of the risk expected. Therefore, staff does not consider the incremental impact of the additional risk posed by the SSU6 Project to be either significant or cumulatively considerable.

The worst-case long-term noncancer health impact from the project (0.156 hazard index) is well below the significance level of 1.0 at the location of maximum impact. Similarly, the worst-case acute health impact of 0.881 is below the significance level of 1.0. At these levels, staff does not expect any cumulative health impacts to be significant. As with cancer risk, acute and long-term hazards would be lower at all other locations and cumulative impacts at other locations would also be less than significant.

Even in the unlikely event that worst-case emissions from an existing facility were to coincide both geographically and temporally with SSU6 emissions at the location of maximum impact, the overall health outlook would not change for anyone. Thus, the SSU6 project will not result in any significant cumulative cancer or noncancer health impacts.

## ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than 50 percent within a six-mile radius of the proposed SSU6 project (please refer to **Socioeconomics Figure 1** in this Staff Assessment). Staff also reviewed Census 2000 information that shows the low-income population is less than fifty percent within the same radius.

Based on the **Public Health** analysis, which included consideration of information supplied by participants at staff workshops, staff has not identified significant direct or

cumulative impacts resulting from the construction or operation of the project and, therefore, there are no public health environmental justice issues related to this project.

## COMPLIANCE WITH LORS

Staff concludes that construction and operation of the SSU6 Project will be in compliance with all applicable LORS regarding long-term and short-term project impacts.

## FACILITY CLOSURE

The scope of staff's public health analysis is limited to routine releases of harmful substances to the environment. During either temporary or permanent facility closure, the major concern would be from accidental or non-routine releases from either hazardous materials or wastes, which may be onsite. These are discussed in the Hazardous Materials and Waste Management sections, respectively. During temporary closure (periods greater than those required for normal maintenance), it is unlikely that there would be any routine releases of harmful substances to the environment, since the facility would not be operating. For permanent closure, the only routine emissions would be related to facility demolition or dismantling, such as exhaust from heavy equipment or fugitive dust emissions. These would be subject to closure conditions adopted by the Energy Commission once a closure plan is received from the project owner. Please refer to the General Conditions section for more details.

## CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the SSU6 project, and does not expect any significant adverse cancer, or short- or long-term noncancer health effects from project emissions. Implementation of staff's proposed Condition of Certification would also ensure that the risk of Legionella growth and dispersion is reduced to less than significant.

## PROPOSED CONDITIONS OF CERTIFICATION

**Public Health-1** The project owner shall develop and implement a cooling towers Biocide Use, Biofilm Prevention, and Legionella Control Program to ensure that the potential for bacterial growth is controlled. The Program shall be consistent with staff's "Biocide Monitoring Program Guidelines" or the Cooling Tower Institute's "Best Practices for Control of Legionella" guidelines.

**Verification:** At least 30 days prior to the commencement of cooling tower operations, the project owner shall submit the Biocide Use, Biofilm Prevention, and Legionella Control Program to the CPM for review and approval.

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## ATTACHMENT A

## POLLUTANT HEALTH EFFECTS

### OZONE ($O_3$)

Ozone is formed when reactive organic gases are mixed with nitrogen oxides in the presence of sunlight. Heat speeds up the reaction, typically leading to higher concentrations in the summer months. Ozone is a colorless, very reactive gas, which oxidizes other materials. Oxidation damages living cells and tissues by altering their protein, lipid, and carbohydrate components or products. Such damage leads to dysfunction and death of cells in the lung and in other internal tissues.

The U.S. EPA revised the federal ozone standard on July 18, 1997 (62 Fed. Reg. 38856) based on new health studies which became available since the standard was last revised in 1979. These new studies showed that adverse health effects occur at lower ambient concentrations over longer exposure times than those reflected in the previous standard, which was based on acute health effects associated with heavy exercise and short-term exposures. The U.S. EPA's proposed ozone rule lists health effects which have been attributed to result from short-term (one to three hours) and prolonged (six to eight hours) exposure to ozone (61 Fed. Reg. 65719). However, a 1999 federal court ruling blocked implementation of the ozone 8-hour standard. EPA has asked the U.S. Supreme Court to reconsider that decision.

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

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

## CARBON MONOXIDE (CO)

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

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

## PARTICULATE MATTER (PM)

Particulate matter is a generic term for particles of various substances, which occur as either liquid droplets or small solids of a wide range of sizes. Particles with the most potential to adversely affect human health are those less than 10 micrometers (millionths of a meter) in diameter (known as PM10), which may be inhaled and deposited within the deep portions of the lung (PM10). PM may originate from anthropogenic or natural sources such as stationary or mobile combustion sources or windblown dust. Particles may be emitted directly to the atmosphere or result from the physical and chemical transformation of gaseous emissions such as sulfur oxides, nitrogen oxides, and volatile organic compounds. PM10 may be made up of elements such as carbon, lead, and nickel; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and soil fragments. The size, chemical composition, and concentration of ambient PM10 can vary considerably from area to area and from season to season within the same area.

PM10 can be grouped into two general sizes of particles, fine and coarse, which differ in formation mechanisms, chemical composition, sources, and potential health effects. Fine-mode particles are those with a diameter of 2.5 micrometers or less (PM2.5), while the coarse-mode fraction of PM consists of particles ranging from 10 micrometers down to 2.5 micrometers in diameter.

Coarse-mode PM10 is formed by crushing, grinding, and abrasion of surfaces, and in the course of reducing large pieces of materials to smaller pieces. Coarse particles consist mainly of soil dust containing oxides of silicon, aluminum, calcium, and iron; as

well as fly ash, particles from tires, pollen, spores, and plant and insect fragments. Coarse particles normally have shorter lifetimes (minutes to hours) and only travel over short distances (of less than tens of kilometers). They tend to be unevenly distributed across urban areas and have more localized effects than the finer particles.

PM2.5 is derived both from combustion by-products, which have volatilized and condensed to form primary PM2.5, and from precursor gases reacting in the atmosphere to form secondary PM2.5. Components include nitrates, organic compounds, sulfates, ammonium compounds, and trace elements (including metals) as well as elemental carbon such as soot. Major sources of PM2.5 are fossil fuel combustion by electric utilities, industry and motor vehicles, vegetation burning, and the smelting or other processing of metals. Dry deposition of fine mode particles is slow allowing such particles to often exist for long periods of time (of from days to weeks) in the atmosphere and travel hundreds to thousands of kilometers. They tend to be uniformly distributed over urban areas and larger regions and are removed from the atmosphere primarily by forming cloud droplets and falling out within raindrops.

The health effects of PM10 from any given source usually depend on the toxicity of its constituent pollutants. The size of the inhaled material usually determines where it is deposited in the respiratory system. Coarse particles are deposited most readily in the nose and throat area while the finer particles are more likely to be deposited within the bronchial tubes and air sacs, with the greatest percentage deposited in the air sacs. Until recently, PM10 particles had been considered to be the major fraction of airborne particulates responsible for various adverse health effects. The PM10 fraction is known to be capable of penetrating the thoracic and alveolar regions of the human and animal lungs. The PM2.5 fraction, however, was found to pose a significantly higher risk for health. This is due to their size and associated deposition and retention characteristics in the respiratory tract, enabling it to penetrate and deposit within the deeper alveolar regions of the lung. The following aspects of PM2.5 deposition all contribute to the more serious health effects attributed to smaller particles:

- The deposition of PM2.5 favors the periphery of the lungs, which is especially vulnerable to injury for anatomical reasons.
- Clearance of the PM2.5 from within the deeper reaches of the lungs is a much slower process than from the upper regions. Consequently, the residence time is longer, implying longer exposure, and hence greater risk.
- The human anatomy further allows the penetration of the superficial tissues by PM2.5 and entry into the bodily circulation without much effort in the periphery of the lungs.

Many epidemiological studies have shown exposure to particulate matter capable of inducing a variety of health effects, including premature death, aggravation of respiratory and cardiovascular disease, changes in lung function and increases in existing respiratory symptoms, effects on lung tissue structure, and impacts on the body’s respiratory defense mechanisms. The underlying biological mechanisms are still poorly understood. Based on their review of a number of these epidemiological studies (as published after 1987 when the federal standards were revised), together with suggestion of PM2.5 concentrations as a more reliable surrogate for the health impacts

of the finer fraction of PM than PM10, the U.S. EPA concluded that the then-current standards were not sufficiently stringent to protect against significant effects in exposed humans. Therefore, federal PM standards were revised on July 18, 1997 (62 Fed. Reg. 38652) to add new annual and 24-hour PM2.5 standards to the existing annual and 24-hour PM10 standards. Taken together, these new standards were meant to provide additional protection against a wide range of PM-related health effects, including premature death, increased hospital admissions and emergency room visits, primarily among sensitive individuals such as the elderly, children and individuals with cardiopulmonary diseases such as asthma. Other impacts include decreased lung function (particularly in children and asthmatics), and alterations in lung tissue and structure.

California has also had 24-hour and annual standards for PM10 (CARB 1982, pp. 81, 84). These studies were aimed at establishing the PM10 levels capable of inducing asthma, premature death, and bronchitis-related symptoms. They were set to protect against such impacts in the general population as well as sensitive individuals such as patients with respiratory disease, declines in pulmonary function, especially as related to children (Tit. 17, Cal. Code Regs., §70200). These standards were set to be more stringent than the federal standard, which the ARB regarded as inadequate for the protection desired (CARB 1991, p. 26).

On June 20, 2002, the ARB approved the adoption of a lower annual state standard for PM10, as well as a new annual standard for PM2.5 (CARB 2002). The 24-hour PM10 standard was not changed. The standards were established to prevent excess death, illnesses such as respiratory symptoms, bronchitis, asthma exacerbation, and cardiac disease, and restrictions in activity from short- and long-term exposures (Title 17, Cal. Code Regs., §70200).

**NITROGEN DIOXIDE ($NO_2$)**

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

Sublethal exposures in animals produce inflammation and various degrees of tissue injury characteristic of oxidant damage (Evans in CARB 1992, Appendix A, p. 5). The changes produced by low-level acute or subchronic exposure appear to be reversible when animals are allowed to recover in clean air.

Health effects of particular concern in relation to low-level nitrogen dioxide exposure include: (1) effects of acute exposure on some asthmatics and possibly on some persons with chronic bronchitis, (2) effects on respiratory tract defenses against infection, (3) effects on the immune system, (4) initiation or facilitation of the development of chronic lung disease, and (5) interaction with other pollutants (CARB 1992, Appendix A, p. 5).

Several groups which may be especially susceptible to nitrogen dioxide related health effects have been identified (CARB 1992, Appendix A, p. 3). These include asthmatics,

persons with chronic bronchitis, infants and young children, cystic fibrosis and cancer patients, people with immune deficiencies, and the elderly.

Studies using controlled brief exposures on sensitive groups have shown an increase in bronchial reactivity or airway responsiveness of some asthmatics, and decreased lung function in some patients with chronic obstructive lung disease (CARB 1992, Appendix A, p. 2). In general, bronchial hyperreactivity (an exaggerated tendency of the airways to constrict) is markedly greater in asthmatics than in nonasthmatics upon exposure to respiratory irritants (CARB 1992a, p. 107). At exposure concentrations relevant to the current one-hour ambient standard, there appears to be little, if any effect on respiratory symptoms of asthmatics (CARB 1992a, p. 108).

**SULFUR DIOXIDE ($SO_2$)**

Sulfur dioxide is formed when any sulfur-containing fuel is burned. $SO_2$ is highly soluble and consequently absorbed in the moist passages of the upper respiratory system. Exposure to sulfur dioxide can cause changes in lung cell structure and function that adversely affect a major lung defense mechanism known as muco-ciliary transport. This mechanism functions by trapping particles in mucus in the lung and sweeping them out via the cilia (fine hair-like structures) also in the lung. Slowed mucociliary transport is frequently associated with chronic bronchitis.

Exposure to sulfur dioxide can produce both short- and long-term health effects. Therefore, California has established sulfur dioxide standards to reflect both short- and long-term exposure concerns. Based on controlled exposure studies of human volunteers, investigators have found that asthmatics comprise the group most susceptible to adverse health effects from exposure to sulfur dioxide (CARB 1994, p. V-1).

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

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

## HYDROGEN SULFIDE

Hydrogen sulfide is a naturally occurring colorless, flammable gas that is denser than air. It is typically formed when organic matter undergoes decomposition. Sewer gas, petroleum production and refining and geothermal power plants are identified as specific sources of this gas in California (CARB 1999). When released, the gas tends to be persistent in the atmosphere for about eighteen hours and remains reactive during that time. It has been found to possibly contribute to the formation of sulfur dioxide and sulfuric acid in the atmosphere, thereby resulting in acid rain (ATSDR 1999). Though considered to be very toxic and extremely hazardous, effects triggered by hydrogen sulfide depend basically upon the amount and duration of exposure. Effects resulting from short term relatively high exposures are well documented and are of great concern for occupational safety and health. Consequently, occupational standards are well established for short-term high level exposures to hydrogen sulfide.
The most common cause of sudden death in the workplace is unsafe exposure to high concentrations of the gas (NIOSH 1977). At high concentrations(500-1000 parts per million- ppm), hydrogen sulfide causes unconsciousness and death by respiratory paralysis. At lower concentrations (50-500 ppm), the gas functions as a respiratory irritant, which can lead to pulmonary edema upon exposure to concentrations in excess of 250m ppm. Exposure to concentrations of 20-50 ppm may cause eye irritation and conjunctivitis (ATSDR 1999).

Several studies have examined the impacts of mid to high-level hydrogen sulfide exposure. These studies have reported ocular, respiratory and neurological effects in exposed individuals. The interpretation of the findings of these studies have been impeded by inadequate data for hydrogen sulfide exposure levels, inability to differentiate between effects of high- level acute exposures compared to low-level chronic exposures, concurrent exposures to other organic sulfur compounds, and the subjective nature of some of the health endpoints (ATSDR 1999).

The effects of prolonged low- level exposures to hydrogen sulfide through inhalation of ambient air have not been well studied. In fact, no epidemiological study thus far has demonstrated that prolonged exposures to low doses of hydrogen sulfide has caused adverse health effects.

The US EPA does not presently classify hydrogen sulfide as either a criteria air pollutant or a Hazardous Air Pollutant (CARB 2000). It has however developed a chronic reference concentration of 0.001 milligrams per cubic meter for the gas. The concentration is an estimate of a daily inhalation exposure of the human population including sensitive subgroups that is likely to be without an appreciable risk of deleterious effects during a lifetime. Uncertainty spanning perhaps an order of magnitude is associated with the concentration. California has a statewide ambient air quality standard of 30 parts per billion (ppb) averaged over a period of one hour and not to be equaled or exceeded for the general public. This standard was adopted in 1969, reviewed in 1980 and 1984 and has not changed since no new relevant information has emerged. The California standard is welfare based and intended to protect the public against nuisance odors from hydrogen sulfide. It was designed to protect against symptoms of headache and nausea due to the strong and offensive odor of hydrogen sulfide(CARB 2000).

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# SOCIOECONOMICS

Testimony of Joseph Diamond, Ph.D.

## INTRODUCTION

This 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 (EJ) and facility closure. Direct, indirect, induced, and cumulative impacts are also included. Staff discusses the estimated impacts of the construction and operation of the Salton Sea Unit 6 (SSU6) project on local communities, community resources, and public services, pursuant to Title 14, California Code of Regulations, Section 15131. The SSU6 project will be constructed, owned, and operated by CE Obsidian Energy (CalEnergy) LLC, a non-recourse affiliate of Mid-American Energy Holdings Company.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

*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.

## DISCUSSION OF SETTING AND IMPACTS

Staff reviewed the SSU6 AFC, Vol. I, July 26, 2002, Socioeconomic section and socioeconomic data responses (CEOE 2002a, e, and n). Based on staff's review of the socioeconomic data provided and referenced from governmental agencies, trade associations and staff's analysis, staff agrees with the AFC's socioeconomic analysis and conclusions.

## STUDY AREA

The SSU6 is located south of the Salton Sea in central Imperial County. For a full description of the socioeconomic setting, please refer to Section 5.9.1 (Affected Environment) of the SSU6 AFC. The study area (affected area), is census tract 101 of Imperial County and all large communities within easy commuting distance of the power plant as well as other ancillary facilities: Imperial County and the local area cities of Calipatria, Niland, Westmorland, Brawley, and El Centro. These communities are within a one-hour one-way commute distance of the power plant site, an area in which construction and operations workers may live. The applicant and staff utilized the Imperial County labor market area for its evaluation of construction and operation worker availability as well as community services and infrastructure impacts from construction and operation.

Imperial County was used as the study area in identifying non-fiscal (private sector) benefits from the SSU6. **Socioeconomics Table 1-Available Labor by Skill For Construction,** that follows, shows that Imperial County has more than adequate labor

supply for the SSU6 project except for plumbers, pipe fitters, steamfitters, welders, cutters, and laborers for relatively short periods of time (CEOE 2002a).

**SOCIOECONOMICS Table 1**
**Available Labor By Skill For Construction***

| Craft | Total Number of Workers in Imperial County 1999 | Projected Total Number of Workers in Imperial County 2006 | Maximum Number of Workers Needed for the Project | Average Number of Workers Needed for the Project | California OES Code |
|---|---|---|---|---|---|
| Maintenance Repairers/ General Utility | 480 | 550 | 62 | 30 | 85132 |
| Carpenters/ Millwrights | 210 | 320 | 89 | 58 | 87102 |
| Concrete Finisher | 50 | 80 | 35 | 22 | 87311 |
| Plumbers, Pipefitters, Steamfitters | 80 | 120 | 147 | 70 | 87502 |
| Welders and Cutters | 60 | 70 | 65 | 35 | 93914 |
| Laborers | 290 | 3600 | 69 | 50 | 79041 |

*** Source: California Employment Department. Labor Market Information. 2002.**

## EMPLOYMENT AND ECONOMY

According to the SSU6 AFC, the specific geographic boundaries from which all pertinent crafts will come includes census tract 101, Imperial County and all large communities within easy commuting distance of the power plant. This area includes El Centro, Calipatria, Brawley, Westmorland, and Niland. The average commute time is defined as distances that involve up to a one-hour, one-way commute for construction and operations employees. However, construction workers generally commute as much as two hours (one-way). This defines the local labor market. Construction workers who live in communities at greater distances than a two-hour, one-way commute tend to relocate to the project for the work week, and then return home on the weekend. Operations workers tend to fall inside a one-hour, one-way commute, and if they fall outside this area they will relocate. These commuting times define the local labor market and are not out of the ordinary for local work. The “non-local” workers are predicted to be 40 percent for construction and 10 percent for operations.

The Impact Analysis For Planning (IMPLAN) model (an input-output model), used in the AFC by the applicant to estimate employment impacts from the SSU6 project on the affected area, is widely used and therefore acceptable to staff. The University of California at Berkeley uses the IMPLAN model for regional economic assessment, and it has been used to assess other generating projects in California and the U.S. 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 that divides the (regional) economy into sectors and provides a multiplier for each sector (Lewis et al. 1979). Social Accounting Matrix (SAM)[1] multipliers were used for the applicant's economic impact analysis. SAM multipliers are similar to Type II multipliers because they include both the indirect and induced effect. An IMPLAN SAM variety employment multiplier of 3.1 was used for construction (e.g., the 265 new construction job's income supports approximately 570 indirect and induced or secondary jobs in the regional economy) and an IMPLAN SAM variety employment multiplier of 2.5 was used for operations (approximately 104 indirect and induced or secondary jobs in the regional economy). An IMPLAN SAM variety construction income multiplier of 1.6 was used that resulted in a secondary impact of $16.9 million and a total impact of $47 million.[2] Finally, an IMPLAN SAM variety operation income multiplier of 1.6 was used that resulted in a secondary impact of $3.6 million and a total impact of $9.5 million (Salton Sea 2002b). These multipliers are within an acceptable range of 2 to 2.5 over the long run often cited by many economists (Moss et al. 1994).

Project construction (power generation including wells, pipeline and electric power transmission) is expected to occur over a 26-month period. The greatest number of construction workers (peak), estimated to be 467 workers will be needed in the 19$^{th}$ month of construction.

The number of construction workers will range from seven in the last month of construction to approximately 467 workers in the 19$^{th}$ month of construction. The proportion of non-local workers needed for power plant construction is estimated to be 40 percent.

During operation of the project, about 69 workers will be needed to maintain and operate the project. These workers will come mainly from the local area.

The Imperial County unemployment rate was 21.9 percent in 2000 and is forecast to be 37.7 percent in 2004 (CEOE 2002a). The November 2002 preliminary, not seasonally adjusted, unemployment rate for Imperial County was 20.8 percent (State of California 2002).

## POPULATION

The project is located in a rural area near nine other geothermal power plants. The 2000 Census shows California with a total population of 33,871,648, minority population of 18,054,858 (53.3 percent), and white (non-hispanic) population of 15,816,790 (46.7 percent). For Imperial County, the 2000 Census shows a total population of 142,361, minority population of 113,593 (79.8 percent), and white population (non-Hispanic) of 28,768 (20.2 percent). The SSU6 AFC reports that Imperial County Census Tract 101 in the 2000 Census had 9,586 persons. There are no known residential communities

[1] Type SAM multipliers capture inter-institutional transfers and account for social security and income tax leakages, institutional savings, and commuting.

[2] All project construction and operations cost data and economic impact estimates are presented in 2002 dollars (CEOE 2002e).

within six miles of the site and the closest residence is 0.75 miles from the power plant site. As mentioned under the **Employment** section, the majority of construction and operation labor will be local so there would be little induced population growth from the SSU6 project. Furthermore, there would be no displacement of population by the SSU6 project.

The non-local construction workforce (approximately 40 percent of the total construction workforce) would be distributed in Imperial County in the following manner:

- 50 percent in El Centro (2000 Census population of 37,835 - 30 miles from the project site) and Brawley (2000 Census population of 22,052 - 17 miles from the project site), and other areas south of the site.
- 25 percent in Calipatria (2000 Census population of 7,289 - six miles from the project site), and other areas east of the site.
- 25 percent from Niland (seven miles from the project site), and other areas north of the site.

No analytical technique (e.g., a gravity model) was used to estimate the data. Staff agrees with the applicant that construction workers will likely not relocate their families for the duration of the project since construction jobs are seasonal and/or short-term (CEOE 2002n).

About 90 percent of the operational workers are expected to come from the above cities in Imperial County and 10 percent are expected to commute from Indio (1 hour and 20 minutes one way from the project site) or La Quinta (1 hour and 30 minutes one-way from the project site) in nearby Riverside County (CEOE 2002n).

Generally, construction workers commute as much as two hours one-way. Construction workers who live in communities at greater distances than a two hour one-way commute tend to relocate to the project for the workweek and return home on the weekend, or temporarily relocate with their families (which is not expected for this project). Operation workers tend to fall inside a one-hour, one-way commute, and if they fall outside this area they tend to relocate. Generally, this is consistent with the data presented. However, staff finds it acceptable that operation workers may commute a somewhat longer distance from Indio or La Quinta. If they choose to relocate, adequate housing is available within 10 miles of the project area (CEOE 2002n) for approximately seven non-local operation workers (and their families).

## HOUSING

According to federal standards, permanent housing is considered to be in short supply if the vacancy rate is less than five percent (URS 2000). As of 2000 (see section 5.9.1.4.2, Permanent Housing and Table 5.9-5 of the SSU6 AFC (CEOE 2003p)), there were approximately 43,891 housing units in unincorporated Imperial County and an additional 20,929 housing units in the incorporated communities in the study area. The vacancy rate for this housing averages approximately 5.9 to 7.1 percent for permanent and rental housing. There are 960 hotel/motel rooms and suites in the study area community, but no information was available on vacancy rates. The housing units available to non-local construction workers (approximately 106) for this project are

sufficient for worker needs. The majority of the construction workforce and most of the operations work force is expected to be drawn from the local labor force.

The SSU6 project will be located in unincorporated Imperial County in a low population density area with no displacement of housing. The **Population** section notes the closest residences and residential community.

## FISCAL

The SSU6 Project is 185 MWs with total project costs of $460 million. The capital costs of the project are from $255 to $405 million (CEOE 2003c). The local capital cost of constructing the project (equipment and materials) is estimated to $100 million. This would generate about $7.75 million in local sales tax revenues, some of which would be returned to the County and, the study area communities. The sales tax rate of 7.75 percent is comprised of the state sales tax rate (6.0 percent), the local sales tax rate (1.25 percent), and the district sales tax rate (0.5 percent for the Imperial County Local Transportation Authority). Approximately $30 million will be expended on construction related payroll.

The total payroll for the operation phase is estimated to be $5.9 million annually. The applicant anticipates that approximately $17 million in non-labor purchases (equipment and materials) would occur.

Operations payroll is expected to generate $178,328 in sales tax revenues annually with some returned to the County and communities in which purchases occur. Equipment and materials purchased during operations would generate sales tax revenues, as some of the purchases would occur in the County and study area communities.

It was estimated by the applicant that this project would have an assessed value of $265 million and at a recent average property tax rate of the applicant's other properties (1.132 percent) the annual property tax would be $2.9 million. This estimate did not consider any potential property tax rebate offered under the Capital Investment Incentive Program (CIIP) since this is currently not available to geothermal electric generating facilities. Currently, the CIIP is available to manufactures identified within a range of standard industry codes that does not include geothermal electric generating facilities (CEOE 2002n).

## SCHOOLS

The AFC (Section 5.9.6.5 School Districts) reports that Imperial County consists of 16 school districts, with a total of 31 elementary schools, seven middle schools, two junior high schools, nine high schools, and seven continuation schools. The project site is in the Calipatria Union School District. Calipatria Union has one elementary school for kindergarten through 8$^{th}$ grade and another elementary school for kindergarten through 4$^{th}$ grade. There is one middle school for grades 5 through 8, one high school for grades 9 through 12, and one continuation high school for grades 9 through 12. School expansion information was available for the Calipatria Union School District, which forecasts an expansion to accommodate 100 additional students over the next two to three years from a current enrollment of 1,300 students. For the Calipatria Union School District currently:

- overall, is not at full (100 percent) capacity.
- where an individual school has grades at over full (100 percent) capacity (demand is greater than supply), busing is used to alleviate the overcrowding problem.
- after the school expansion program is over, there will be no over full (100 percent) capacity (Raceles 2003).

School impact fees will only be paid to the Calipatria Unified School District serving the project area. Given that Calipatria Union School District assesses developer fees at the rate of $0.34 per square foot of roofed area for commercial and industrial space times 34,458 square feet of development (CEOE 2003p), the school impact fee amounts to $11,716. This fee goes to the school district, and can be used for temporary or permanent construction.

Staff agrees with the applicant that most non-local workers (40 percent or 187 of the peak and 106 average workers) will probably not bring their families for the 26-month project slated to start construction in the 6$^{th}$ month after the notice to proceed to the construction contractor. The first few months of the project involves work done by the engineering staff both on site and off site. In addition, 90 percent of the 69 permanent operations staff are likely to reside in one of the several communities in Imperial County (seven employees may be non-local). Overall, staff expects no significant impact on study area schools.

Education Code section 17620 states that public agencies may not impose fees, charges or other financial requirements to offset the cost for “school facilities.” School facilities are defined as “any school-related consideration relating to a school district’s ability to accommodate enrollment.” Local and state agencies are precluded from imposing (additional) fees or other required payments on development projects for the purpose of mitigating possible enrollment impacts to schools.

## POLICE PROTECTION

The AFC (Section 5.9.1.6.2 Law Enforcement) notes that the County Sheriff’s Department provides public protection services with 75 full time officers in unincorporated Imperial County which is where the SSU6 project will be located. Niland is about seven miles away and is where the nearest sub-station is located, but it is not operational 24 hours a day. The El Centro station, which is 40 miles from the SSU6 project site, is open 24 hours per day. Overall, average response time is 10 minutes to the project and there is no plan for additional police stations or officers as a result of the project.

The SSU6 project would not significantly increase the existing demand for police service or adversely affect police protection in and around the SSU6 project area. There would be a small increase in population during the 26 months of construction and during operation, but most of the workforce is local (CEOE 2002a).

## MEDICAL SERVICES/UTILITIES

SSU6 will have its own emergency response plan. In an emergency the Calipatria Fire Department Emergency Medical Team, located 11 miles from the site, would be the first unit dispatched. Next would be Gold Cross Ambulance with 50 personnel, and a

response time of 40 minutes from El Centro, and 20 minutes from Brawley. According to Gold Cross Ambulance, ambulances are more likely to be dispatched from Brawley located 20 minutes closer to the SSU6 project site. Furthermore, it would take approximately 20 minutes to send a person needing medical attention from the SSU6 project site to Pioneer Memorial Hospital in Brawley and 40 minutes to the El Centro Regional Center in El Centro (CEOE 2002a).

There are two hospitals in Imperial County. Pioneers Memorial Hospital in Brawley is the closest and is about 22 miles from SSU6 with 105 doctors/physicians and 100 beds. El Centro Regional Medical Center is in El Centro about 30 miles away. El Centro Regional Medical Center has 107 beds and 137 doctors/physicians. The El Centro Regional Medical Center is currently undergoing expansion with a new building expected to be completed sometime in March 2003. The new building will be jointly used by the ICU (Intensive Care Unit), DOU (Definitive Observation Unit), and the Med-Surgery (Medical Surgery) unit (CEOE 2002a).

Increases in demand for emergency medical services and hospitals would be small due to the short-term nature of construction and the small-expected increase in population during operation and construction.

Increases in demand for utilities because of project construction or operation will not be great because project construction is short-term, 26 months, and not anticipated to increase demand for utilities. No natural gas will be used in this project. Imperial Irrigation District (IID) provides electric power to this area, which includes Imperial County and portions of Riverside and San Diego Counties.

Water and wastewater discharge is discussed in a separate FSA section entitled **Water Resources**. Adequate supplies of electricity are available for the SSU6 project and are discussed in the FSA **Reliability** section. Fire protection is discussed in the FSA section entitled **Worker Safety and Fire Protection**. Solid waste removal is discussed in the FSA section entitled **Waste Management**.

Finally, the SSU6 project will not directly or indirectly induce substantial population growth. Hence, there are no significant socioeconomic impacts that might trigger adverse physical impacts in the provision of public services.

## 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.

Construction of the SSU6 project is expected to occur between the last quarter of 2003 and the last quarter of 2005, with peak construction activity occurring in the first part of 2005. Three projects were identified in the area; however, only two projects had concurrent construction schedules with the SSU6 project. Since construction would begin in 2004 and end in 2007, most construction of the State Route 78/111 Expressway (Brawley Bypass) would not coincide with construction of the SSU6 project. The expressway project is also located 12 to 15 miles from the SSU6 Project. Due to the nature of the expressway project, it is likely that both projects would require different

types of skilled labor, and the concurrent construction schedules would not deplete certain types of trade labor and equipment even on a temporary basis. Cumulative impacts would not be considered significant.

Construction activities associated with the Imperial Irrigation District Water Conservation and Transfer Project/Habitat Conservation Plan are anticipated to begin by the end of 2003 and be on-going. Although the SSU6 project would be constructed concurrent with some of these construction activities, cumulative impacts would not be considered significant because these projects will require skilled workers from different crafts. There is no concurrent power/generating construction projects planned in the project vicinity (CEOE 2002e).

Because the SSU6 would not result in any significant adverse socioeconomic impacts to population, housing, or public services, it is unlikely that it would contribute significantly to cumulative socioeconomic impacts. Staff concludes that there are no significant adverse cumulative socioeconomic impacts.

## MINORITY AND LOW-INCOME POPULATIONS (ENVIRONMENTAL JUSTICE SCREENING ANALYSIS)

The purpose of the environmental justice (EJ) screening analysis is to determine whether a low-income and/or minority population exists within the potentially affected area of the proposed site. Staff conducted the screening analysis in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis", Guidance Document, (EPA 1998). Minority populations, as defined by this Guidance Document, are identified where either:

- the minority population of the affected area is greater than fifty percent of the affected area's general population;
- the minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis, or
- one or more census blocks in the affected area have a minority population greater than fifty percent.

In 1997, the President's Council on Environmental Quality issued Environmental Justice Guidance that defines minority as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander; Black not of Hispanic origin; or Hispanic. Low-income populations are identified with the annual statistical poverty thresholds from the Bureau of the Census's Current Population Reports, Series P-60 on Income and Poverty (OMB 1978).

Staff has reviewed Census 2000 information that shows that the minority population by census block within a six-mile radius is 65.77 percent. This exceeds staff's threshold of fifty percent within a six-mile radius of the proposed SSU6 power plant (See **Socioeconomics Figure 1**).

Also, there are pockets (census blocks) with a greater than 50 percent minority population. Census 2000 by Census Block Group information shows that the low-income population is 18.55 percent within the same radius. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old.

Based on this socioeconomic analysis, staff has not identified significant direct or cumulative, adverse socioeconomic impacts resulting from the construction or operation of the project. The SSU6 will be built in a rural area, will not physically alter a community, and will largely utilize a local labor force that would not create any new significant demands on community infrastructure and services. Therefore, there are no socioeconomic EJ issues related to this project.

For a listing of other technical sections that include an EJ analysis, please refer to the **Introduction** section of this **Final Staff Assessment**. For a summary of Environmental Justice impacts regarding these other sections, please see the **Executive Summary**.

## FACILITY CLOSURE

The SSU6 AFC did not provide for the inclusion of socioeconomic LORS that 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. The planned lifetime of the proposed power plant is 30 years.

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.

Any unexpected, permanent closure of the SSU6 would not likely cause any significant adverse socioeconomic impacts on the affected area, because facility closure impacts (i.e., dismantling) would be similar to construction impacts, and staff has found no significant adverse socioeconomic impacts due to the construction of the project. However, a facility closure plan would be analyzed to determine if there would be any socioeconomic impacts.

## MITIGATION

Staff has not identified any significant adverse socioeconomic impacts. One mitigation measure is proposed to require payment of the one-time statutory school development fee.

## CONCLUSIONS AND RECOMMENDATIONS

## CONCLUSIONS

There are estimated gross benefits from the SSU6, which include increases in sales taxes, employment, and income for Imperial County (secondary impacts could spill over outside Imperial County). For example, during construction, there are estimated to be 265 direct project-related construction jobs for 26 months of construction, resulting in 834 total jobs (265 average construction jobs x 3.1 based on IMPLAN SAM variety construction employment multiplier) that will be created, of which 570 are secondary (indirect and induced) jobs. Secondary construction income impacts are estimated at $16.9 million. For operations, 69 direct jobs will be created with 104 secondary (indirect and induced) jobs for a total of 173 jobs. Secondary operation income impacts are estimated at $3.6 million. The sales tax on materials (purchase of equipment during construction) is estimated to be $7.7 million, some of which would be returned to Imperial County and the study area communities. Property taxes would be $2.9 million annually over a planned plant life of 30 years.

Staff finds that the SSU6 will not cause a significant adverse socioeconomic impact on the affected area's (i.e., the labor supply area) housing, schools, police, emergency services, hospitals, and utilities. Based on staff's demographic screening analysis, the minority population within six miles of the proposed power plant site met the threshold of greater than 50 percent, though this was not true for low-income people. There were no significant adverse socioeconomic impacts since most of the construction and operation workforce is within the regional or local labor market area and construction activities are short-term. Staff has determined that there would be no significant adverse direct or cumulative socioeconomic impacts, and therefore there are no socioeconomic environmental justice issues.

The SSU6 project, as proposed, is consistent with all applicable socioeconomic LORS.

The following **Socioeconomics Table 2** provides a summary of socioeconomic data and information from this analysis, with emphasis on economic benefits of the SSU6 project.

| SOCIOECONOMIC DATA AND INFORMATION – TABLE 2[3] | |
|---|---|
| Project Capital Costs | $460 million |
| Estimate of Locally Purchased Equipment and Materials | |
| Construction | $100 million |
| Operation | $17 million |
| Estimated Annual Property Taxes | $2.9 million |
| Estimated School Impact Fees | $11,716. |
| Direct Employment | |
| Construction | 265 jobs |
| Operation | 69 jobs |
| Secondary Employment (Indirect and Induced Impacts) | |
| Construction | 570 jobs |
| Operation | 104 jobs |
| Direct Income | |
| Construction | $30 million |
| Operation | $5.9 million |
| Secondary Income (Indirect and Induced Impacts) | |
| Construction | $16.9 million |
| Operation | $3.6 million |
| Payroll | |
| Construction | Total:$30 million |
| Operation | Total:$5.9 million annually |
| Estimated Sales Taxes | |
| Construction | $7.75 million in local tax revenues from locally purchased equipment and materials, some which would be returned to the County and the study area communities. |
| Operation | $178,328 in sales tax revenue annually from operation payroll.[4] |
| Existing/Projected Unemployment Rates | Existing - 20.8 percent in November 2002, not seasonally adjusted.<br>Projected - 37.7 percent in 2004. |
| Percent Minority Population (6 mile radius) | 65.77 percent. |
| Percent Poverty Population (6 mile radius) | 18.55 percent. |

[3] Table 2 uses 2002 dollars, construction is for 26 months, and project life planned for 30 years. Economic (non-fiscal and fiscal) impacts, unemployment, and population information are generally for Imperial County.

[4] Equipment and materials purchased during operations would be worth about $17 million and generate sales tax revenues. Some of the purchases would be in the study area communities and would generate sales tax revenue for the county and the study area communities.

## RECOMMENDATIONS

Staff recommends one proposed condition of certification.

## PROPOSED CONDITION OF CERTIFICATION

**SOCIO-1** The project owner shall pay the one-time statutory school facility development fee as required at the time of filing for the in-lieu building permit with the Imperial County Planning/Building Department.

**Verification:** The project owner shall provide proof of payment of the statutory development fee in the next Monthly Compliance Report following the payment. (Rev. 2/7/02)

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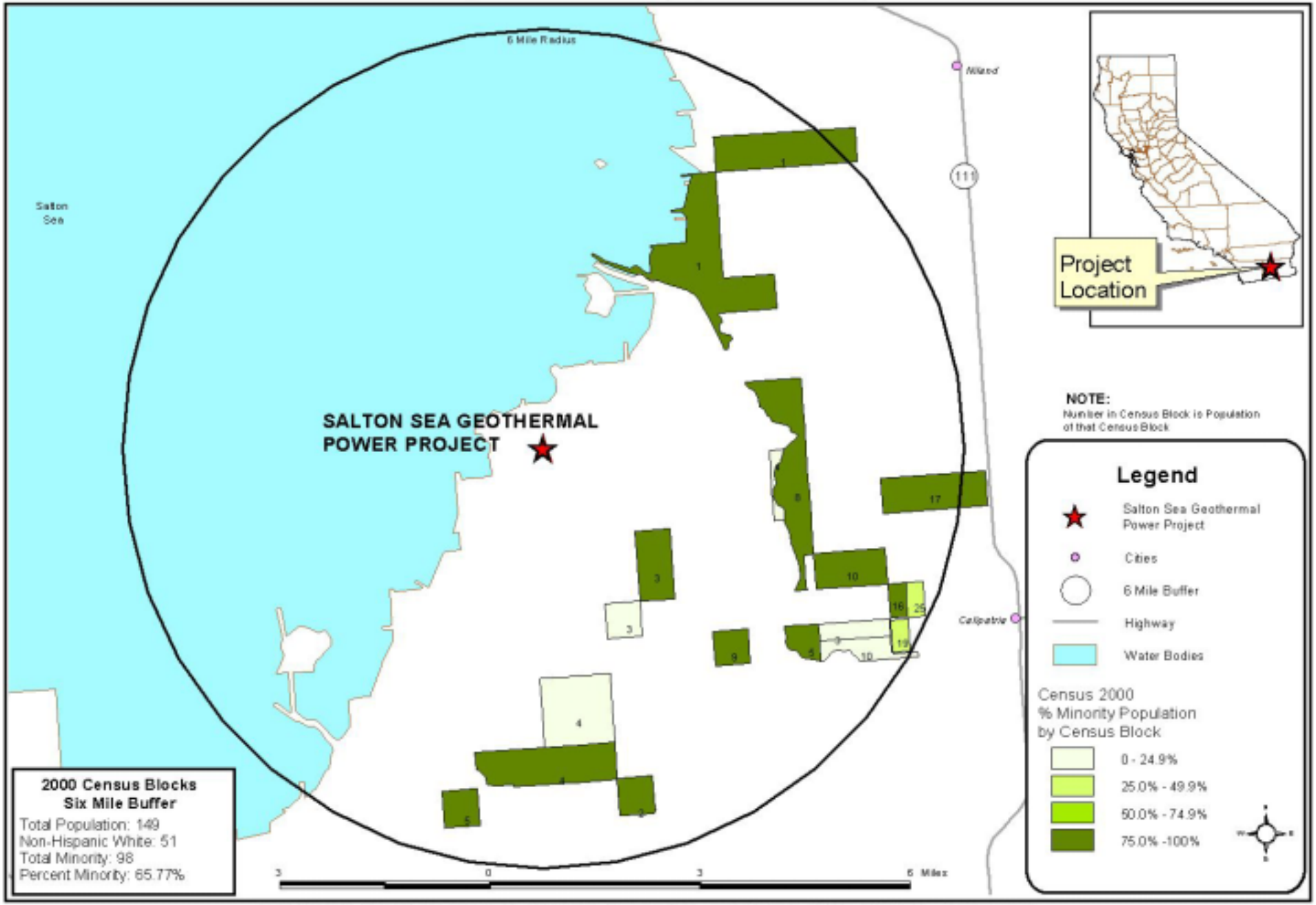
**SOCIOECONOMICS - FIGURE 1**

Salton Sea Geothermal Power Project - Census 2000 Minority Population Percentage by Census Block - Six Mile Buffer




CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003

SOURCE: California Energy Commission Statewide Transmission & Power Plant Maps 2002, Census 2000 PL 94-171 Data - Matrix PL2

# SOIL AND WATER RESOURCES

Testimony of Mike Krolak

## INTRODUCTION

This analysis examines the soil and water resource aspects of the Salton Sea Unit 6 Project (SSU6 Project) proposed by CE Obsidian Energy, LLC, specifically focusing on the following:

- Whether the project's demand for fresh inland surface water affects long-term reliability of water supply;
- Whether the project's wastewater management practices would lead to degradation of surface or ground water quality;
- Whether the project construction or operation would lead to degradation of existing surface drainage or surface water quality; and,
- Whether the project would comply with all applicable laws, ordinances, regulations and standards.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

### FEDERAL

#### Clean Water Act

The Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States.

The Clean Water Act requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. These discharges are regulated by the National Pollutant Discharge Elimination System (NPDES). In California, NPDES permitting authority is delegated to, and administered by, the nine Regional Water Quality Control Boards (RWQCBs). The Colorado River Basin Regional Water Quality Control Board (CRBRQWCB) regulates NPDES permits for cooling water, construction and operational stormwater discharges, and other wastewater discharges for this project.

Section 401 of the Act requires that the RWQCB must certify any activity that may result in a discharge into a waterbody. This certification ensures that the proposed activity will not violate state and federal water quality standards.

Section 404 of the act regulates the discharge of dredged or fill material into waters of the United States, including rivers, streams, and wetlands. Site-specific or general (Nationwide) permits for such discharges are issued by the Army Corp of Engineers (ACOE) and are certified by the RWQCB under Section 401.

## Resource Conservation and Recovery Act

40 CFR part 261 identifies those solid wastes which are subject to regulation as hazardous wastes which are subject to the notification requirements of section 3010 of RCRA. These definitions exempt geothermal fluids from hazardous waste classification.

# STATE

## Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1967, Water Code section 13000 et seq., requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. These criteria include the identification of beneficial uses, narrative and numerical water quality standards and implementation procedures. The criteria for the project are contained in the Water Quality Control Plan (Basin Plan), Colorado River Basin Region. This plan sets numerical and/or narrative water quality standards controlling the discharge of wastes to the state's waters. These standards would be applied to the proposed project through the Waste Discharge Requirements (WDRs), during construction and/or operation of the project.

## The Safe Drinking Water And Toxic Enforcement Act of 1986 (Proposition 65)

The Safe Drinking Water and Toxic Enforcement Act of 1986, Health and Safety Code section 25249.5 et seq., prohibits the discharge or release of chemicals known to cause cancer or reproductive toxicity into drinking water sources.

## Public Resources Code, Division 3, Chapter 4, Sections 3700-3776

These sections of the California Public Resources Code require that wells for the discovery and production of geothermal resources be drilled, operated, maintained, and abandoned in such manner as to encourage the greatest ultimate economic recovery of geothermal resources, to prevent damage to life, health, property, and natural resources, and to prevent damage to, and waste from, the underground and surface waters suitable for irrigation or domestic purposes by reason of the drilling, operation, maintenance, and abandonment of geothermal resource wells. The California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) regulates these wells.

The California Code of Regulations, Title 14, Division 2, Chapter 4, Subchapter 4 contains the articles that regulate the CDOGGR review and approval process for these facilities. The substantive articles address the following: drilling, blowout prevention, completion and production, injection, subsidence, and plugging and abandonment.

## California Constitution, Article X, Section 2

This section requires that the water resources of the State be put to beneficial use to the fullest extent possible. The waste, unreasonable use or unreasonable method of use of water is prohibited. The conservation of such waters is to be exercised with a view to the reasonable and beneficial use in the interest of the people and for the public

welfare. The right to water or to the use or flow of water in or from any natural stream or water course in the State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use, or unreasonable method of use, or unreasonable method of diversion of water. This section is self-executing, and the Legislature may also enact laws in the furtherance of the policy contained in this section.

## STATE POLICIES

### State Water Resources Control Board Policy 75-58

The SWRCB has also adopted a number of policies that provide guidelines for water quality protection. The principle policy of the SWRCB which addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for powerplant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. This SWRCB policy requires that power plant cooling water should come from, in order of priority:

- wastewater being discharged to the ocean
- ocean water
- brackish water from natural sources or irrigation return flow
- inland waste waters of low total dissolved solids
- other inland waters

This policy also addresses cooling water discharge prohibitions.

## LOCAL

### Imperial County Land Use Code

#### Division 16, Chapter 3

This chapter establishes that this ordinance applies to all areas of special flood hazards, including land around the Salton Sea and lying at or below the –220 foot elevation contour.

#### Division 16, Chapter 4

This chapter identifies development permit requirements for special flood hazard areas. These requirements include, but are not limited to, plans in duplicate drawn to scale showing the nature, location, dimensions and elevations of the area in question; existing or proposed structures, fill, storage or materials, drainage facilities; and the project location.

**Division 17, Chapter 1**

This chapter establishes regulations to facilitate the beneficial use of the geothermal resource, to prevent wasteful or detrimental uses, and to protect people, property, and the environment from adverse impacts of improper use of the resource.

Section 91701.01, Item J requires an Emergency Response Plan be prepared in consultation with appropriate agencies to address emergencies including but not limited to blowouts and major fluid spills.

Section 91701.01, Item O requires that facilities be designed to protect surface and ground water quality.

Section 91702.00, Specific Standards, C requires that the site be designed to retain the maximum amount of usable agricultural land and that the site not interfere with irrigation or drainage patterns, and shall comply with the requirements and regulations of the Imperial Irrigation District.

Section 91702.00, Specific Standards, H requires that permanent sumps, brine ponds, waste holding ponds, and any other pond be designed and constructed to meet sound engineering standards and the regulations and requirements of the Regional Water Quality Control Board.

## SETTING

## VICINITY AND SITE DESCRIPTION

The proposed project would be located in a region known as the Salton Basin. The proposed facility site would occupy approximately 80 acres. The eight production and injection well pads would occupy approximately 5 acres each; linear facilities, including brine pipelines, transmission towers, and the Bannister Road switchyard would bring the total land occupied by the project to approximately 197 acres. Of this 197 acres, 173 acres are currently used for farmland production. The power plant site would be graded to a final elevation of –228 feet.

The climate of the Salton Basin region is influenced heavily by the mountains in the area. Cool, moist westerly winds blow inland from the Pacific Ocean, losing their moisture as they rise up over the San Bernardino and San Jacinto Mountains. These winds, now dry, heat up as they flow down into the Salton Basin, producing the arid environment that dominates the Basin.

Temperatures in the Basin vary over a great range. July temperatures range from average lows of 75°F to average highs of 107°F, while January temperatures range from average lows of 38°F to average highs of 70°F.

Recent annual rainfall averages have been as low as 0.3 inches during the winter of 1995-96, and have been as high as 7.7 inches during the winter of 1992-93. **SOIL & WATER Table 1** depicts the average monthly rainfall for the basin.

**SOIL & WATER Table 1**
**Average Monthly Precipitation for the Salton Basin (inches)**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.6 | 0.4 | 0.2 | 0.08 | 0.03 | 0.01 | 0.1 | 0.2 | 0.3 | 0.2 | 0.2 | 0.3 |

Source: Redlands 2002.

While rainfall events generally occur in the winter months, during summer months, warm, moist tropical air moves from the Gulf of California and Mexico into the Colorado Desert, occasionally bringing thunderstorms to the Basin. In addition, the hot desert sun warms the water in the Gulf, which rises and picks up vast amounts of water vapor, sometimes forming thunderheads and occasionally a tropical cyclone. These storms, which occur infrequently (once every five to ten years) bring near hurricane-strength winds which pick up sand and debris, and bring nearly three or four years worth of average precipitation in just a few fours (Redlands 2002).

## Surface Hydrology

The Salton Sea and its two primary tributaries, the Alamo River and the New River, are the most prominent surface water bodies in the project vicinity. The project is located in a 7,851 square mile watershed known as the Salton Basin. The Salton Basin is a closed basin, which means that it has no outlet; in this case, no rivers or streams flow out from the Salton Sea.

An outlet can stabilize water quality by consistently flushing the system, however, water leaves the Basin only through evaporation. Absent current inflows, the Salton Sea would dry up in about ten years. However, approximately one-sixth of the Sea is replaced each year, equal to the amount lost through evaporation (Redlands, 2002). The Alamo and the New Rivers account for approximately 77% of the inflow to the Salton Sea each year (Redlands 2002).

Approximately 1.36 million acre-feet per year (AFY) of water evaporates from the Sea's 381-square mile surface (Redlands 2002). This evaporation concentrates all the chemical substances that make their way to the Sea. The most abundant of these substances are salts, entering the sea at a rate of approximately 4,000,000 tons of dissolved salt per year. Scientists estimate that there are approximately 500 million tons of salt in the Salton Sea, creating a concentration of approximately 44 parts per thousand (ppt). For comparison, the Pacific Ocean salt content is approximately 35 ppt, or about 25% less saline than the Salton Sea (SSA 2000).

The Alamo and New Rivers are both perennial waters originating in Mexico. Alamo River inflows come primarily from agricultural runoff, and as a result the stream is listed as impaired under the Clean Water Act 303(d) lists for pesticides, silt, and selenium. The New River is fed by agricultural runoff as well, but also receives untreated wastewater flows from Mexico. The New River is listed as impaired for pesticides, silt, nutrients, bacteria, and volatile organic compounds (VOCs).

The SSU6 site occupies land designated by the Federal Emergency Management Agency (FEMA) as Zone A (within the 100-year floodplain) and Zone D (possible but undetermined flood hazard). The site is currently in use for agricultural purposes, and is artificially graded and conditioned, so natural swales and drainage features do not

currently exist on-site. The site is currently surrounded by a series of eight-foot-tall levees that also act as access roads for the area. The levees and berms in the project vicinity control run-off and direct stormwater to canals that terminate in the Salton Sea.

Man-made canals comprise a large number of smaller surface water conveyances in the area. Canals operated by the Imperial Irrigation District criss-cross the vicinity of the project, generally paralleling roads and other permanent features. The canals are used to distribute irrigation water to agricultural lands and other projects, and some canals are dedicated to conveying agricultural tailwaters to the Salton Sea.

## Ground Water

Ground water at the site is categorized under the Imperial Valley Planning Area according to the Region 7 Basin Plan (CRBRWQCB, 2002). Ground water in the site vicinity generally flows toward the axis of the Imperial Valley and then northward to the Salton Sea (CEOE 2002a Page 5.4-4). This ground water recharge accounts for approximately four percent of the Sea's annual inflow (Redlands 2002), and also provides recharge for the Alamo and New Rivers.

The geotechnical investigation performed at the site and included in Appendix J of the AFC found that the depth to groundwater is shallow at the project site, ranging from approximately three to six feet. During periods of heavy irrigation, the water table can rise to 18 inches below ground surface (CEOE 2002a Page 5.3-2). The shallow ground water aquifers in the central Imperial Valley are fed primarily by seepage from agricultural canals and drains throughout the region. Leaching of salts from irrigated lands contributes high salinity to ground waters in the central Imperial Valley, as total dissolved solids concentrations vary between 1,000 and 3,000 mg/L (ICPBD 1993).

The upper 500 feet of soil in the central part of the valley range has transmissivities from 150 to 1,500 feet squared per day, which is very low compared to soils in the eastern and western Imperial Valley (approximately 20,000 to 30,000 feet squared per day) (USGS 1995). These low permeabilities minimize mixing of waters between shallow and deep aquifers in the region. Tile-drain systems are required to dewater the sediments to a depth below the root zone of most crops (ICPBD 1993).

Few wells have been drilled in these lake sediments because of the poor yield and saline quality. In addition, studies performed by the Regional Board and U.S. Geological Survey indicated that drainage water in the Imperial Valley contains pesticides in quantities which often exceed the Environmental Protection Agency's criteria for protection of fish and wildlife, as well as high levels of sediments and nutrients (ICPBD 1993).

The deep aquifer has been estimated to contain anywhere from 1.1 billion to 3 billion acre-feet of water, with the recoverable amount around 20% (220 million to 600 million acre-feet). Annual recharge is about 400,000 acre feet from various sources (ICPBD 1993). Referred to as the Salton Sea Known Geothermal Resource Area (KGRA), this aquifer includes brines from which geothermal steam is extracted for powering the turbine for the proposed SSU6. Detail regarding the geothermal resources specific to SSU6 are further described in CEC 2002e, CEOE 2002I, CEOE 2002j, and DOGGR

2002. For more information on the sufficiency of the fuel supply, please refer to the finding of sufficient geothermal resource for the project (CEC 2003b).

## Soils

Soils underlying proposed project facilities consist of 15 different soil types. However, more than 95% of the project would disturb only two soil types.

Approximately two-thirds of the disturbance would impact soils of the Imperial-Glenbar Series, Silty Clay Loams, Wet, with slopes from zero to two-percent. This poorly drained soil is level and very deep. Permeability is slow to rapid, with shrink-to-swell potential ranging from moderate to high. This soil is highly susceptible to water erosion, and moderately susceptible to wind erosion.

The other approximate third would disturb Holtville Silty Clay, Wet. This poorly drained soil is nearly level and very deep. Permeability is slow to rapid, with shrink-swell potential ranging up to high. Much like the Imperial-Glenbar Series soils on the project site, this soil is highly susceptible to water erosion, and moderately susceptible to wind erosion.

Fifteen of the twenty soil-mapping units in the SSU6 vicinity, when irrigated, meet the criteria for either Prime Farmland or Farmland of Statewide Importance as designated by the United States Department of Agriculture's Natural Resources Conservation Service. For more information regarding farmland impacts, please refer to the **LAND USE** section of this document.

## PROJECT DESCRIPTION

The proposed SSU6 Project would produce a nominal 185 MW, and consist of a geothermal Resource Production Facility (RPF), a geothermal-powered Power Generation Facility (PGF), and associated linear and on-site facilities. The RPF would include extraction wells, brine and steam handling facilities, solids handling facilities, two brine ponds, injection wells, and steam polishing equipment. The PGF would include a condensing turbine/generator set, gas removal and abatement systems, and a heat rejection system. The project would require approximately 293 AFY of fresh water during an average year, but could require up to 987 AFY if the brine were to reach a salinity of 25.0% (for a full discussion see the **Fresh Water Supply** discussion below).

Ten production wells would produce the geothermal brine, from which steam is extracted and utilized as fuel in the PGF process. These production wells are generally located to the northwest of the plant facility. Once solids are removed to appropriate levels, a portion of the treated brine would be used as makeup water in the cooling towers for heat rejection by evaporation.

Process wastewater would be reinjected back into the geothermal aquifer to the southeast of the plant facility to facilitate the renewable quality of the resource. When necessary, the brine would be pumped to one of two lined brine ponds for storage prior to reinjection or disposal.

Stormwater would be routed to an evaporation/percolation pond located in the northwest corner of the project site. The pond is designed to hold runoff from a 10-year, 24-hour storm event. In the event of a 100-year, 24-hour storm event, the system is designed to direct excess runoff to the service water pond if necessary to prevent stormwater discharge off-site. Stormwater routed to the service water pond may then be used to process heat-depleted brine.

The project would also consist of various linear facilities to serve the project. A total of approximately one mile of cement-lined carbon-steel pipelines would bring the geothermal brine from the production wells to the facility, and a total of approximately three miles of cement-lined carbon steel pipelines would direct the spent brine to the injection wellheads. Five hundred feet of buried pipeline would carry fresh water to the project's service water pond from the Imperial Irrigation District (IID) delivery system.

The project would also require a 16-mile transmission line that would connect the project to the existing IID L-Line at a new switchyard, and a 15-mile transmission line to tie-in to the existing IID Midway substation.

Please refer to the **Project Description** section of this document for more information on SSU6 Project facilities.

## Water Supply

The primary water demand for the SSU6 Project is for cooling tower makeup. This water demand would be satisfied by condensate from steam extracted from the geothermal brine. This brine comprises the fuel as well as the cooling water for the project. During average conditions, the production wells would bring 25,536 gallons per minute (gpm) of geothermal brine with wellhead temperatures approaching 500°F to the Brine/Steam Handling facility.

Steam is flashed off in three stages: high pressure, standard pressure, and low pressure. All of the steam (approximately 5639 gpm) is sent to the PGF, where it is forced through the turbine/generator, producing 185 MW of net power. After powering the turbine, steam is sent to the condenser, this condensate is routed to the cooling tower, where 4,289 gpm (6.2 million gallons per day) is evaporated in the cooling process.

The SSU6 project would also require fresh water to dilute and cool the brine prior to reinjection. A water balance diagram submitted as part of Data Response 76 (CEOE 2002l, Figure 3.3-9b) that depicts the extreme hour case shows 1,625 gpm of fresh water to be consumed in the cooling towers for evaporative cooling, and Data Response 75 (CEOE 2002l) states that fresh water augmentation for cooling purposes may be required under certain operating circumstances. This demand would be met by the delivery of 293 acre-feet per year (AFY) to the project by IID. The Applicant has contracted a supply of up to 1000 AFY with IID to meet fresh water demands under varying conditions.

IID would supply this water from their annual entitlement of 2.6 million acre-feet (MAF). This water right was defined in 1964 as a result of the United States Supreme Court Case of *Arizona v.* California *(373 U.S. at 546)*, and this case also defined those rights as “present perfected” rights, which are rights that must be satisfied first during times of shortage (IID 2002b).

The project includes construction of a buried 500-foot pipeline that would tie into the existing IID delivery system to facilitate the transfer of water to the site.

**California Water Rights and the Colorado River**

In accordance with the Colorado River Compact of 1922, the Upper and Lower Basin States are each entitled to the exclusive beneficial consumptive use of 7.5 million acre-feet (MAF) of Colorado River water each year, in perpetuity. In addition, an option is granted to the Lower Basin States for the use of an additional 1.0 MAF for beneficial consumptive use. The 1929 California Limitation Act limits California's annual consumptive usage to 4.4 MAF, plus not more than one-half of any excess or surplus water unapportioned by the Compact. A supplemental decree issued for the case of *Arizona v. California* in 1979 by the U.S. Supreme Court reaffirmed this amount.

While California has been apportioned this 4.4 MAF (plus excess), it has been using approximately 0.8 MAF more than this amount. IID has delivered an average of 2.84 MAF from 1996 to 2001, with approximately 97% of that water being delivered for agricultural uses (IID 2002a).

Recently, the U.S. Department of the Interior ruled that California must reduce its usage to the approved 4.4 MAF allotment because a plan to reduce Colorado River water use to that level over a set period of time was not agreed upon by the water purveyors concerned with this issue in California. While hope for a satisfactory plan still remains, two State Senators have announced their intention to introduce legislation that would prohibit IID from delivering more than their historic 2.6 MAF baseline water right. Discussion and negotiations at various levels concerning this case will likely continue into the future.

## Wastewater

The SSU6 Project would dispose of most waste streams through the use of injection wells. Seven injection wells would reinject spent brine, drilled to depths between 8,500 and 8,800 feet. These wells would be cased to depths between 3,650 and 5,250 feet.

One dedicated injection well would inject cooling tower blowdown, and another would inject liquids from the brine ponds. These wells would be designed to discharge those waste streams at depths between 1,200 and 2,250 feet.

After steam has been flashed off of the geothermal brine and solids are handled, it would pass through the clarifiers and would be reinjected at an annual average rate of 19,201 gpm. Approximately 433 gpm of liquid waste from the thickener, which includes filter press filtrate, and liquid from bermed areas around plant equipment would be injected with the spent brine.

When necessary during non-standard conditions such as maintenance or injection shut down, the brine would be directed to the two brine ponds and would eventually be reinjected through the dedicated brine pond well. The ponds are sized to hold 548,000 cubic feet of brine (approximately 4.1 million gallons), allowing for two feet of freeboard.

Approximately 983 gpm of cooling tower blowdown would be injected through the dedicated cooling tower blowdown well.

Domestic waste would be directed to a septic tank, which would be pumped out as necessary.

## ENVIRONMENTAL IMPACTS

## DIRECT AND INDIRECT IMPACTS

### Surface Hydrology

Development of roads, buildings, and other paved or impermeable surfaces constructed as part of the project would increase the amount of runoff at the site. This may increase stormwater flows and may increase the chances for contaminants to enter stormwater flows and be carried off-site.

The SSU6 Project would be required to comply with the general NPDES requirements that regulate storm water effluent limitations and monitoring and reporting requirements for construction activities stormwater and the industrial activities (operational) stormwater general permits. The applicant would supply all information required by the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) to determine compliance with the NPDES requirements for storm water discharge. When the information provided is satisfactory to the CRBRWQCB, the project owner would receive both an NPDES General Permit for Stormwater Discharges Associated with Construction and an NPDES General Permit to Discharge Stormwater Associated with Industrial Activity.

The project would also be required to incorporate a Stormwater Pollution Prevention Plan (SWPPP) into its design to ensure that stormwater discharges from the project are handled properly with respect to both volume and water quality.

The project would construct a 4.4 acre-foot capacity detention basin to prevent stormwater runoff from leaving the site. The detention basin is designed to handle the runoff from a 10-year, 24-hour rainfall, and would function primarily as an evaporation/percolation basin. Stormwater runoff with the potential for oil contamination would be routed to an oil/water separator before being discharged to the detention basin. In the event of a 100-year, 24-hour storm event, the system is designed to direct excess runoff to the service water pond if necessary to prevent stormwater discharge off-site. The 100-year, 24-hour storm event water volume would still allow for 0.82 feet of freeboard in the service water pond (CEOE 2002e, page WATER-19). Stormwater routed to the service water pond may then be used to process heat-depleted brine.

During construction, stormwater would be directed to either the detention basin or the brine ponds, both of which would be constructed during the early stages of grading.

This design and mitigation should result in no significant impacts on stormwater volumes or water quality. If the proposed mitigation measures and conditions of certification are implemented, no significant stormwater runoff impacts are expected. Please refer to the **Mitigation** discussion for further information on stormwater runoff-related issues and requirements.

**Flooding**

The site would be graded to final elevation –228 feet. Imperial County land use ordinances state that developments below elevation –220 feet are required to apply for a Development Permit. The CEC is the permitting authority for the power plant site and transmission lines, however, the County retains permitting authority for project well pads and pipelines. .

The SSU6 site is located between three waterbodies that have a potential for flooding: the Salton Sea, New River, and Alamo River. Staff was referred to the Nasland flood study (1985) by the Imperial County Public Works Department. This study analyzed flooding impacts at locations that are applicable to the SSU6 project site.

The Salton Sea equilibrium elevation is approximately –227.3 feet. The estimated rise in the Salton Sea as a result of a 100-year storm event is approximately 1.4 feet (Imperial County 1981a), which means that during a 100-year storm event, the Sea's elevation would rise to –225.9 feet.

Nasland (1985) assumed that the situation of both the New and Alamo Rivers experiencing 100-year floods at the same time was used to establish the flood boundaries for the Flood Insurance Rate Map (FIRM) developed by the Federal Emergency Management Agency (FEMA). Given their proximity to each other and the likely overlap of their 100-year flood flows, staff agrees with this assumption.

The 100-year confluent flood flows between the New and Alamo Rivers are estimated to lie between 40,000 and 60,000 cubic feet per second (cfs) (Nasland 1985). This estimate assumes worst-case situations (no storage available in irrigation supply and drainage ditches, laterals and other channels) and accounted for differing roughness coefficients across bare land versus farmed crops. These flows led to a peak 100-year flood elevation ranging as low as –223.0 feet or as high as –222.0 feet.

The project would be surrounded by 8-foot high berms that reach an elevation of –220 feet. This height would protect the project from floods caused by the Salton Sea because at 100-year storm event elevation, there would be a difference of +5.9 feet between the Sea and the top of the project's berms. During a 100-year event along the New and Alamo Rivers simultaneously, the berms would provide protection for the project with approximately two to three feet of freeboard.

Under County Flood Damage Prevention Regulations, the project must supply the following information in order to receive a building permit in the 100-year floodplain:

1. Proposed elevation in relation to “Mean Sea Level” of the lowest habitable floor (including basement) of all structures;
2. Proposed elevation in relation to “Mean Sea Level” to which any structure will be floodproofed;
3. Certification by a California registered civil engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing criteria in Section 74301(c)(2) of this ordinance;
4. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.

The SSU6 site occupies land designated by the Federal Emergency Management Agency (FEMA) as Zone A (within the 100-year floodplain) and Zone D (possible but undetermined flood hazard). The site is currently surrounded on the north and west sides by seven to ten-foot tall berms (CEOE, 2002a, Appendix J). The project would entail the construction of eight-foot berms to surround the site; the existing berms would require improvements to satisfy flood protection ordinances for industrial development, and would hence be improved to withstand hydrostatic pressure up to the height of the berm.

By bringing the berm system to a height of 8 feet above the current elevation of -228, the project will be protected to an elevation of -220 as required by Imperial County LORS. The project will be required to provide certification by a registered engineer that the berms meet the floodproofing criteria specified in the Imperial County LORS; this requirement is included as **Condition of Certification SOIL & WATER-13**.

The project site is currently located within a 160-acre parcel of land that is surrounded by a series of berms associated with local access roads: McKendry Road to the north, Gentry Road to the west, Peterson Road to the south, and Boyle Road to the east. These berms currently take the 160-acre parcel out of the floodplain, in which case, if the project were to construct a berm to enclose the 80-acre site and reinforce existing berms, the only additional volume of water to be displaced would be the volume of material used to construct the new berm. This additional displacement of flood flows is not expected to cause significant alteration to the 100-year floodplain or to existing watercourses in the vicinity.

## Ground Water

Some excavations would require dewatering due to a shallow water table. This water would be used during construction for dust suppression. Staff finds this to be a beneficial use of such water.

For a discussion of potential impacts to ground water quality, please refer to the **Water Quality** discussion.

## Soil Erosion and Sedimentation

Accelerated wind and water-induced erosion may result from earthmoving activities associated with construction of the proposed project. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Prolonged

periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities, can result in on-site erosion eventually increasing the sediment load within nearby receiving waters. Where soils would be disturbed during construction, the surface would be void of vegetation and would have the highest potential for erosion.

Land disturbance figures for the project can be found below in **Soil & Water Resources Table 1**.

**Soil & Water Resources Table 1**
Land disturbance for SSU6 (in acres)

| **Project Element** | **Temporary Disturbance** | **Permanent Disturbance** |
|---|---|---|
| Plant Facility | 80.0 | 80.0 |
| Substation | 11.0 | 11.0 |
| Construction Laydown for Plant Site | 20.0 | 0.0 |
| Production Wells | 26.2 | 26.2 |
| Injection Wells | 15.4 | 15.4 |
| Production Pipelines | 13.3 | 13.3 |
| Injection Pipelines | 40.0 | 40.0 |
| L-Line Interconnection Poles | 89.0 | 2.7 |
| L-Line Access Roads | 35.2 | 6.6 |
| IID Midway Interconnection Poles | 88.0 | 2.6 |
| Laydown Along Transmission Routes | 48.0 | 0.0 |
| Construction Parking | 4.4 | 0.0 |
| Pull Sites | 39.0 | 0.0 |
| **Total** | **479.5** | **197.8** |

Source: CEOE 2002a, Table 3.2-2

A geothermal brine spill could adversely impact the soils surrounding pipelines. If a surface spill were to reach lands currently farmed, the soil would be rendered hypersaline and most likely unsuitable for agricultural purposes. It is likely that if a spill were to occur, such disturbance would be temporary, lasting only as long as remediation measures required. These measures are not expected to include permanent controls. The amount of this disturbance would vary depending on the volume of brine released and the area affected, and therefore estimates were not included in **Soil & Water Resources Table 1**.

In Data Response 71 (CEOE 2002l), the applicant provided preliminary Storm Water Pollution Prevention Plans (SWPPP) for the construction and operation phases of the SSU6 Project. Plans approved by the CEC Compliance Project Manager (CPM) would be required prior to any earthmoving activities and power plant operation, respectively. These plans would require the implementation of Best Management Practices (BMPs) to reduce potential erosion and sedimentation impacts. Approval and implementation of appropriate plans prior to any earthmoving activities would mitigate erosion and sedimentation impacts to less than significant levels. Please refer to **Conditions of Certification SOIL & WATER-1, 2, and 3** for more information.

The proposed SSU6 Project would convert approximately 173 acres from agricultural use to industrial use. IID's water service area covers approximately 484,000 acres of agricultural land, meaning that the project would take approximately 0.0004 percent of the agricultural land in this area out of production. For a discussion of farmland impacts, please refer to the **LAND USE** section of this document.

The project would also entail the discharge of fill to an inundated area adjacent to the Salton Sea and associated jurisdictional waters to widen an existing road and install a pipeline crossing. The applicant has applied for a Clean Water Act Section 401 Permit with the CRBRWQCB and a Clean Water Act Section 404 Permit with the U.S. Army Corps of Engineers.

These permits would require the applicant to implement BMPs to minimize and/or mitigate impacts to jurisdictional waters and associated biota. These BMPs would be included in the Erosion and Sedimentation Control Plans that would be required as part of certification. Please refer to **Condition of Certification SOIL & WATER-3** for more information.

For further discussion of mitigation required to offset loss of wetlands and associated biota, please refer to the **BIOLOGICAL RESOURCES** section of this document.

## Water Supply

### Fresh Water Supply

As proposed, the SSU6 project would use an annual average of 293 AFY of fresh water delivered from IID's canal system.

This water demand is based on the design salinity of 23.5% for the geothermal brine, derived from analysis of TDS trends of current production wells tapping the geothermal aquifer. The fresh water would be used to cool and dilute the brine to make it suitable for reinjection to the geothermal aquifer. The applicant has noted in the AFC (CEOE 2002a Vol. I, page 5.4-8) that if the brine were to reach a salinity of 25.0%, which is the worst-case scenario and is believed to be unlikely, the project would require water at a rate of 987 AFY.

In Data Response 78 to CURE's Data Requests (CEOE, 2003a), the applicant provided a summary of historical data regarding the TDS concentrations of the brine from the Salton Sea KGRA. The summary stated that the TDS of the brine in the Region 1, Region 2 and Elmore areas remains virtually constant according to the 14-year historical data. The applicant states that some production wells in the area even trend downward. Only one production well near the Leathers plant revealed an increase in TDS levels. At the Leathers plant, where dilution water is required, water demand has remained essentially steady over the past three years.

Above a salinity of 23.3%, "the required dilution water is provided by plant condensate and augmented by fresh water as needed." (CEOE 2003f) The applicant has noted that fresh water demand does not fluctuate according to ambient thermal conditions at salinities below 23.8% (Data Response 144, CEOE 2003f). Because the expected salinity is 23.5%, the fresh water demand of the project is expected to be relatively

constant at 293 AFY. However, when ambient temperatures exceed 113°F and salinity exceeds 23.8%, fresh water may be required to augment cooling at the facility. In Data Response 146, the applicant estimates that while the cooling water deficit at 113ºF is zero, at 121ºF (the local record high temperature), the deficit could be up to 1.7 acre-feet/day. Over the last 57 months, the temperature in the area exceeded 113ºF an average of 5.47 days per year (CEOE 2003f). Therefore, during the average year, 2.9 AFY of fresh water would be used to augment cooling.

### *Baseline Determination*

The project would take 173 acres of farmland out of production as a result of development associated with the RPF, PGF, and associated facilities.

In Data Response 84 to CURE's Data Requests (CEOE 2003a) the applicant provided an attachment (CDR-84) from IID that estimated water use at the site to be approximately five AFY per acre of irrigated land. This factor multiplied by 173 acres indicates a total of 865 AFY of water use would be offset by converting that land to industrial use. Subtracting the project's average annual water use (293 AFY) from that figure, the applicant estimates that the project would result in a net savings of 572 AFY of fresh water for IID. If the plant operated with a geothermal brine salinity of 25.0% for an entire year (requiring 987 AFY), which is unlikely, the project would increase IID's current fresh water deliveries by 122 AFY.

However, the baseline water use of five AFY/acre included in CDR-84 was derived from IID water delivery data from 1887-1995. To establish an appropriate CEQA baseline, staff has acquired historical water delivery data from IID from Gates 459 and 460, both of which currently serve the parcel of land on which the project would be located. This data is from the years 1996 to 2002, for a total of seven years of data, with no zero water use years or other such data gaps.

As stated above, the five AFY/acre water use estimate results in a water use of 865 AFY for the parcel. However, the average annual water use calculated by staff using the historical data yielded a result of 759 AFY.

In addition, the water delivery contract between the applicant and IID would use 763 AFY as a threshold for changes in the cost of water. If water use for the project is below 763 acre-feet during any year, the rate for water delivery would be based on the industrial rate for IID supply. If water use exceeds 763 acre-feet, the price of acre-foot 764 and above in any given year is priced at the conservation rate, which is higher, to assist IID in implementing conservation measures.

Based on this evidence, staff is comfortable using the 759 AFY figure as a baseline for historical water use at the site.

### *Water Use/Conservation*

As discussed above, there would be changes to the existing IID delivery scheme as follows:

**Soil & Water Resources Table 2**
**Salton Sea Unit 6 Project Water Use**

| Operating Condition | Project Water Use | Δ in IID Delivery to Site |
|---|---|---|
| Average Year | 293 AFY | -466 AFY |
| Maximum Year | 987 AFY | +228 AFY |

The project would have no adverse impacts on fresh water supply until the point that it exceeds the baseline. For the SSU6 project, this situation would only occur when the salinity of the brine is elevated.

The project would use an annual average of 293 AFY. When compared against the baseline of 759 AFY, this means that the project would reduce the water needed to be delivered to the site by approximately 466 AFY on an average annual basis. If the plant operated with a geothermal brine salinity of 25.0% for an entire year (requiring 987 AFY), which is the worst possible case, and is also unlikely, the project would increase IID's current fresh water deliveries by 228 AFY.

In an average year, the project would require approximately 1.6 acre-feet per MW of capacity, which is very water-efficient compared to nearly four to five times that for a standard combined-cycle, wet-cooled plant per megawatt of capacity. During the average year, the project would free up fresh water resources in the area, therefore, staff anticipates no significant impacts on fresh water supply to result from this project.

The applicant has proposed to store the project's fresh water supply in a lined earthen surface pond. In Data Response 114 to CURE's Data Requests (CEOE 2003a), the applicant estimated an average loss of approximately 20 AFY and a maximum loss of approximately 30 AFY to evaporation due to high temperatures in the region. Staff believes that such loss would be unnecessary and is avoidable.

In response to discussions regarding the need to mitigate this loss during the PSA workshop, the applicant proposed that their Water Supply Agreement with IID has a means to mitigate such losses. The applicant proposed that IID be allowed to charge the project the higher conservation rate for an additional 30 AFY, rather than the industrial rate that would otherwise be charged for that water (CEOE 2003q). On July 29, 2003, CEOE and CURE submitted a joint mitigation proposal, a portion of which recommends that the applicant, in coordination with IID and the Energy Commission, develop a conservation program "that will result in the conservation of 30 acre-feet per year" ( CURE and CEOE, 2003a). Staff supports this concept, as the additional funds generated by IID would be available for use in future conservation projects. Please refer to **Condition of Certification SOIL & WATER-6** for more information.

### Salton Sea Impacts

For the purposes of this project with regard to water resources, the most likely nexus between the project and an impact to the Salton Sea is the reduction of agricultural runoff. The Sea currently receives approximately 90% of its annual inflow (which totals approximately 1.36 million AFY) from various forms of agricultural runoff (SSA 2000). It can be assumed that the current agricultural use on the proposed project site contributes runoff to drains that eventually reach the Sea.

Estimating how much water will reach the Sea from on-site runoff is extremely difficult, as it depends on many factors including irrigation methods, crop types and design, as well as drainage methods. Imperial County's Salton Sea Anomaly Master EIR (1981a) estimates that "approximately one-third of the water imported into the valley by the IID becomes drainage water, which enters the Salton Sea," however, not all of that water is used for irrigation. To evaluate the worst-case scenario, staff will use the unlikely but extremely conservative value of 100% drainage to the Salton Sea.

For CEQA evaluation purposes, staff has determined an average historical water use at the site of approximately 759 AFY. Assuming that all irrigation water applied to the site ends up in the Salton Sea, if the project is not licensed and the status quo is preserved, the Salton Sea will continue to receive approximately 759 AFY from that particular parcel.

The project will use IID fresh water primarily for dilution of the geothermal brine prior to reinjection (although it will be utilized elsewhere in the process). Therefore, the fresh water used by the project will not be made available to the Sea because it will be reinjected into the geothermal aquifer, which is not known to have a hydrogeologic link to the Sea.

If the worst case years were to occur, the project would use 987 AFY, meaning that the inflow to Salton Sea under the assumptions stated here will decrease by that same amount. Because the Sea receives an inflow of approximately 1.36 million AFY, even the worst case deprives the Sea of a fraction of a percent of the annual inflow (approximately 0.07%).

The Redlands Institute (2002) estimates that the Salton Sea would dry up in approximately ten years if it stopped receiving any inflow. Taking away 0.07% of the 1.36 million AFY inflow would not significantly reduce the time in which the Sea would dry up absent of other flows. During an average year, the impact to the Salton Sea would be approximately one-third of the worst-case scenario. Therefore, staff does not anticipate significant adverse water supply impacts to the Salton Sea resulting from the SSU6 project.

**Alternative Water Sources**

The SSU6 Project will not use a significant amount of fresh water for cooling under average conditions. The fresh water use of the project will consist mainly of fresh water to handle and condition the brine for reinjection. The brine distillate will be used for cooling which is non-potable water, and is excluded as a drinking water source by the CRBRWQCB. However, Article X of the California Constitution states that the use of high quality fresh inland water for cooling, process water and other non-potable uses when recycled water is available is a waste or unreasonable use of fresh water. Therefore, due to the average use of 293 AFY of fresh water for non-potable use, staff will provide an analysis of alternative water sources.

The use of recycled water in lieu of IID fresh water would free up fresh water resources for use in other applications. The most likely source for recycled supply would be the City of Westmorland. The City's newly upgraded wastewater treatment plant produces approximately 0.5 million gallons per day (560 AFY) of treated recycled water. 560 AFY

would be adequate for non-cooling process water under average conditions for an entire year, however, this would not be adequate under high-demand periods for the project.

Use of this supply would require the construction of an approximately 8.5-mile pipeline as well as additional treatment facilities to bring the water to a level of purity appropriate for use in the SSU6 facility. The applicant has voiced concerns with the use of recycled water in the facility as disinfectants used in the treatment process may pose a risk to some equipment used at the plant.

As described in the **Setting** discussion above, the TDS concentrations of the local ground water range from approximately 1,000 to 3,000 mg/L. The proposed fresh water supply from IID has an estimated TDS of 600 mg/L. Because the primary function of the fresh water supply is to dilute the geothermal brines to aid in reinjection, TDS becomes an important component in determining the feasibility of alternatives. The project would most likely then require an average supply greater than 293 AFY if local ground water were used for the project. The shallow aquifers near the site (within the upper 500 feet) have transmissivities (the rate at which water can travel through the soil) of less than 10,000 gallons per day per foot. This yield is probably too low to fill the needs of the project (180 gpm), especially given the fact that more water would likely be needed as compared to the IID supply. Local ground water is thought to contribute approximately 4% of the Salton Sea's annual recharge; use of this source would most likely reduce that contribution to some extent.

### Cooling Water Supply

As described above in the **Project Description** discussion, the project would use approximately 4,289 gpm of steam condensate for evaporative cooling. This water originates in the geothermal aquifer, with total dissolved solids (TDS) concentrations of approximately 235,000 milligrams per liter (mg/L).

The Safe Drinking Water Act defines Underground Sources of Drinking Water as aquifers with water having TDS concentrations of less than 10,000 mg/L. Aquifers containing ground waters known to be a source of geothermal energy are also exempted from consideration as a potential drinking water supply by the CRBRWQCB. Due to the high TDS values of the brine, it is generally unfit for most uses outside of geothermal applications.

This water would best be categorized as "brackish water from natural sources" as it relates to State Water Resources Control Board Policy 75-58, which is the primary guidance for assigning priority of water use for power plant cooling in the state. Staff believes that this water is suitable for cooling purposes and is available in sufficient quantity to cool the plant. In addition, the applicant has proposed using this water at a minimum of 20 cycles of concentration in the cooling towers to ensure optimum use of condensate make-up water supplies (CEOE 2002l, Data Response 79). On January 21, 2003 the Committee assigned to the SSU6 AFC made a finding of sufficient geothermal resource for the project (CEC 2003b).

## Water Quality

Improper wastewater disposal can lead to soil, surface and ground water degradation, and impairment of beneficial uses.

### Injection/Production Wells and Brine Handling

While not a wastewater stream, the produced brine is saturated with very high levels of chemicals and could adversely impact local water quality if improperly handled.

There is limited ground water quality information currently available in the area. However, as part of the Title 27 regulations that would regulate the brine ponds if the project is licensed, ground water data is currently being generated by the applicant, which would establish a baseline for regional ground water quality. This baseline would be used in conjunction with monitoring wells also required by Title 27 to detect any releases from the ponds if a leak were to occur.

If a geothermal brine spill or brine pond release were to occur, it could pose a threat to ground water quality, as the high salinity of the brine is far above that which naturally occurs in local shallow aquifers. These spills, if not contained, could travel to either agricultural drains, which eventually reach the Salton Sea, or they could travel directly to the Sea. Additional inputs of salts, as well as some metals such as lead or arsenic, to the Sea could lead to further impacts on local biological resources. If the spills were to reach agricultural canals they could adversely impact agricultural resources by adding large amounts of salts to irrigation water.

The shallow ground water in the project vicinity is not used for municipal or industrial purposes, and is not deemed suitable for agriculture by the CRBRWQCB in their Basin Plan for Region 7 (CRBRWQCB 2002, p. 2-18). Therefore, an unmitigated spill would most likely have no short-term impact on local fresh water supplies, and long term impacts on groundwater would be minimal (Imperial County 1981a).

In addition, the low vertical permeabilities (or transmissivities) of the soil would aid in inhibiting the flow of surface spills toward ground water aquifers if spills were handled properly and in a timely manner. Percolation tests performed in conjunction with the Geotechnical Investigation included in the AFC (CEOE 2002a, Appendix J) cited percolation rates between 1.3 and 2.6 gallons per day at the site. These tests were performed on the Holtville silty clay, wet soil type, which is the same soil type underlying all but about 600 meters of injection pipelines and all but about 900 meters of production pipelines. The other soil types that would be traversed by the brine pipelines all have lower potentials for rapid permeability than the Holtville silty clay, wet soil type.

In 2001, 120,799 gallons of brine were released in 23 spills from the applicant's current operations (CURE 2003e). Many of these spills involved volumes less than 1,000 gallons, but they range as high as 60,000 gallons. These spills, while a small fraction of the estimated 23 billion gallons of brine processed by these facilities, are nevertheless a significant volume of brine with respect to potential degradation of water quality.

To ensure proper handling of the brine, the applicant has proposed two primary mitigation measures. However, it can be reasonably assumed that even with a stringent monitoring and maintenance program in place, an unexpected release of geothermal

brine could occur at some point during the life of the project. In addition to the proposed mitigation measures, staff has proposed additional mitigation to ensure that proper spill contingencies are addressed. For more information, please refer to the **Mitigation** discussion below.

Please also refer to the **Waste Management** section for discussion of other brine handling issues.

### Waste Injection

The applicant is proposing to inject cooling tower blowdown, spent brine, and other process wastewaters back into the geothermal aquifer. The regulations under the Resource Conservation Recovery Act (40 CFR 261.4(b)) exempt "drilling fluids, produced waters, and other water associated with development and production of crude oil, natural gas, or geothermal energy" from the definition of hazardous waste. Furthermore, because the aquifer is valuable only for purposes of geothermal energy production, Staff would not expect any significant impacts resulting from reinjection of these streams. Injection of these streams would also serve to replenish the geothermal supply. Please refer to the finding of sufficient geothermal resource for the project (CEC 2003b) for further information.

Class V geothermal injection wells are regulated by the EPA, but authority is delegated to the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) in California.

#### *Production and Injection Well Drilling and Design*

The drilling and design of the production and injection wells present a high potential for local water quality impacts. Proper methods must be employed to satisfy DOGGR regulations to protect the well and the surrounding environment.

Production wells would be drilled as follows:

A 30-foot length of 36-inch conductor pipe would be set in place. A 36-inch hole would be drilled to a depth of approximately 400 feet below ground surface (bgs), and a 30-inch casing would be cemented in that hole. A 30-inch hole would be drilled to a depth of approximately 1,400 feet, and a 24-inch casing would be cemented in that hole. This method of overlapping casings would provide protection for the surrounding soils and ground water from 400 to 1,400 feet bgs with one string of casing, and the soils and ground water from 0 to 400 feet bgs with two strings of casing.

Before the drill bit nears the geothermal reservoir the shallow sands are sealed and protected (CEOE 2002e, p. WATER-3). A 22-inch hole would be drilled to 2,625 feet bgs, the top of the geothermal reservoir, and a 16-inch casing would be cemented in place. At this point, the soil from 0 to 400 feet bgs would be protected with three strings of casing, soil from 400 to 1,400 feet bgs would be protected with two strings of casing, and 1,400 to 2,625 feet bgs would be protected with one string of casing as the drilling continues into the geothermal reservoir. A 13-3/8-inch titanium casing would be cemented in place to a depth of approximately 2,570 feet bgs to complete the process.

This process would leave the geothermal reservoir open to the wellbore, 1,400 to 2,570 feet bgs protected by two strings of casing, 400 to 1,400 feet bgs protected by three strings, and the top 400 feet protected by 4 strings. The full depth of 2,570 feet bgs would be protected by the titanium casing.

Injection wells would be drilled and constructed in a similar manner, but with smaller casings and to a deeper distance below ground surface. The injection wells would consist of a 30-inch string to 30 feet bgs, a 24-inch string to 500 feet bgs, an 18-5/8-inch string to 1,800 feet bgs, and a 13-3/8-inch string to 3,600 feet bgs. The open borehole would extend only in the geothermal reservoir, from approximately 3,600 feet bgs to 8,600 feet bgs. The injection wells would have a replaceable 10-3/4-inch carbon steel liner hung in the well from ground surface to 3,600 feet bgs.

The method of drilling and design of the wells would sufficiently protect the surrounding environment and comply with relevant Public Resources Code regulations. The project would be required to receive an Underground Injection Control (UIC) permit from DOGGR prior to operation of the injection wells. This requirement is included in **Condition of Certification SOIL & WATER-7** to assure proper mitigation of injection would occur.

### Brine Ponds

Occasionally, the project may encounter upset conditions, which are described in Data Response 82 (CEOE 2002l) as events such as major vessel leak until isolation is achieved, loss of solids removal capability, or draining of major vessels for maintenance. During these periods, the spent brine would be pumped to the two brine ponds. Because of the chemical characteristics of the spent brine (TDS approximately 316,000 mg/L), a release of this brine into the local ground water aquifers could significantly impact local ground water quality. To minimize the chance of release through seepage, the applicant has proposed high-density polyethylene (HDPE) liners for the ponds. The applicant would also be required to observe all Title 27 regulations related to waste management units and would be required to receive Waste Discharge Requirements from the CRBRWQCB, who retains authority for permitting the ponds. The applicant has initiated coordination with the CRBRWQCB to ensure that the permitting process would not significantly delay the project if it is licensed. For more information, please refer to the **Mitigation** discussion below.

### Stormwater Runoff

As discussed above under **Surface Hydrology**, the SSU6 Project would be required to comply with the NPDES requirements that regulate storm water by establishing effluent limitations and monitoring and reporting requirements for construction activities stormwater, and industrial activities (operational) stormwater general permits. Stormwater would be routed to the 4.4-acre-foot capacity detention pond on-site for percolation and/or evaporation. Stormwater with the potential to encounter oil contamination would be routed to the oil/water separator prior to discharge to the detention pond.

The project owner would be required to develop a Storm Water Pollution Prevention Plan and an Erosion and Sedimentation Control Plan to mitigate impacts to water

quality from spills or sedimentation. Implementation of these plans would result in no significant impacts to water quality. Refer to **Conditions of Certification SOIL & WATER-1, 2 and 3** for more information.

### Road Widening and Pipeline Installation Activities

Road widening activities could result in sedimentation or other water quality threats.

The project would require widening of the existing access road to Obsidian Butte and the installation of a pipeline crossing. In order to provide a route for drilling rigs to get to Obsidian Butte, the 10-foot road surface would have to be widened by 15 feet, making the road 25-feet wide.

A pipeline to bring the produced brine to the site would follow a similar route, requiring disturbance of a 600-foot length of land along the south side of the widened road. Twenty pipe supports would be required, installed at intervals of 30 feet.

These activities would impact 0.05 acres of brackish marsh, 0.03 acres of other waters of the U.S., 0.02 acres of desert sink scrub, and 0.33 acres of tamarisk scrub, and would result in the creation of 81 cubic yards of fill.

The applicant has applied for a Clean Water Act Section 404 Permit with the U.S. Army Corps of Engineers to regulate these activities. The applicant would be required to receive these permits prior to site mobilization. The Army Corps has indicated that the permit would not be completed until the applicant has provided a conceptual mitigation plan (Baker, 2003a).

The project would also entail construction activities associated with the Bannister switchyard. The applicant had initially planned to create fill within the wash that parallels Bannister Road, however, the applicant currently plans to carefully maneuver equipment through the wash rather than fill it to create access roads (Baker 2003b). At this time, the project does not need a Section 404 permit for these activities, but if it is determined by the Army Corps that one is necessary, the applicant will be required to receive one.

The applicant has also applied for a Clean Water Act Section 401 Permit with the CRBRWQCB to assure that any sedimentation or other water quality threats that may arise during road widening activities or pipeline installation would be adequately addressed and properly mitigated.

Please refer to the **Biological Resources** section of this document and the **Mitigation** discussion for more information.

### Domestic Waste

Domestic and sanitary waste would be directed to a septic tank. This tank would be pumped out as necessary. There are no domestic-use ground water wells in the project area. Staff does not expect significant impacts to water quality resulting from the septic waste system. Please refer to **Condition of Certification SOIL & WATER-11** for more information.

## Subsidence

Subsidence can result in impacts to surface structures if it occurs to a large extent. In the project vicinity a major concern is potential impacts to the local network of water canals for both delivery and drainage. If subsidence were to occur in certain areas, water canals could begin to flow in different directions, which could impact proper conveyance of supply and drainage.

Data compiled by the applicant from 1989 to 1999 shows subsidence across the site to range from approximately 0.8 inches (20 mm) to 2.4 inches (60 mm) (CEOE 2002a). Regional tectonic subsidence may result in approximately 1.6 inches of subsidence annually (Lofgren, 1978) over the Salton Trough area. Since the SSU6 will reinject spent geothermal fluids with injection wells, subsidence due to geothermal fluid withdrawal is expected to result in a low potential for damaging localized differential settlement.

Please refer to the **Cumulative Impacts** discussion below for further subsidence discussion.

# CUMULATIVE IMPACTS

## Surface Hydrology

As described above in the **Direct and Indirect Impacts** discussion, the SSU6 Project would be required to comply with the general NPDES requirements that establish storm water effluent limitations and monitoring and reporting requirements for construction and operation activities. Storm Water Pollution Prevention Plans reviewed and approved by the CEC CPM would be required prior to the start of construction or operation activities. Compliance with these requirements in addition to the project's proposed design should avoid any significant cumulative impacts to surface hydrology.

In addition, the project would be improving an existing eight-foot berm surrounding the project site. As such, the project would not add any new diversions or impediments to the 100-year flood plain that are not already in place. No significant cumulative impacts for downstream or on-site flooding are expected.

## Groundwater

Water supply provided by local ground water has not been proposed. Therefore, the SSU6 Project should have no significant cumulative impact on ground water resources.

## Soil Erosion and Sedimentation

Construction and operational activities related to the SSU6 Project may cause an increase in cumulative wind and water erosion to soils affected by these activities. However, implementation of the NPDES stormwater requirements described above in the **Direct and Indirect Impacts** discussion would ensure that the SSU6 Project would not result in significant cumulative erosion and sedimentation impacts.

## Water Supply

Based on the uncertainty of the current fresh water situation in the region, staff believes undue strain on local fresh water resources could become a cumulative impact.

Built-in measures to mitigate any further strain in fresh water use caused by the project consist of taking currently irrigated agricultural lands out of production. Staff has determined that historical water use at the site averages approximately 759 AFY. The project would use 293 AFY of fresh water supplied by IID on an average annual basis, meaning that during average annual conditions, the project would conserve approximately 466 AFY of IID fresh water by taking previously irrigated land out of agricultural production.

Because the project would free up fresh water resources in the area staff anticipates that the project would not significantly contribute to cumulative impacts on fresh water supply.

### Salton Sea Water Supply

The future of the Salton Sea is uncertain at this point. There is still disagreement as to how the Sea will be managed in the future, if at all. One of the major obstacles to finalizing a Colorado River water plan is determining responsibility for impacts to the Salton Sea. Impacts to the Sea's supply would most likely result from transferring water from IID's service area, where the Sea would receive inflows from irrigation runoff, to San Diego or Metropolitan Water District, where the water would not be made available to the Sea. Water leaves the Sea only through evaporation, which is relatively constant. If the Sea loses inflows, it could shrink, making it more saline and inhospitable to biota.

However, as stated above, the project will reduce the Sea's inflow by approximately 0.07%. This is an insignificant reduction; therefore the project is not expected to contribute to cumulative impacts to the Salton Sea.

## Water Quality

Improper wastewater disposal or handling can lead to soil, surface and ground water degradation, and impairment of beneficial uses. However, the design and mitigation proposed by both staff and the applicant should prevent further degradation of already impacted surface and groundwater supplies. Staff does not anticipate cumulative impacts to water quality resulting from the SSU6 project.

## Subsidence

Subsidence can result in impacts to surface structures if it occurs to a large extent. In the project vicinity a major concern is potential impacts to the local network of water canals for both delivery and drainage. If subsidence were to occur near canals, these water delivery canals could begin to flow in different directions, which could impact proper conveyance of the water supply and drainage.

The existing geothermal plants in the Salton Sea Geothermal Field currently extract approximately 27 million pounds of brine per hour (pph), while reinjecting 20.5 million pph. This calculates to a 76% reinjection rate. The SSU6 project would extract 12-13

million pph and reinject about 9.7 million pph (CEOE 2002a), for a reinjection rate between 75 and 81%.

Taking the high end of extraction (13 million pph) for the proposed project, approximately 40 million pph would be extracted from the Salton Sea Geothermal Field with 30.2 pph reinjected. The reinjection rate for the field would total approximately 76% if this project were licensed and extracted at the higher rate, which is approximately the same rate of reinjection currently. If the project withdraws brine at the lower 12 million pph, the reinjection rate for the field would increase to approximately 77%. In either case, the cumulative impacts of brine withdrawal would be less than significant.

Staff recognizes the importance of a monitoring plan that would address subsidence in the vicinity of the project. Imperial County and DOGGR currently have a strategy in place to monitor the region for settlement or bulges due to geothermal extraction or injection. This plan includes surveys that measure the land level elevations with accuracy levels of 1/100$^{th}$ of an inch. Staff has proposed that the project be required to participate in these monitoring efforts in order to detect any subsidence caused by the project before it can pose a threat to local resources. If subsidence is detected, measures can be taken to reduce any potential significant impacts. Please refer to **Condition of Certification SOIL & WATER-14** for more information.

## ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed SSU6 project (please refer to **Socioeconomics Figure 1** in this Staff Assessment), and Census 2000 information that shows the low-income population is less than fifty percent within the same radius. Based on the **Soil and Water Resources** analysis, which included consideration of information supplied by participants at staff workshops, staff has not identified unmitigated significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no **Soil and Water Resources** environmental justice issues related to this project.

## FACILITY CLOSURE

The SSU6 Project is expected to operate for a minimum of 30 years. Closure options range from “mothballing”, with the intent of restart at some time, to the removal of all equipment and facilities.

The facility closure plan would be submitted to the California Energy Commission for approval prior to decommissioning. Compliance with all applicable LORS, and any local and/or regional plans would be required. The plan would be required to address all concerns regarding soil and water resources.

## COMPLIANCE WITH LORS

The project as proposed would comply with all relevant LORS if the proposed mitigation and recommended Conditions of Certification are adopted.

## MITIGATION

## APPLICANT PROPOSED MITIGATION

In the AFC and subsequent filings the applicant has proposed mitigation measures regarding Soil and Water Resources as follows:

### Surface Hydrology

All on-site stormwater would be routed to the 4.4-acre-foot capacity detention pond. All stormwater flows with the potential to encounter oil contamination would be routed to an oil/water separator prior to discharge to the ponds. The applicant would be required to meet general stormwater requirements of the NPDES permits. The requirement for construction is contained in **Condition of Certification SOIL & WATER-1**, and the requirement for operation is required in **Condition of Certification SOIL & WATER-2**.

### Ground Water

The applicant has proposed the use of Best Management Practices (BMPs) for spill prevention and control in the Draft Stormwater Pollution Prevention Plan (SWPPP) to minimize the potential for groundwater contamination (CEOE 2002l, Attachment SW-70A). This mitigation would be included in **Conditions of Certification SOIL & WATER-1 and 2**.

The design and installation of production and injection wells would be conducted in a manner to protect local ground water resources. Please refer to the **Staff Proposed Mitigation – Water Quality** discussion for more information.

### Soil Erosion and Sedimentation

The applicant would incorporate standard BMPs into the project design for construction and operation to mitigate erosion and sedimentation impacts. This mitigation would be contained in the SWPPP requirements for the project, as described above in the **Surface Hydrology** discussion above. Please refer to the **Staff Proposed Mitigation** discussion for erosion and revegetation requirements.

Road widening and pipeline installation activities would require Section 401 and Section 404 permits from the CRBRWQCB and U.S. Army Corps of Engineers, respectively. The applicant has filed applications for both of these permits. Please refer to **Conditions of Certification SOIL & WATER-4 and 5** for more information. Please refer to the **BIOLOGICAL RESOURCES** section of this document for more information regarding mitigation for these activities.

### Water Supply

In the Preliminary Staff Assessment, staff identified an avoidable water supply impact from the project's use of service ponds in a hot, arid, environment. Staff proposed the use of a water storage tank in order to prevent the loss of an average of 20 AFY of fresh water. Adding such a tank would add approximately $2 million to the capital cost of the project (CEOE 2003q). While this tank would indeed reduce the loss of that water, the

service ponds are also designed to handle excess stormwater flows and therefore provide additional protection for the plant and the surrounding environment.

In response to discussions regarding the need to mitigate this loss during the PSA workshop, the applicant proposed that their Water Supply Agreement with IID has a means to mitigate such losses. The applicant proposed that IID be allowed to charge the project the higher conservation rate for an additional 20 AFY, rather than the industrial rate that would otherwise be charged for that water (CEOE 2003q). In a joint mitigation proposal between CURE and CEOE this was raised to 30 AFY (CURE and CEOE 2003a). Staff supports this concept, as the additional funds generated by IID would be available for use in future conservation projects. The cost of using that extra 20 AFY is accounted for in the higher conservation rate, which staff believes is a fair means of correlating impact and mitigation. Please refer to **Condition of Certification SOIL & WATER-6** for more information.

## Water Quality

All on-site stormwater would be routed to the 4.4-acre-foot capacity detention pond. All stormwater flows with the potential to encounter oil contamination would be routed to an oil/water separator prior to discharge to the ponds. The applicant has proposed the use of BMPs for spill prevention and control in the Draft Stormwater Pollution Prevention Plan (SWPPP) to minimize the potential for groundwater contamination (CEOE 2002l, Attachment SW-70A). The applicant would be required to meet general stormwater requirements of the NPDES permits for construction and operation. Please refer to **Conditions of Certification SOIL & WATER-1 and 2** for more information.

The applicant proposes a brine pond design that includes liners with the base of the ponds at least five feet from the highest water elevation, as Title 27 regulations require. The applicant has also proposed installation of monitoring wells to monitor and assess potential releases to local groundwater. This design is in accordance with the regulations that govern such ponds. **Condition of Certification SOIL & WATER-8** requires the applicant to receive final Waste Discharge Requirements from the CRBRWQCB prior to discharge to the brine ponds. The applicant proposes that the production and injection pipelines be constructed of polymer concrete-lined carbon steel to prevent accidental releases of geothermal fluids. The applicant also proposes that pipelines at each production wellhead be equipped with alloy isolation valves on either side of an alloy emergency shut-off valve to prevent accidental releases.

The applicant has applied for a Clean Water Act Section 404 Permit with the U.S. Army Corps of Engineers to regulate road widening and pipeline installation activities across nearby wetlands. The applicant would be required to receive these permits prior to site mobilization. The U.S. Army Corps of Engineers has indicated that the permit would not be completed until the applicant has provided a conceptual mitigation plan (Baker, 2003).

The applicant has also applied for a Clean Water Act Section 401 Permit with the CRBRWQCB to assure that any sedimentation or other water quality threats that may arise during the activities that trigger the Section 404 permit would be adequately addressed and properly mitigated.

Please refer to **Conditions of Certification SOIL & WATER-4 and 5** for more information.

The applicant has proposed the installation of a monitoring well 100 feet west of the northwest corner of the 80-acre plant site. This well could be used to monitor or assess potential releases from the proposed septic system. Proper installation and operation of the septic system is addressed in **Condition of Certification SOIL & WATER-11.**

## STAFF PROPOSED MITIGATION

### Soil Erosion and Sedimentation/Surface Hydrology

In addition to measures proposed by the applicant, Staff would require the design and implementation of a Drainage, Erosion Control and Revegetation Plan to assure restoration of soils disturbed during the construction and/or operation of the SSU6 Project. This requirement is addressed in **Condition of Certification SOIL & WATER-3.**

The project is designed to conform with all relevant flooding LORS at the County level. However, Imperial County LORS require certification by a California registered civil engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing criteria in Section 74301(c)(2) of the County ordinance. Staff will require such verification in **Condition of Certification SOIL & WATER-13**.

### Water Supply

Because the applicant has not proposed any water supply outside of that provided by IID, staff has not analyzed alternative water supplies for the SSU6 Project. Staff will be recommending **Condition of Certification SOIL & WATER-12** to prevent usage of other supplies that were not analyzed and therefore could possibly have unmitigated impacts.

### Water Quality

As discussed in the Applicant Proposed Mitigation discussion above, the applicant would be required to obtain a Section 404 permit from the U.S. Army Corps of Engineers to permit fill placed in wetlands resulting from road widening and pipeline installation activities. The Army Corps has stated that a conceptual plan for wetland compensation is required to complete the permit**. Condition of Certification SOIL & WATER-4** requires submission of copies of the Section 404 permit prior to commencement of those activities. Please refer to the **BIOLOGICAL RESOURCES** section of this document for more information.

Similarly, the applicant would be required to obtain a Section 401 certification from the Regional Water Quality Control Board to address potential impacts to wetlands due to the road widening and pipeline installation activities. **Condition of Certification SOIL & WATER-5** requires a copy of this certification to be submitted prior to commencement of those activities.

Class V geothermal injection wells are regulated by the EPA, but authority is delegated to the Department of Oil, Gas, and Geothermal Resources (DOGGR) in California. The

project would be required to receive an Underground Injection Control (UIC) permit from DOGGR prior to operation of the injection wells. This requirement is addressed in **Condition of Certification SOIL & WATER-7** to assure that proper mitigation of injection and proper documentation of the well activities would occur.

**Condition of Certification SOIL & WATER-8** requires the applicant to receive final Waste Discharge Requirements from the CRBRWQCB prior to discharge to the brine ponds. Staff, in consultation with CRBRWQCB Staff, would extend this requirement to cover mud sumps associated with drilling activities. WDRs for the mud sumps must be obtained prior to drilling activities requiring these sumps. This requirement is addressed **in Condition of Certification SOIL & WATER-9.**

While project elements and design minimize the potential for brine releases to the environment, the applicant must be prepared in the event an accidental release should occur**. Condition of Certification SOIL & WATER-10** requires the applicant to develop and implement an Emergency Response Plan to notify appropriate agencies and mitigate any potential impacts resulting from an accidental brine release. This plan would be required to detail steps taken to ensure protection of resources in the case of both major and minor spills.

It is expected that such methods would be similar to those employed during frac-outs (releases of drilling fluid typically associated with directional drilling) or other unexpected releases. These methods generally focus first on stopping the source of the spill, which generally means the shutdown of impacted operations. Measures are then taken to contain the spill and prevent further migration. The spill should then be cleaned up, whether through vacuum trucks or other means. Under no circumstances shall such spills be dealt with by means of dilution, as such cases can cause migration of the geothermal fluids. If any soils are identified as being impacted by the spill, those soils should be excavated and disposed of in an appropriate manner.

An adequate spill response plan should incorporate these general concepts to ensure that potential soil and water resource impacts are minimized. The plan should also be supplemented with maintenance, monitoring, and other preventative measures to minimize the chance of spills occurring in the first place.

## Subsidence

As discussed above, Imperial County and DOGGR currently conduct land level monitoring efforts in the region to detect subsidence. Reinjection of extracted brines should minimize any subsidence caused by the project. However, as this project's activities still have the potential to induce subsidence, staff recommends that the project owner be required to coordinate with Imperial County and DOGGR to fit the SSU6 project into the current monitoring arrangement if the project is licensed. **Condition of Certification SOIL & WATER-14** contains this requirement. This will assure that any subsidence or bulges caused by the project's extraction or reinjection will be detected and suitable measures can be taken to reduce any potential impacts.

## MITIGATION BY OTHER AGENCIES

The preceding pages identified the potential impacts that could result from the proposed project. The Energy Commission only has jurisdiction over the power plant facility and the transmission lines. The department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) and Imperial County will be the permitting agencies for the wellheads and pipelines. We have included in our analysis the suggested mitigation measures for impacts identified, but it is up to the other agencies to impose them. In order to make a finding that all of the impacts can be mitigated either by our action or the actions of others, staff must know that all mitigation can and should be adopted as a part of a permit.

Staff recommends that Imperial County and DOGGR incorporate the appropriately noted mitigation measures and conditions (or their equivalent) as detailed in **Soil & Water Resources Table 3** into their environmental analysis and decision documents.

**Soil & Water Resources Table 3**
**Recommended Mitigation**

| Condition of Certification | Imperial County | DOGGR |
|---|---|---|
| SOIL & WATER-1 | X | |
| SOIL & WATER-2 | X | |
| SOIL & WATER-3 | X | |
| SOIL & WATER-4 | X | |
| SOIL & WATER-5 | X | |
| SOIL & WATER-6 | | |
| SOIL & WATER-7 | | X |
| SOIL & WATER-8 | | |
| SOIL & WATER-9 | X | |
| SOIL & WATER-10 | X | X |
| SOIL & WATER-11 | | |
| SOIL & WATER-12 | | |
| SOIL & WATER-13 | X | |
| SOIL & WATER-14 | X | |

## RESPONSES TO AGENCY AND PUBLIC COMMENTS

## IMPERIAL COUNTY PUBLIC WORKS DEPARTMENT

(These comments refer to the AFC rather than the PSA, but staff has provided responses to relevant comments.)

**ICPW (5-22-03) 1:** Section 3.3.2-1: Noting a blowout of a well south of the site, and a proposed drilling depth of 7,400 feet with casings set at 2,625 feet, shouldn't the barefoot well have a deeper casing?

***Staff Response**: The blowout that is referred to in this comment occurred when vibrations from work on another well exacerbated existing corrosion damage (Woods 2003). The well that blew had not yet been retrofitted with titanium casing. The well*

*casings for the SSU6 project will be titanium, therefore rendering them more resistant to corrosion.*

*The other concern for well blowouts is pressure. A blowout requires a surface pressure of approximately 1000 psi; a conservative estimate might be 700 psi (Woods 2003). The project will operate its wells at pressures around 300 psi, which is much lower and therefore less susceptible to pressure blowouts.*

**ICPW (5-22-03) 5:** Section 3.3.5.6: Perimeter Berms around the entire 30-acre site are scheduled for 8-foot berms. Public Works notes that protection to the -220 foot elevation is needed and that a flood study of the New River by Nasland Engineering dated June 1985 should be reviewed and considered for setting the pad and berm elevations of the project area.

***Staff Response**: The 80-acre project site that lies at elevation –228 feet will be bermed for flood protection to the –220 foot elevation, as described in the **Flooding** discussion above.*

*The Nasland study has been reviewed by staff. This study suggested that the 100-year flood elevation is between –223 and –222 feet. Protection to elevation –220 should therefore be sufficient to protect the site from inundation during a 100-year storm event.*

**ICPW (5-22-03) 12:** Section 4.3.1.2, Flood related impacts: As an essential (power plant) facility the site should be designed for PMP in lieu of a 100-year storm event (see note 29 above). Also, there is no mention of what a 100-year storm even is at 5.4.2.1.3.

***Staff Response**: Staff has incorporated information gathered regarding the 100-year storm event and its impacts in the **Flooding** discussion above.*

*Probable Maximum Precipitation (PMP) can be measured across differing timeframes (1hour, 10 hours, 24 hours, etc.), all of which arrive at different peak flows. Staff has attempted to discuss with the County the level and criteria that they typically use to determine PMP, but staff has been unable to secure answers or guidance from the County.*

*In absence of such guidance, staff refers to comment **ICPW (5-22-03)) 5**, wherein the County advises that "protection to the -220 foot elevation is needed." Staff notes that the project meets such requirements, and as described in the **Flooding** discussion above, protection to -220 foot elevation will suffice for the 100-year flood event as described in the Nasland study (1985). This is a protection benchmark typically employed in other siting cases; staff believes that it is adequate in this case as well.*

**ICPW (5-22-03) 17:** The AFC does not mention subsidence. The report needs to discuss depressions and bulges due to production and injection well fields. Also, impacts to irrigation and drainage facilities due to subsidence. In addition a monitoring program compatible with the other geothermal facilities and wells will need to be addressed.

***Staff Response**: Staff has included a **Subsidence** discussion in the **Direct and Indirect Impacts** and **Cumulative Impacts** discussions above. Staff has also*

*proposed that the project owner be required to participate in regional subsidence monitoring that is currently conducted by Imperial County and DOGGR. Please refer to the **Mitigation** discussion for more information.*

## CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that the use of brine condensate for cooling purposes will reduce the project's demand on external sources of water supply. Furthermore, the project's efficient use of potable water supplies will create a surplus of fresh water, reducing the use of fresh water at the project site during an average year by approximately 466 acre-feet as compared to current agricultural demands on-site.

In addition to mitigation proposed by the applicant, staff recommends additional mitigation to prevent acceleration of erosion, increases in off-site sedimentation and contamination of soils and water resources, or increases in flood conditions in the vicinity of the project.

The proposed SSU6 project will comply with applicable LORS if the Conditions of Certification recommended by staff are required. Staff recommends that measures identified to mitigate potential impacts should be required by Imperial County and DOGGR where applicable. Staff recommends that the project not be licensed without these Conditions of Certification included as part of the license.

## CONDITIONS OF CERTIFICATION

**SOIL & WATER-1:** The project owner shall comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the construction of the entire project. Prior to beginning any site mobilization associated with any project element, the project owner shall submit to the CPM a copy of the Notice of Intent for Construction accepted by the Colorado River Basin RWQCB and obtain Energy Commission CPM approval of the construction activity SWPPP for SSU6.

**Verification:** No later than 60 days prior to the start of site mobilization for any project element, the project owner shall submit a copy of the SWPPP required under the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity to Imperial County for review and comment, and to the CPM for review and approval. The SWPPP will include copies of the Notice of Intent for Construction accepted by the RWQCB and any permits for SSU6 that specify requirements for the protection of stormwater or water quality. Approval of the SWPPP by the CPM must be obtained prior to site mobilization for any project element.

**SOIL & WATER-2:** The project owner shall comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the operation of SSU6. The project owner shall submit to the CPM a copy of the Notice of Intent for

Operation accepted by the Colorado River Basin RWQCB and obtain approval of the General Industrial Activities SWPPP from the Energy Commission CPM prior to commercial operation of the SSU6.

**Verification:** No later than 60 days prior to the start of commercial operation, the project owner shall submit to the CPM a copy of the SWPPP required under the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity to Imperial County for review and comment, and to the CPM for review and approval. The operational SWPPP shall include copies of the Notice of Intent for Operation accepted by the RWQCB and any permits for SSU6 that specify requirements for the protection of stormwater or water quality. Approval of the operational SWPPP by the CPM must be obtained prior to start of commercial operation.

**SOIL & WATER-3:** Prior to beginning any site mobilization activities for any project element, the project owner shall obtain CPM approval for a site-specific Drainage, Erosion and Sedimentation Control Plan that addresses all project elements. The plan shall address revegetation and be consistent with the grading and drainage plan as required by **Condition of Certification CIVIL-1**.

**Verification:** No later than 60 days prior to the start of any site mobilization for any project element, the project owner shall submit the Drainage, Erosion and Sedimentation Control Plan to the CPM for review and approval. No later than 60 days prior to start of any site mobilization, the project owner shall submit a copy of the plan to Imperial County for review and requesting any comments be provided to the CPM within 30 days. The plan must be approved by the CPM prior to start of any site mobilization activities.

**SOIL & WATER-4:** Prior to the start of site mobilization activities associated with any project element, including linear and off-site facilities, the project owner shall obtain a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (USACE) for the road widening and pipeline installation between the west end of McKendry Road and Obsidian Butte, and also for the construction of the Bannister switchyard if deemed necessary by USACE.

**Verification:** No later than thirty (30) days prior to the start of site mobilization activities associated with any project element, including linear and off-site facilities, the project owner shall submit to the CPM a copy of the Clean Water Act Section 404 permit from USACE for the project.

**SOIL & WATER-5:** Prior to the start of site mobilization activities associated with any project element, including linear and off-site facilities, the project owner shall obtain a Section 401 Certification from the Colorado River Basin RWQCB for the road widening and pipeline installation between the west end of McKendry Road and Obsidian Butte, and also for the construction of the Bannister switchyard if a Section 404 permit is deemed necessary for those activities by USACE.

**Verification:** No later than thirty (30) days prior to the start of site mobilization activities associated with any project element, including linear and off-site facilities, the

project owner shall submit to the CPM a copy of the Section 401 Certification from the Colorado River Basin RWQCB for the project.

**SOIL & WATER-6:** The project's use of service ponds will create an average loss of up to 30 acre-feet/year (AFY) of fresh water through evaporation. To offset the loss of fresh water, the project owner shall pay the elevated conservation rate for 30 AFY fresh water supply to IID on an annual basis to account for the loss of such supply.

**Verification:** No later than thirty (30) days prior to power plant operation, the project owner shall provide verification that the project and IID have agreed upon the payment of the conservation rate for 30 AFY on an annual basis. Verification should be in the form of a written contract that demonstrates this pay schedule is valid. Verification must be received prior to power plant operation and shall be provided on an annual basis, reported in the Annual Compliance Report for the life of the project.

**SOIL & WATER-7:** The project owner shall provide a copy of the Underground Injection Control (UIC) permit issued by the California Department of Oil, Gas, and Geothermal Resources (DOGGR) for the construction and operation of the brine and wastewater disposal injection wells. The project shall not construct or discharge to these wells without the final permit in place or without emergency/temporary authorization from DOGGR or U.S. EPA Region IX. The project shall provide on a continuing basis, copies of all monitoring or other reports, as well as any changes made to the permit by DOGGR related to the operation of these wells. The project shall not operate without a valid UIC permit.

**Verification:** No later than fifteen (15) days prior to the construction of the injection wells, the project owner shall submit copies of the final UIC permit to the CPM. All copies of permit changes and monitoring or other reports must be received within thirty (30) days of their submittal to DOGGR.

**SOIL & WATER-8:** The project owner shall obtain Waste Discharge Requirements (WDRs) issued by the Colorado River Basin RWQCB for the operation of the project's brine ponds.

**Verification:** No later than sixty (60) days prior to any wastewater discharge to the brine ponds, the project owner shall obtain and provide a copy of the WDRs issued by the Colorado River Basin RWQCB for the project's discharge to the brine ponds to the CPM. Any change to the design, construction, or operation of the ponds permitted by the WDRs will be noticed in writing to both the CPM and the Colorado River Basin RWQCB during both construction and/or operation. The project owner will notify the Energy Commission in writing of any changes to the WDRs that are instituted by either the project owner or the Colorado River Basin RWQCB, including WDRs permit renewal. The project owner will provide the CPM with the annual monitoring report summary required by the WDRs, and will fully explain any violations, exceedances, enforcement actions, or corrective actions.

**SOIL & WATER-9:** The project owner shall obtain Waste Discharge Requirements (WDRs) issued by the Colorado River Basin RWQCB for the project's mud sumps.

**Verification:** No later than thirty (30) days prior to the use of mud sumps associated with drilling activities, the project owner shall obtain and provide a copy of final WDRs issued by the Colorado River Basin RWQCB for the project's mud sumps to the CPM. Any change to the design, construction, or operation of the mud sumps permitted by the WDRs will be noticed in writing to both the CPM and the Colorado River Basin RWQCB during their use. The project owner will notify the Energy Commission in writing of any changes to the WDRs that are instituted by either the project owner or the Colorado River Basin RWQCB. The project owner will provide the CPM with any reporting or monitoring required by the WDRs, and will fully explain any violations, exceedances, enforcement actions, or corrective actions.

**SOIL & WATER-10:** Prior to production of brines from the geothermal aquifer, the project owner shall receive approval for an Emergency Response Plan in consultation with appropriate agencies to ensure proper notification and mitigate any potential impacts resulting from an accidental brine release.

**Verification:** No later than thirty days (30) days prior to production of brines from the geothermal aquifer, the project owner shall consult with appropriate agencies and submit an Emergency Response Plan to the CPM for approval. Approval of the final plan by the Energy Commission CPM must be obtained prior to the production of brines from the geothermal aquifer.

**SOIL & WATER-11:** The on-site septic system shall be designed according to the applicable county standards. The project owner shall submit the final designs for the septic system to the CPM for review and approval, and to the Imperial County Environmental Health Services, County Health Department for comment.

**Verification:** No later than thirty (30) days prior to commencement of septic system construction activities, the project owner shall submit the final designs for the septic system to the CPM for review and approval, and to the Imperial County Environmental Health Services, County Health Department for comment. The project owner shall obtain CPM approval of the final plans prior to commencement of septic system construction activities.

**SOIL & WATER-12:** The project shall not use any fresh water supplies in addition to water supplied by IID as proposed during these proceedings.

**Verification:** After operation has begun, the project owner shall provide to the CPM in the annual compliance report a record of the monthly IID fresh water deliveries to the project. The project owner shall file an amendment with the CPM should another source of fresh water be deemed necessary, or should the project require more than the 1000 AFY of IID fresh water as described in the will-serve letter provided during these proceedings.

**SOIL & WATER-13:** The project owner shall provide certification by a California registered civil engineer or architect that the floodproofing methods for the project meet the floodproofing criteria in Section 74301(c)(2) of the Imperial County Flood Damage Prevention Regulations.

**Verification:** No later than thirty (30) days prior to start of commercial operation, the project owner shall provide certification by a registered civil engineer or architect that the floodproofing methods for the project meet the floodproofing criteria in Section 74301(c)(2) of the Imperial County Flood Damage Prevention Regulations to the CPM for review and approval and to Imperial County for review. This verification must be provided prior to the start of commercial operation.

**SOIL & WATER-14:** The project owner shall participate in regional subsidence monitoring conducted by Imperial County and the California Division of Oil, Gas and Geothermal Resources (DOGGR).

**Verification:** No later than thirty (30) days prior to start of commercial operation, the project owner shall reach an agreement with Imperial County and DOGGR that incorporates the SSU6 project into current subsidence monitoring efforts. Verification of this agreement shall be provided in writing and shall be submitted to the CPM for review and approval prior to commercial operation. The project's participation shall be reported and summarized in the Annual Compliance Report for the life of the project.

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# TRAFFIC AND TRANSPORTATION

Testimony of Ken Peterson

## INTRODUCTION

In the Traffic and Transportation section, staff addresses the extent to which the project may impact the transportation system within the vicinity of the proposed Salton Sea Unit 6 project (SSU6). The influx of large numbers of construction workers can, over the course of the construction phase, increase roadway congestion and also affect traffic flow. In addition, the transportation of large pieces of equipment can impact roadway congestion and safety. The construction of linear facilities can temporarily disrupt traffic flows when trenching across roadways. Potential impacts related to traffic operations and safety hazards resulting from the construction and operation of the project are discussed below.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

LORS that are applicable to the proposed project are listed below. Regulations related to the transportation of hazardous materials, which are designed to control and mitigate for potential impacts are included.

### FEDERAL

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

- Title 49, Code of Federal Regulations, sections 171 through 177, governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.
- Title 49, Code of Federal Regulations, sections 350 through 399, and Appendices A-G, Federal Motor Carrier Safety Regulations, addresses safety considerations for the transport of goods, materials, and substances over public highways.
- Title 14, Code of Federal Regulations, Section 77.13(2)(I), requires an Applicant to notify the FAA of construction of structures with a height greater than 200 feet from grade or greater than an imaginary surface extending outward and upward at a slope of 10 to 1 from the nearest point of the nearest runway of an airport with at least one runway more than 3,200 feet long (CEOE 2002a p. 5.10-14).

### 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 rights-of-way. The California Health and Safety Code addresses the transportation of hazardous materials. Specific provisions include:

- California Vehicle Code section 353 defines hazardous materials.
- California Vehicle Code sections 31303 through 31309 regulate the highway transportation of hazardous materials, the routes used, and restrictions thereon.

- California Vehicle Code sections 31600 through 31620 regulate the transportation of explosive materials.
- California Vehicle Code sections 32000 through 32053 regulate the licensing of carriers of hazardous materials and includes noticing requirements.
- California Vehicle Code sections 32100 through 32109 establish special requirements for the transportation of inhalation hazards and poisonous gases.
- California Vehicle Code sections 34000 through 34121 establish special requirements for the transportation of flammable and combustible liquids over public roads and highways.
- California Vehicle Code sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5. 7, 34506, 34507.5 and 34510-11 regulate the safe operation of vehicles, including those which are used for the transportation of hazardous materials.
- California Health and Safety Code section 25160 et seq., addresses the safe transport of hazardous materials.
- California Vehicle Code sections 2500 through 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, it requires the possession of certificates permitting the operation of vehicles transporting hazardous materials.
- California Streets and Highways Code sections 117 and 660 through 672 and California Vehicle Code section 35780 et seq., require permits for the transportation of oversized loads on county roads.
- California Vehicle Code sections 35550 through 35559 impose gross weight limits upon the highway by requiring that the wheels on any one axle of a vehicle shall not exceed 18,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway, by the wheels on any front steering axle of a motor vehicle, shall not exceed 12,500 pounds. The maximum allowable gross combination weight is 80,000 pounds.
- California Street and Highways Code sections 660, 670, 1450, 1460 et seq., 1470, and 1480 regulate right-of-way encroachment and the granting of permits for encroachments on state and county roads.
- In addition all construction within the public right-of-way must comply with the manual of traffic controls for construction and maintenance of work zones (California Department of Transportation, 1996).

## Imperial County Airport Land Use Commission

The Imperial County Airport Land Use Commission (ALUC) reviews all land developments affecting airspace, and makes advisory determinations to local

jurisdictions on developments' consistency with the County Airport Land Use Compatibility Plan.

## Imperial County General Plan

### Circulation and Scenic Highways Element

The project is located within the unincorporated area of Imperial County; therefore the County General Plan is relevant. The general plan's Circulation and Scenic Highways Element, which was revised May 16, 1993, is relevant to the traffic and transportation analysis. The following circulation goal and objective are relevant to SSU6:

- Goal 1 The county will provide an integrated transportation system for the safe and efficient movement of people and goods within and through the County of Imperial with minimum disruption to the environment. (Imperial County 1993 p. 29)
- Objective 1.3 Ensure safe and coordinated traffic patterns, contiguous growth, and promote a planned and consistent development around city/township areas. (Imperial County 1993 p. 29)

The following implementation programs and policies are relevant to SSU6:

IVB1d The County's goal for an acceptable traffic service standard during AM and PM peak periods shall be Level of Service (LOS) C for all arterial and street links and LOS C for all intersections. (Imperial County 1993 p. 34)

IVB1f The County may permit construction of private streets within individual development projects….(Imperial County 1993 p. 35)

Excerpt from IVB2: Requiring the dedication of right-of-way and street improvement as a condition of issuance of a Building Permit should be required, at least for any development in multiple family, commercial, and industrial zones. (Imperial County 1993 p. 36)

Excerpt from IVB6b: The County shall prohibit the use of public streets for freight loading and unloading. (Imperial County 1993 p. 40)

Excerpt from IVB7b: The County shall encourage the use of railroad freight service to minimize long haul truck traffic by providing efficient rail freight loading access facilities. (Imperial County 1993 p. 41)

### Geothermal/Transmission Element

The Geothermal and Transmission Element is an optional element of the Imperial County General Plan that provides a framework for the review and approval of geothermal projects in the County. This Element contains the following goal:

- Goal 1: The County of Imperial supports and encourages the full, orderly, and efficient development of geothermal resources while at the same time preserving and enhancing where possible agricultural, biological, human, and recreational resources. (Imperial County 1998 p. 14)

## Imperial County Zoning Ordinance

The County zoning ordinance requires a building permit for power plants. The County would require a building permit and an encroachment permit for SSU6 if it were not for the preemptive jurisdiction of the Energy Commission provided in the Warren-Alquist Act. The encroachment permit for the project would include street improvement conditions.

# SETTING

## REGIONAL DESCRIPTION

SSU6 is planned for a cultivated 80-acre site within a 160-acre parcel located 1,000 feet southeast of the Salton Sea and the Sonny Bono Salton Sea National Wildlife Refuge. The project's boundaries would be principally Severe Road to the west, McKendry Road to the north, Boyle Road to the east, and Peterson Road to the south. There are nine geothermal power plants presently within nine miles of the SSU6 site. The land in the SSU6 site vicinity is used for wild life habitat, agriculture, and geothermal energy production.

**TRAFFIC AND TRANSPORTATION FIGURE 1** (CEOE 2002a Figure 5.10-1) shows the site and surrounding area. Access to the site vicinity is provided from State Highway (SH) 111 by traveling west on Sinclair road and south on Gentry Road, west on McKendry Road, and south on Boyle Road. Access to the site would be provided by a proposed private access road west from Boyle Road. Descriptions of relevant roads and highways in the study area are provided below.

## Freeways and Local Roadways

SH-111, located about 6 miles to the east of the project site, carries an average of 7,000 vehicles per day between Sinclair Road and SH -115 (CEOE 2002a Table 5.10-1).

SH-78/-86, located to the south of the project site, carries an annual average of 8,100 vehicles per day between B Street and Center Street and 13,000 vehicles per day between between Center Street and H Street (CEOE 2002a Table 5.10-1).

Sinclair Road is classified as a two-lane collector between Severe and Gentry Roads, and carries an average of 1,160 vehicles per day between these points (CEOE 2002a Table 5.10-3).

Gentry Road is classified as a two-lane collector between Sinclair and Lindsey Roads, and carries an average of 1,350 vehicles per day between these points (CEOE 2002a Table 5.10-3).

Boyle Road is classified as a local two-lane between McKendry and Peterson Roads, and carries an estimated average of 100 vehicles per day between these points (CEOE 2002a Table 5.10-3).

McKendry Road is classified as a local two-lane between Severe and Gentry Roads, and carries an average of 53 vehicles per day between these points (CEOE 2002a Table 5.10-3).

## Airports

The nearest airport is the Calipatria Municipal Airport in Calipatria, approximately six miles southeast of the SSU6 site. There are also airports in Brawley, the City of Imperial, and El Centro.

## Public Transportation

There are no public transit routes within three miles of the project site, and there are no plans for public transit expansion in the project vicinity (CEOE 2002 b p. TRA-1).

## Bicycle Facilities

The Imperial County Bicycle Master Plan proposes countywide Class I, II, and III bicycle routes. In the project vicinity there is a Class II bicycle route that travels in part along the project construction route path on Sinclair and Gentry Roads. A Class II bicycle route is defined by the Bicycle Master Plan as part of the roadway or shoulder as marked by pavement markings or barriers. Vehicle parking, crossing, or turning movements are permitted within the Class II Bicycle Route (CE Obsidian 2002a p. 5.10-3). There are no bicycle pavement barriers on Sinclair and Gentry Roads along the project construction truck routes. Staff's field observations of roads in the vicinity indicated little or no bicycle traffic.

## Planned Roadway and Transit Improvements

The County does not anticipate any road projects in the next few years within six miles of the project site (Jorgenson). The California Department of Transportation (Caltrans) has plans for three road improvement projects in the region (Cartagena):

1) SR-78/86: Widen shoulders on SR-86 to just south of Legion Road
   Start-Summer 2003
   End- Summer 2004
2) Construct 4 lane express way near Brawley from Fredricks Road on SR-86 to north of Mead Road on SR-111
   Start- Fall 2003
   End- information not available
3) SR-111: Construct 4.5 miles 4 lane expressway on SR-111 near Brawley from Worthington Road to Keystone Road
   Start- currently under construction
   End- Fall 2003

Caltrans also owns a 240-acre mitigation parcel next to the Salton Sea National Wildlife Refuge. Staff does not expect this mitigation parcel to be a source of construction traffic.

These projects are not expected to conflict with SSU6 construction traffic.

## Truck Traffic

Vehicle classification counts indicate that along the expected project construction truck route, trucks currently comprise approximately 32 percent of the total traffic volume on Sinclair and Gentry Roads, and 22 percent along Boyle Road (CE Obsidian 2002b p. TRA-2). Truck traffic on SH-111 from Sinclair Road to SH-115 is 21 percent of the total, and on SH-78/86 from B Street to H Street in Westmoreland is from 25 to 40 percent (CEOE 2002a Table 5.10-1, p. 5.10-21).

## Current Intersection and Roadway Operating Conditions

Intersections are usually the critical elements of the roadway system when assessing adequate travel capacity, maximizing safety, and minimizing environmental impacts. The operating conditions of a roadway system, including intersections, are described using the term “level of service” (LOS). LOS is a description of a driver’s experience at an intersection or roadway based on the level of congestion (delay). However, it is not a measure of safety or accident potential. LOS can range from “A,” representing free-flow conditions with little or no delay, to “F,” representing saturated traffic conditions with substantial delay.

The County has set LOS C as a goal for a minimally acceptable traffic service standard during AM and PM peak periods for all arterial and street links, and for all intersections. The County's implementation policy for this standard includes placing the major responsibility of the associated costs of improvements with the developers of new land development projects (Imperial County 1993 p. 34).

The existing conditions on portions of highways and local roadways that will be most affected by the expected construction traffic and the current peak hour traffic levels are shown in **TRAFFIC AND TRANSPORTATION Table 1** (CEOE 2002a Table 5.10-1) and **Table 2** (CEOE 2002a Table 5.10-3). During peak hours LOS A is achieved in all of these areas of concern. Existing traffic conditions at intersections in the project area are shown in **TRAFFIC AND TRANSPORTATION Table 3** (CEOE 2002a Table 5.10-4). During peak hours the lowest level of service at any of these intersections is LOS B.

## Traffic and Transportation Table 1
## Existing Traffic Characteristics of Highways in the Project Area

| Highway | Location | Annual Average Daily Traffic | Peak Hour Traffic | Annual Average Daily Truck Traffic | Truck Traffic % of Total [1] | LOS [2] |
|---|---|---|---|---|---|---|
| SH-78/86 | B Street to Center Street (Forrester Road) | 8,100 | 710 | 3,200 | 40% | A |
| SH-78/86 | Center Street (Forrester Road) to H Street | 13,000 | 1,150 | 3,290 | 25% | A |
| SH-111 | Sinclair Road to SH-115 (East) | 7,000 | 690 | 1,477 | 21% | A |

Source: CEOE 2002a p. 5.10-21, Table 5.10-1.

1 Percentages calculated using 2000 average daily truck traffic as a percentage of 2000 AADT.

2 LOS = level of service. LOS from Highway Capacity Software (HCS): Multilane Highways Release 4.1 (see Table 5.10-2).

## Traffic and Transportation Table 2
## Existing Traffic Characteristics of Local Roadways in the Project Area

| Roadway | Location | Classification | Average Daily Traffic | Level of Service C Capacity | LOS[3] |
|---|---|---|---|---|---|
| Sinclair Road[1] | Between SH-111 and Gentry road | Collector, 2-lane | **1160** | **7,100** | **A** |
| McKendry Road[2] | Between Severe Road and Gentry Road | Local, 2-lane | 53 | 4,500 | A[4] |
| Lindsey Road[2] | Between Gentry Road and Severe Road | Local, 2-lane | 823 | 4,500 | A[4] |
| Eddins Road[1] | Between SH-111 and Gentry Road | Collector, 2-lane | 1354 | 7,100 | A |
| Severe Road[2] | Between McKendry Road and Lindsey Road | Local, 2-lane | 52 | 4,500 | A[4] |
| Boyle Road[5] | Between McKendry Road and Peterson Road | Local, 2-lane | 100 (est.) | 4,500 | A[4] |
| Gentry Road[1] | Between Sinclair Road and Lindsey | Collector, 2-lane | 1350 | 7,100 | A |

Source: CEOE 2002a, p. 5.10-22 Table 5.10-3.

1 From Imperial County Traffic Count Database.

2 New counts taken on January 2002.

3 LOS from Imperial County Standard Street Classification (Table 4 Circulation/Open Space Element).

4 According to the Circulation/Open Space Element (Table 4), the Level of Service concept is not applied to residential streets because their primary purpose is to serve abutting lots, not to carry through traffic. Level of service normally applies to roads carrying through traffic.

5 Estimated counts approximately double Severe Road counts, taken on January 2002.

## Traffic and Transportation Table 3
## Existing Traffic characteristics of Intersections in the Project Area[1]

| Intersection | Signal Control | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | LOS | Delay | V/C | LOS | Delay | V/C |
| Gentry Road/McKendry Road | Unsignalized | A | 9.6 | *** | A | 8.8 | *** |
| Gentry road/Lindsey Road | Unsignalized | A | 9.6 | *** | A | 9.3 | *** |
| Gentry Road/Eddins Road (North) | Unsignalized | A | 8.6 | *** | A | 8.4 | *** |
| Gentry Road/Eddins Road (South) | Unsignalized | A | 9.4 | *** | A | 9.5 | *** |
| Forrester Road/SH-78 | 4-Way Stop | A | 9.6 | 0.209 | B | 10.1 | 0.264 |
| SH-111/Sinclair Road | Unsignalized | B | 10.2 | *** | B | 10.8 | *** |

Source: CEOE 2002a, p. 5.10-22 Table 5.10-4

1 Unsignalized intersection LOS calculated using 2000 Highway Capacity Manual (HCM) Unsignalized Intersection methodology; 4-Way Stop.
intersection LOS calculated using 2000 HCM 4-Way Stop Intersection methodology.
*** No volume-to-capacity (V/C) ratio is calculated under 2000 HCM Unsignalized Intersection methodology.

The portions of McKendry and Boyle Roads within the vicinity of the site, which are part of construction and operation truck and employee routes, are gravel roads.

## IMPACTS

The discussion below analyzes potential traffic and transportation impacts, and proposed mitigation measures, at the project site and along the routes of related proposed linear facilities.

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project may have a significant effect on traffic and transportation if the project will:

- cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections);
- exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;
- result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- result in inadequate emergency access;
- result in inadequate parking capacity; or
- conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

## CONSTRUCTION PHASE

### Commute and Truck Traffic

Trips generated as a result of the project will consist of construction worker travel, truck delivery and waste hauling activity. The applicant has estimated that construction of the power plant facility will occur over a 20-month period (CEOE 2002a p. 5.10-8) and will require an average construction workforce of 265 workers per month (CEOE 2002a Table 3.4-1), assuming a single shift and a 40-hour workweek (CEOE 2002a p.3-35). At the peak of the construction workforce for the plant and transmission lines, which would be month #14 of construction, an estimated 467 construction workers would be required with a daily trip total of 934 (CEOE 2002a Table 3.4-1). Construction month #7 would be the high point of the combination of daily construction truck and worker trips at 946 without carpooling required (CEOE 2002a Tables 3.4-1 & 2).

The preferred commuting route for construction workers would be primarily from SH-111 west on Sinclair Road, south on Gentry road, west on McKendry Road and south on Boyle Road to the site; and secondarily from SH-78/86 east on Bannister Road, north on Forrester and Gentry Roads, west on McKendry Road, and south on Boyle Road to

the site. Most construction trucks would follow the route from SH -111 to Sinclair Road (CE Obsidian 2002a p. 5.10-8). During the peak month for construction activity there would be 539 truck deliveries (CEOE 2002a Table 3.4-3). Construction equipment and material delivieries typically would be made between 7:00 a.m. and 5:00 p.m. Monday through Friday (CEOE 2002a p. 5.10-7). Off-road construction worker parking would be provided (CEOE 2002a p. 5.10-6).

**LOS IMPACT**

**Traffic and Transportation Tables 4** and **5,** from the AFC, show the project construction-related traffic on portions of highways and local roads, and the expected effect on local road intersection level of service (CEOE 2002c Tables 5.10-7R1 and 5.10-8R1). These tables demonstrate that the projected LOS for highways and local roads in the project vicinity would be LOS A or B. AFC Table 5.10-9 ((CEOE 2002a, p. 5.10-25) demonstrates that at one intersection, Gentry Road/McKendry Road, the construction period LOS would change from A to C during the AM peak traffic period; all other intersections studied by the applicant would be at LOS A or B during AM and PM peak traffic periods during construction. Therefore, these tables demonstrate that projected LOS levels would in most cases be at LOS A or B, and would not fall below LOS C for any of these points of study, thus meeting the County's minimum traffic service standard of LOS C.

The Imperial County Planning/Building Department has reviewed the Preliminary Staff Assessment, and the County Public Works Department has reviewed the Application for Certification. Imperial County is of mixed opinion on the project's traffic impact. The County Planning Department has stated that "…there will be no significant impacts on local traffic due to the construction or operation of the proposed power plant, specifically at the intersection of Gentry Road and McKendry Roads and is not a significant environmental impact." (Heuberger 2003, p. 2)

However, the County Public Works Department has stated that the average daily trip count for Gentry Road in July 2000 was 1885, rather than the 1350 trips reported in the AFC (see CEOE 2002a, p. 5.10-24,, Table 5.10-8), and therefore the projected peak hour LOS values for the Gentry Road/McKendry Road intersection would be C- (Jones 2002, p. 2). Staff assumes that the County Public Works Department is referring to the projected construction period LOS value at this intersection during the AM peak traffic period. In the County Public Works staff's opinion, since this LOS value is less than the County's standard of LOS C, the County, this intersection would require mitigation (Fiorenza). The Public Works Department has stated that the County would request improvements at the Gentry/McKendry intersection (Jones, p. 2). Staff assumes that the Public Works Department's assessment of existing traffic data and projected LOS values is correct and reasonable. Condition **TRANS-2** and **TRANS-5** would assure compliance with County mitigation requirements.

## Table 4
## Distribution of Plant Construction-related Traffic on Highways
## Projected Additional Vehicle Trips Per Day

| Highway/ Roadway | Existing AADT | Existing LOS | Construction & Employee Traffic | Delivery and Haul Traffic | Added Vehicle Increase | Projected Vehicle Trips per Day | Projected LOS |
|---|---|---|---|---|---|---|---|
| **SH-78/86, B Street to Center Street (Forrester Road)** | 8,100 | A | 76 | 0 | <1% | 8,716 | A |
| **SH-78/86, Center Street (Forrester road) to H Street** | 13,000 | A | 16 | 0 | <1% | 13,016 | B |
| **SH-111/Sinclair Road to SH-115 (East)** | 7,000 | A | 246 | 10 | 4% | 7,256 | A |

Source: CEOE 2002c, p. 63, Table 5.10-7R1
AADT = Average Annual Daily Traffic
LOS = Level of Service1. Includes traffic associated with deliveries to the site and waste hauling from the site. Assume SH 111 to Sinclair Road is the preferred route for all delivery/haul traffic. See CEOE 2002c Table 5.10-11R1 and 5.10-12R1, pp. 81-82.

## Table 5
## Distribution of Plant Construction-related Traffic on Local Roads
## Projected Additional Vehicle Trips Per Day

| Highway/Roadway | Existing AADT | Existing Los | Construction & Employee Traffic | Delivery and Haul Traffic(1) | Added Vehicle Increase (%) | Projected vehicle Trips per Day | Projected LOS(3) |
|---|---|---|---|---|---|---|---|
| Sinclair Road(1) | 1,160 | A | 478 | 10 | 42% | 1648 | A |
| McKendry Road(2) | 53 | A(4) | 930 | 10 | 1774% | 993 | A |
| Lindsey Road(2)(5) | 823 | A(4) | 81 | 0 | 10% | 904 | A |
| Eddins Road(1) | 1,354 | A | 360 | 0 | 27% | 1714 | A |
| Severe Road(2) | 52 | A(4) | 10 (est.) | 0 | 21% | 62 | A |
| Boyle Road(6) | 100 (est.) | A(4) | 930 | 10 | 940% | 1040 | A |
| Gentry Road(1) | 1,350 | A | 452 | 0 | 34% | 1802 | A |

Source: CEOE 2002c, p. 83, Table 5.10-8R1
AADT = Average Annual Daily Traffic
LOS = Level of Service
1 From Imperial County Traffic Count Database
2 New Counts taken on January 2002
3 LOS from Imperial County Standard Street Classification (Table 4 Circulation/Open Space Element)
4 According to the Circulation/Open Space Element (Table 4), Level of Service are not applied to residential streets because their primary purpose is to serve abutting lots, not to carry through traffic. Level of service normally applies to roads carrying through traffic.
5 Segment not a significant access route to project site.
6 Estimated counts approximately double Severe Roads counts, taken on January 2002.
7 Includes traffic associated with deliveries to the site and waste hauling from the site. Construction related haul uses SH-111
to Sinclair Road route. See CEOE 2002c Tables 5.10-11R1 and 5.10-12R1.

Because Boyle Road is a local two-lane road, there could be peak hour traffic crossing-related delays and conflicts at or near the entrance of the private access road that would connect the laydown area to Boyle Road. The construction traffic control and implementation plan that would be required by **TRANS-5** would need to demonstrate resolution of any such problems.

### Transport of Hazardous Materials and Waste

Some construction truck deliveries would include hazardous materials, but there would be no use of acutely hazardous materials during construction (CEOE 2002a p. 5.10-7). The transportation and handling of hazardous substances associated with the project can increase roadway hazard potential. These potential impacts can be mitigated to insignificance by compliance with federal and State standards established to regulate the transportation of hazardous substances. No sensitive land uses (such as schools and childcare centers) are located near the project site. There is one sensitive land use along the above-described truck route: Grace Smith Elementary School at 9 East 4th Street, Niland, near the corner of East 4$^{th}$ Street and SH-111. Because SH-111 north of Sinclair Road is not expected to be a major route for project transport of construction materials and waste, It is not expected that the additional truck traffic caused by project construction would create an impact on this school site. There has been no history of problems caused by truck traffic at the one school bus stop on SH-111, 3/4 mile south of Niland (Spellins). Furthermore, the school bus stop is recessed from the highway. There are no school bus routes in the vicinity of the project site (Raceles).

The California Department of Motor Vehicles specifically licenses all drivers who carry hazardous materials. Drivers are required to check for weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are also required to take instruction in first aid and procedures on handling hazardous waste spills. Drivers transporting hazardous waste are required to carry a manifest, which is available for review by the California Highway Patrol at inspection stations along major highways.

The California Vehicle Code and the Streets and Highways Code (Sections 31600 through 34510) are equally important in ensuring that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol.

The transportation and handling of hazardous substances associated with the project can increase roadway hazard potential. The handling and disposal of hazardous substances is also addressed in the Waste Management, Worker Safety and Fire Protection, and Hazardous Materials sections of this report. Potential impacts of the transportation of hazardous substances can be mitigated to insignificance by compliance with federal and State standards established to regulate the transportation of hazardous substances. Proposed Condition **TRANS-3** would ensure compliance with these requirements for transportation of hazardous materials. Additional requirements are discussed in the sections mentioned above.

### Oversize and Overweight Loads

Transportation of equipment that would exceed the load size and limits of certain roadways would require special permits from the County and Caltrans. Staff has proposed Condition **TRANS-1** to ensure compliance with this requirement.

### Emergency Access

The nearest emergency response facility is the Calipatria Fire Department, approximately 11 miles from the project site. Ambulance services would be provided

by the Gold Cross Ambulance Company based in El Centro and Brawley. It is estimated that the average response time for an ambulance would be a maximum of one hour (Gold Cross Ambulance Company)). Pioneers Memorial Hospital in Brawley, the closest hospital, is approximately 22 miles from the site (CEOE 2002a p. 5.9-5). The route for emergency services by the Calipatria Fire Department would be north on SH-111, then primarily west on Sinclair Road, south on Gentry Road, west on McKendry Road, and south on Boyle Road to the project site (Salamy 2003a, p. 4). Proposed Condition **TRANS-5** would require preparation of a Construction Traffic Control and Implementation Plan that addresses emergency access.

## Well Pads

Five well pads with two wells for each pad, for a total of 10 production wells, and seven injection wells on three new injection well pads would be constructed. Traffic impacts caused by the construction of these wells would be insignificant due to the short distance of the wells to the SSU6 site.

## Linear Facilities

### Transmission Lines

The project's proposed L-Line Interconnection would run south from SSU6 for 16 miles to the Imperial Irrigation District's (IID) existing "L" line. This line would be constructed for 14 miles along Lack Road and Bannister Road. The IID Midway Interconnection would be constructed from SSU6 for 15 miles east generally along Hoober road to the existing Midway Substation. The applicant has identified an alternative L-Line Interconnection route which would replace the last 2.8 miles of this route through Bureau of Land Management (BLM) lands with a route north along SH-86 for approximately 7.5 miles to the intersection of SH-86 and the L-Line. This alternative would allow the Applicant to avoid using the BLM land for transmission line construction (CEOE 2002a pp. 6.6-6.7).

Both transmission line routes would cross many roads (CEOE 2002a p. 5.10-5). Temporary staging areas would be used when a transmission line construction area is distant from the project site (CEOE 2002a p. 5.10-11). The locations of these staging areas have yet to be determined. These temporary staging areas, to be located on private property, would also be used for construction worker parking. Traffic impacts during construction along access routes could be caused by use of heavy equipment, trucks, and workers' vehicles. The construction traffic control and implementation plan required by **TRANS-5** would need to mitigate the effect of these impacts to the extent necessary.

### Production and Injection Pipelines

Geothermal steam production pipelines would be constructed to connect the well pads to the project. These pipelines would cross six roads near the project site. Injection pipelines would be constructed from the project to the injection wells, crossing five roads. Construction of the production and injection pipelines across roads would cause short term interruption of traffic (CEOE 2002a p. 5.10-13). The construction traffic control and implementation plan required by **TRANS-5** would need to mitigate the impact of these interruptions to the extent necessary and practical.

## Parking and Laydown Areas

Temporary construction worker parking at the main project site would be located south of the project site adjacent to Boyle Road. The approximately 5.5 acre parking space would be adequate at the peak of construction with carpooling. If the worst case scenario of having to provide parking for 467 workers' vehicles (without carpooling) were to occur, staff believes that the applicant-owned site is large enough to allow for expansion of the lot if necessary. The construction laydown area would be located on the south side of the proposed power plant site.

# OPERATIONAL PHASE

## Commute Traffic

Operation of the power plant is expected to require a labor work force of approximately 69 full-time employees. Assuming a worst case scenario in which each employee would be on site at the same time, drive separately to work, and make one round trip from home to work per day, operation of the project would generate approximately 138 employee vehicle trips per day (CEOE 2002a p. 5.10-10). Employee carpools and ridesharing could reduce employee-related trips. Employee parking would be available on a paved lot adjacent to the project site (CEOE 2002a p. 5.10-10). Based on the relatively low number of full-time employees at SSU6 and current uncongested traffic conditions, it is anticipated that the traffic generated would be easily accommodated by the existing roadway system.

## Truck Traffic

Deliveries to the project site are expected for on-going maintenance of the plant. There would be a minimum of 32 delivery, hazardous waste (e.g., oily rags, brine solids, and sulfur byproducts), and nonhazardous waste hauling trips daily during the operations period, with more trips made on irregular schedules reaching as many as 54 trips per day (CEOE 2002c Table 5.10-12R1). The operational period truck route is expected to be the same as for the construction period described above.

There would be at least 39 hazardous materials and waste truck trips weekly during project operation (CEOE, 2002c, p. 82 Table 5.10-12R1). Adoption of **TRANS-3** would ensure that necessary permits and licenses are secured for the transport of hazardous materials. There is one sensitive land use along the above-described truck route: Grace Smith Elementary School at 9 East 4th Street, Niland, near the corner of East 4$^{th}$ Street and SH-111. It is not expected that the additional truck traffic caused by project construction would create an impact on this school site. There are no school bus routes in the vicinity of the project site (Raceles).

## LOS IMPACT

The County Public Works Department has stated that the Traffic and Transportation section in the AFC did not include a 20 year traffic study for the project, a standard County procedure, and therefore that portion of the AFC Traffic and Transportation section is inaccurate and incomplete (Jones, p. 2). Given the high number of truck trips during operations (i.e., at least 32 daily) due to delivery and waste hauling, there could be peak hour impacts on local roads and intersections.

The applicant has projected that with the addition of the SSU6 project operation, the LOS on highways in the project vicinity would change in one section (SH-78-86/B Street to Center Street (Forrester Road)) from LOS A to LOS B,above the County's minimum standard of LOS C (CEOE 2002c Table 5.10-7aR1) The applicant has stated that there are no anticipated long-term traffic impacts associated with project operations, including workforce traffic, deliveries, and waste hauling (CEOE 2002a, p. 5.10-9. Condition **TRANS-2** would require that the applicant comply with County requirements for the encroachment permit, which would be issued by the County Public Works Department. With the proposed conditions, the power plant would not generate substantial vehicular movement; would not alter present traffic circulation patterns; would not alter waterborne, rail, or air traffic; would not substantially increase traffic hazards to motor vehicles, bicyclists, or pedestrians; would not violate adopted LOS standards; and would not create demand for new parking that cannot be accommodated by the project design. As such, operation of the proposed power plant is not expected to result in significant long-term impacts to the local transportation system.

### Federal Aviation Administration (FAA) and the Imperial County Airport Land Use Commission

Because of the distance of the project site from the nearest airport and the height of project facilities, the FAA does not need to review this project. There are no airports in the vicinity of the project site, and the project would not be within the safety zones of any airport. Therefore the ALUC will not review the total project but has reviewed the construction of the 125-foot high IID transmission line and poles that would extend 16 miles south and westward from the project site to the existing 161 kV “L”-line and 15 miles eastward to the Midway Substation. The ALUC has found the proposed new transmission line and poles to be consistent with the Airport Land Use Compatibility Plan with the condition that warning devices in the form of high-density, orange balls be attached to the portion of the transmission lines adjacent to a private airstrip and under the low-level military route (Heuberger 2002). The applicant has stated that there are two airstrips in the vicinity of the transmission line and has described the locations of these airstrips (Salamy 2003a). Staff assumes that the ALUC’s condition regarding warning devices refers to the portions of the transmission line in the vicinity of these two airstrips. The applicant has also verified the time of use, operational floors, and location of the military route (Salamy 2003b). Staff assumes that the ALUC reviewed this information regarding the military route in the determination of its condition. Condition **TRANS-7** would require the applicant to meet the requirements of the ALUC.

## CUMULATIVE IMPACTS

The AFC contains the results of a survey of State and local government agencies for potential projects that could have a cumulative impact. There are three planned projects within 12 miles of the SSU6 site (CEOE 2002a p. 5.10-13, 5.17-1 through 5). These projects are:

- Caltrans Improvement of State Route 78/111 Expressway (Brawley Bypass) (Project ID1)
- Solar Evaporation Pond Pilot Project (Project ID2) (12 to 15 miles north of the SSU6 site)

- IID water conservation and Transfer Project/Habitat Conservation Plan (Project ID3).
- This project involves conservation activities within IID's water service area in Imperial County.

Construction impacts from these projects would be temporary and local, and would not cause significant cumulative impacts. Because of their distance from SSU6 they would not conflict with SSU6 construction, nor would SSU6 construction conflict with these projects. SSU6 would also not add to growth-inducing impacts in the area because the project would add only 69 operational employees.

## FACILITY CLOSURE

There are at least three circumstances in which a facility closure can take place; planned closure, unexpected temporary closure and unexpected permanent closure. The minimum design life of the power plant is expected to be 30 years. At least 12 months prior to the proposed decommissioning, the applicant shall prepare a closure plan for submission to the Energy Commission for review and action. At the time of closure all then-applicable LORS will be identified and the closure plan will address how to comply with these LORS. The effects of closure for the SSU6 Energy power plant on traffic and transportation will be similar to those discussed for the construction of the project. Closure will create traffic levels that are similar in intensity and duration to those expected during facility construction.

Unexpected temporary closure occurs when the facility is closed suddenly or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster, or an emergency. From the perspective of traffic and transportation issues, in the event of temporary facility closure, the applicant would have to comply with all applicable policies contained in the LORS section of this report regarding transportation permits for hazardous materials and equipment.

Unexpected permanent closure occurs if the project owner closes the facility suddenly or unexpectedly, on a permanent basis. If unexpected closure occurs, the owner remains accountable for implementing the on-site contingency plan. Unexpected closure can occur when 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 temporary closure, the effects on traffic and transportation would be similar to those for normal operation of the power plant facility. 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 commuter traffic. In either instance, the roadway systems within the vicinity of the project should be able to handle traffic without significantly affecting the current level of service of the area.

## MITIGATION

Staff proposes conditions of certification **TRANS-1**, **TRANS-2**, **TRANS-3**, and **TRANS-7** to ensure compliance with applicable LORS requirements.

The County would require that the gravel roads in the project vicinity be paved by the applicant (Jorgenson). The County road improvement requirements would be met by implementation of County encroachment permit specifications. Any work performed on County roads requires an encroachment permit. The encroachment permit would also include the private access road into the construction laydown/parking site (Cabanilla 2003).

The County General Plan's relevant goals, implementation programs, and policies would be supported by this project with the implementation of the conditions of certification.

Staff has also proposed additional conditions to require the applicant to implement the following traffic and transportation mitigation measures:

- Enforce a policy that all project-related parking occurs in designated, off-street parking areas (**TRANS-4**).
- Prepare a construction traffic control and implementation program subject to review by the Imperial County Public Works Department, and Caltrans. (**TRANS-5**). The construction traffic control and implementation plan shall include measures to maximize construction worker carpooling and any other necessary measures to mitigate direct and cumulative impacts associated with construction activities occurring within any public street right-of-way in accordance with local jurisdictional requirements.
- Repair any damage to adjacent roadway sections incurred during construction to the road's pre-project construction condition. (**TRANS-6**).

## ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than 50 percent within a six-mile radius of the proposed SSU6 Energy Project (please refer to **Socioeconomics Figure 1** in this Staff Assessment), and Census 2000 information that shows the low-income population is less than 50 percent within the same radius. Based on the **Traffic and Transportation** analysis, staff has identified several potential direct impacts resulting from the construction or operation of the project. We believe that these potential impacts can be mitigated to a level of insignificance and we are recommending adoption of mitigation measures. Given the recommended mitigation of the potential traffic impacts, staff has concluded that there are no **Traffic and Transportation** environmental justice issues related to this project.

## CONCLUSIONS

Staff has concluded that the proposed project has the potential to cause an impact in the traffic and transportation area. These potential impacts include the following concerns:

- Possible peak hour traffic impacts during construction and operational phases;
- Hazardous materials and waste transport;
- Oversize/overweight loads;
- Emergency access to the project site;
- Interruption of traffic during construction of linear facilities;
- Operation period peak hour congestion of local roads and intersections;
- Safety concerns regarding the proximity of the new transmission lines to private airstrips and the low-level military route.

It appears that all identified project impacts can be mitigated to a level of insignificance through the implementation of staff's proposed mitigation measures except for any impact on the low-level military route caused by the new transmission lines. Staff has not yet received applicant information on the location of this military route.

If the project is approved, staff recommends that the Energy Commission adopt the following Conditions of Certification.

**TRANS-1** The project owner shall comply with the California Department of Transportation (Caltrans) and other relevant jurisdictions limitations on vehicle sizes and weights. In addition, the project owner or its contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for roadway use.

**Verification:** In the Monthly Compliance Reports (MCRs) , the project owner shall submit copies of any 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. [12/18/02]

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

**Verification:** In the MCRs, the project owner shall submit copies of 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. [12/18/02]

**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. [9/9/02]

**TRANS-4** During construction of the power plant and all related facilities, the project shall develop a parking and staging plan for all phases of project construction to enforce a policy that all project-related parking occurs on-site or in designated off-site parking areas.

**Verification:** At least 60 days prior to start of site mobilization, the project owner shall submit the plan to the (City and/or County) for review and comment, and to the CPM for review and approval. [9/9/02]

**TRANS-5** The project owner shall consult with Imperial County, and prepare and submit to the CPM for approval a Construction Traffic Control Plan and Implementation Program which addresses the following issues:

- Timing of heavy equipment and building materials deliveries;
- Redirecting construction traffic with a flag person;
- Signing, lighting, and traffic control device placement if required;
- Need for construction work hours and arrival/departure times outside of peak traffic periods;
- Insure access for emergency vehicles to the project site;
- Temporary travel lane closure; and
- Access to adjacent residential and commercial property during the construction of all linears.

**Verification:** At least 30 days prior to site mobilization, the project owner shall provide to the CPM a copy of the referenced documents. [12/18/02]

**TRANS-6** The project owner shall repair affected public rights-of-way (e.g., highway, road, bicycle path, pedestrian path, etc.) to original or near original condition that have been damaged due to construction activities conducted for the project and its associated facilities.

Prior to start of site mobilization, the project owner shall notify the affected local jurisdiction(s) and Caltrans (if applicable) about their schedule for project construction. The purpose of this notification is to request the local jurisdiction(s) and Caltrans to consider postponement of public right-of-way repair or improvement activities until after project construction has taken place and to coordinate construction related activities associated with the applicable identified local jurisdiction or Caltrans project(s) with the project owner.

**Verification:** Prior to the start of site mobilization, the project owner shall photograph, or videotape the public right-of-way segment(s) to be used during construction. The project owner shall provide the CPM, the affected local jurisdiction(s), and Caltrans (if applicable) with a copy of these images.

Within 60 calendar days after completion of construction, the project owner shall meet with the CPM, the affected local jurisdiction(s) and Caltrans (if applicable) to identify sections of public right-of-way to be repaired, to establish a schedule to complete the repairs and to receive approval for the action(s). Following completion of any public right-of-way repairs, the project owner shall provide to the CPM a letter signed by the affected local jurisdiction(s) and Caltrans stating their satisfaction with the repairs.

**TRANS-7** The project owner shall provide appropriate evidence of compliance with the airport land use commission's regulations and conditions (e.g., Airport Land Use Compatibility Plan, etc.) for the project and any associated facilities located within an airport planning boundary of a public use airport or military air facility.

**Verification:** The project owner shall submit to the ALUC information as required demonstrating compliance with the ALUC's recommended condition.

At least 30 calendar days prior to start of commercial operation, the project owner shall provide a copy of the ALUC's signed written determination prepared for the project to the CPM for review and approval.

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# TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

## INTRODUCTION

The energy from the proposed Salton Sea Unit 6 Project (SSU6) would be delivered to the Imperial Irrigation District (IID) power grid by electrically connecting the facility with the existing IID transmission line (L-Line) to the southwest, and to the 230 kV Midway Substation to the east. According to information from the applicant, CE Obsidian Energy, LLC (CEOE), the connection to the L-Line would be a single circuit 161 kV overhead line 16 miles long (CEOE 2002f), while the connection to the Midway Substation would be a 15-mile single-circuit 161 kV line. Both lines would have a 230 kV capacity and be built, owned, operated, and maintained by IID (CEOE 2002a, pp. 1-1, 3-31, 3-46, and 5.8-4).

The purpose of this staff analysis is to assess the proposed transmission line design and operational plan for compliance with the applicable health and safety related laws, ordinances, regulations, and standards (LORS). If such compliance is established, staff would not recommend further mitigation measures with respect to the field and non-field issues of concern in this analysis; if not, staff would recommend revisions to the interconnection plan as appropriate. Staff's analysis focuses on the following issues:

- aviation safety;
- interference with radio-frequency communication;
- audible noise;
- fire hazards;
- hazardous shocks;
- nuisance shocks; and
- electric and magnetic field (EMF) exposure.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Discussed below by subject area are design-related Laws, Ordinances, Regulations, and Standards (LORS) applicable to the physical impacts of the overhead transmission lines as proposed to be used to transmit the energy from SSU6. The potential for these impacts would depend on the applicant's compliance with these LORS, which are specific federal or state regulations or established industry standards and practices. There presently are no local laws or regulations specifically aimed at those aspects of the structure or dimensions of electric power lines that influence the magnitude of the impacts noted above. The only such regulations are local requirements for such lines to be located underground in new housing developments because of the potential for visual impacts on the landscape. Such requirements are not aimed against any specific health effects.

## AVIATION SAFETY

Any hazard to area aircraft would relate to the potential for collision in the navigable air space. The applicable federal LORS discussed below are intended to ensure the distance and visibility necessary to prevent such collisions.

### Federal

- Title 14, Code of Federal Regulations (CFR), Part 77, "Objects Affecting the Navigation Space." Provisions of these regulations specify the criteria used by the Federal Aviation Administration (FAA) for determining whether a "Notice of Proposed Construction or Alteration" is required for potential obstruction hazards. The need for such a notice depends on factors related to the height of a structure, the slope of an imaginary surface from the end of nearby runways to the top of the structure, and the length of the runway involved. Such notification allows the FAA to ensure that all structures are located to avoid the aviation hazards of concern.
- FAA Advisory Circular (AC) No. 70/460-2H, "Proposed Construction and or Alteration of Objects that May Affect the Navigation Space." This circular informs each proponent of a project that could pose an aviation hazard of the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA.
- FAA AC No. 70/460-1G, "Obstruction Marking and Lighting." This circular describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.

## INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION

Transmission line-related radio-frequency interference is one of the indirect effects of line operation produced by the physical interactions of line electric fields. Since electric fields are unable to penetrate most materials, including the ground, such interference and other electric field effects are not associated with underground lines. The level of any such interference usually depends on the magnitude of the electric fields involved. Because of this, the potential for such impacts can be assessed from field strength estimates obtained for the line. The interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge, but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio-frequency communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration, and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The following regulations are intended to ensure that such lines are located away from areas of potential interference and that any interference is mitigated whenever it occurs.

### Federal

Federal Communications Commission (FCC) regulations in Title 47 CFR, Section 15.25. Provisions of these regulations prohibit operation of any devices producing force fields, which interfere with radio communications, even if (as with transmission lines) such

devices are not intentionally designed to produce radio-frequency energy. For such lines, interference is minimized through the use of specific low-corona cables as conductors. The FCC requires each line operator to mitigate all complaints about interference on a case-specific basis.

### State

General Order 52 (GO-52), California Public Utilities Commission (CPUC). Provisions of this order govern the construction and operation of power and communications lines and specifically deal with measures to prevent or mitigate inductive interference. Such interference is produced in the case of power lines by the electric field directly induced by the energized conductor in the antenna of a radio signal receiver.

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

## AUDIBLE NOISE

### Industry Standards

There are no design-specific federal regulations that limit the audible noise from transmission lines. As with radio noise, such noise is limited instead through design, construction, or maintenance practices established from industry research and experience. These practices are effective and do not significantly impact line safety, efficiency, maintainability, and reliability. All modern overhead high-voltage lines are designed to assure compliance. As with radio-frequency noise, such noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying or hissing sound, or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a 100-foot right-of-way. Underground lines do not generate such noise since they cannot produce the responsible surface-level electric fields.

## NUISANCE SHOCKS

### Industry Standards

There are no design-specific federal regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line electric and magnetic fields. As with the proposed

overhead lines, the applicant is responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

## FIRE HAZARDS

The fire hazards addressed through the following regulations are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

### State

- General Order 95 (GO-95), CPUC. "Rules for Overhead Electric Line Construction" specify tree-trimming criteria to minimize the potential for power line-related fires.
- Title 14, California Code of Regulations, Section 1250. "Fire Prevention Standards for Electric Utilities" specify utility-related measures for fire prevention.

## HAZARDOUS SHOCKS

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

### State

- GO-95, CPUC. "Rules for Overhead Line Construction" specify uniform statewide requirements for overhead line construction regarding ground clearance, grounding, maintenance, and inspection. Implementing these requirements ensures the safety of the general public and line workers.
- Title 8, California Code of Regulations (CCR), Sections 2700 through 2974. "High Voltage Electric Safety Orders" establish essential requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment

### Industrial Standards

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements in the National Electrical Safety Code, Part 2: Safety Rules for Overhead Lines. These provisions specify the minimum national safe operating clearances applicable in areas where the line might be accessible to the public. They are intended to minimize the potential for direct or indirect contact with the energized line.

## ELECTRIC AND MAGNETIC FIELD EXPOSURE

The possibility of deleterious health effects from EMF exposure has increased public concern in recent years about living near high-voltage lines. Both fields occur together whenever electricity flows, hence the general practice of describing exposure to them together as EMF exposure. The available evidence as evaluated by CPUC, other regulatory agencies, and staff, has not established that such fields pose a significant

health hazard. However, staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate, in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability, and maintainability.

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

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant patterns (e.g., high-level, short-term versus low-level, long-term) of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

## State

In California, the CPUC (which regulates the installation and operation of high-voltage lines in California) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields below levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each electric utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. The other utilities that are not within the jurisdiction of the CPUC voluntarily comply with these CPUC requirements by designing their lines in keeping with the guidelines of the major area utility. The service utility in this case is IID. This field reduction policy of the CPUC resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires each applicant to show how each proposed overhead line would be designed to comply with the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local issues bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied to an extent that does not significantly affect line operation and safety. The extent of such applications would be reflected by the ground-level field strengths as measured during operation. When estimated, or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess each line design for effectiveness at field strength reduction. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic

field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since each new line in California is currently required to be designed according to the EMF-reducing guidelines of the utility in the service area involved, its fields are required under existing CPUC policies to be similar to fields from similar lines in that service area. Designing the proposed project lines according to existing IID field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management. Staff recommends a specific condition of certification (**TLSN-1**) to ensure implementation of the design measures necessary.

### Industrial Standards

There are no health-based federal regulations or industry codes specifying limits on the strengths of fields from power lines. However, the federal government continues to conduct and encourage research necessary for an appropriate policy on the EMF health issue.

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

Before the present health-based concern developed, measures to reduce field effects from power line operations were mostly aimed at the electric field component whose effects can manifest themselves as the previously noted radio noise, audible noise, and nuisance shocks. The present focus is on the magnetic field because only it can penetrate the soil, building, and other materials to potentially produce the types of health impacts at the root of the present concern. As one focuses on the strong magnetic fields from the more visible overhead transmission and other high-voltage power lines, staff considers it important for perspective, to note that an individual in a home could be exposed for short periods to much stronger fields while using some common household appliances such as hair dryers, electric shavers, and electric tooth brushes (National Institute of Environmental Health Services and the U.S Department of Energy, 1995). Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

## SETTING

The proposed SSU6 would be located on an 80-acre portion of a 160-acre land parcel approximately 1,000 feet southeast of the Salton Sea in the unincorporated area of Imperial County, California. The related switchyard would be located about 12.5 miles away along the L-line interconnection on Bannister Road (CEOE 2003b). The actual

project site is in the northern half of the block bounded by McKendry Road to the north, Severe Road to the west, Peterson Road to the south, and Boyle Road to the east. The town of Niland is approximately 7.5 miles to the northeast, with the town of Calipatria approximately 6.1 miles to the southeast. The site is in a region of mostly open spaces, agricultural lands, and geothermal energy production, with nine geothermal power plants located within a 2-mile-radius.

There are relatively few residences along the routes of the proposed lines, with the nearest ones being between 150 feet and 0.5 miles distant. The one residence about which specific concern was expressed by the owner was determined by the applicant to be located approximately 200 feet from the centerline of the project line at issue (July 17, 2003 letter from Eddie Lutz, SSU6 Project Manager to Robert Worl, the Energy Commission's SSU6 Project Manager). At such a distance, staff expects any line-related field impacts, or human exposures, to be within normal background residential levels, which are not a part of the present concern over long-term human exposures, or interference with radio-frequency communication. The only project-related EMF exposures of potential significance to staff are the short-term exposures to plant workers, regulatory inspectors, maintenance personnel, approved guests, or individuals in transit across the project's lines. These types of exposures are short term and well understood as not significantly related to the present health concern.

## PROJECT DESCRIPTION

The proposed project lines and related facilities would consist of the following major segments:

- A new 161 kV switchyard 12.5 miles away on Bannister Road;
- A single-circuit, 16-mile long, overhead 161 kV (230 kV-capacity) transmission line running between SSU6, the new Bannister Road switchyard, and IID's L-Line to the southwest,
- A single-circuit 15-mile long, overhead 161 kV (230 kV-capacity) transmission line running between the SSU6 and the existing IID Midway substation to the west; and
- Project-related modifications within the Midway substation.

Both lines would be supported on steel poles of between 100 feet and 125 feet in height to ensure a minimum conductor height of 35 feet in keeping with GO-95 requirements. The lines would be placed approximately 1000 feet apart and located within a 150-ft right-of-way. These utilized rights-of-way would be within existing IID line corridors, or corridors of roadways. Locating these lines within these existing corridors would be in keeping with present state policy on location of new lines. The applicant has provided information showing the basic structures of these support poles as necessary to ensure safe use and effective field strength reduction. The applicant also provided specific information identifying the routes for both proposed lines as they extend from the project switchyard to their respective termination points at the L-Line and the IID Midway Substation (CEOE 2002a, pages 3-32 through 3-34).

## IMPACTS

## GENERAL IMPACTS

GO-95, and Title 8, California Code of Regulations, section 2700 et seq., as noted in the LORS section, ensures the minimum regulatory requirements necessary to prevent the direct or indirect contact previously discussed in connection with hazardous shocks or aviation hazards. Of secondary concern are the noted field impacts manifesting themselves as nuisance shocks, radio noise, communications interference, and magnetic field exposure. The relative magnitude of such impacts would be reflected in the field strengths characteristic of a given line design. Since applied field-reducing measures can affect line operations and safety, the extent of their implementation and resulting field strengths would vary according to environmental and other local conditions bearing on line safety, efficiency, reliability, and maintainability. IID established its own design guidelines as best applicable to its utility service area. Given the present CPUC requirement to maintain the noted impacts within the levels associated with existing lines, compliance with applicable LORS would be achieved by showing the project-specific fields to be within the range associated with IID lines of the same voltage and current-carrying capacity.

## PROJECT SPECIFIC IMPACTS

### Aviation Safety

As noted by the applicant, (CEOE 2002a, page 4-15), the closest airport to the proposed and related facilities is an airstrip 6 miles southwest in the city of Calipatria This airstrip is used mostly for crop dusting operations and is too far from the project to pose a collision hazard to utilizing aircraft. The nearest commercial airport is the Imperial County Airport, located approximately 20 miles southeast of the project, where it is too far for the project's lines to pose a collision hazard to utilizing aircraft, according to the previously noted FAA criteria. As is common industry practice, the applicant will inform the FAA about the proposed project lines, although no FAA notice would be required.

### Audible Noise and Interference with Radio-Frequency Communication

The previously noted corona-related communications interference is most commonly caused by irregularities (such as nicks and scrapes on the conductor surface), sharp edges on suspension hardware, and other discontinuities around the conductor surface. All existing IID lines were built and are currently maintained according to standard IID practices that minimize such surface irregularities and discontinuities (CEOE 2002a, page 3-46). Moreover, the potential for such corona-related audible noise and interference is usually of concern for lines of 345 kV and above and not the 161 kV lines of these types. The low-corona design to be used would be the same as used for other IID lines of the same voltage (CEOE 2001a, page 4-15) in compliance with the previously noted FCC (47 C.F.R. §15.25) and GO-52 prohibitions against interference with radio communication. Since (a) the edge of the right-of-way would mark the beginning of the areas of possible human habitation around a high-voltage line, and (b) the nearest residences are beyond the zone of significant field exposure or perceivable field for lines of the proposed voltage, staff does not expect the proposed line to

generate any complaints about operational noise, or interference with the use of residential radio, television, or other electrical equipment. In the unlikely event of specific complaints, IID would be responsible (as with other IID lines) for the necessary mitigation as required by the FCC. Staff recommends a specific condition of certification (**TLSN-2**) in this regard. For an assessment of noise from all aspects of the project construction and operation, please see staff's analysis in the **Noise and Vibration** section.

## Fire Hazards

Standard fire prevention and suppression measures for all IID lines would be implemented for the proposed project 161kV lines. The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this compliance approach (CEOE 2002a, page 4-15). IID's fire prevention practices for high-voltage lines would be implemented in compliance with Title 14, California Code of Regulations, section 1250. Staff recommends Condition of Certification **TLSN-4** to ensure implementation.

## Hazardous Shocks

Since the proposed 161 kV lines would be designed according to GO-95 requirements together with the requirements in specific sections of Title 8, California Code of Regulations, section 2700 et seq. against direct contact with the energized line, as is normal IID practice (CEOE 2002a, page 4-15), staff does not expect their use to pose a significant shock hazard.

## Nuisance Shocks

The potential for nuisance shocks around the proposed project lines would be minimized through standard grounding practices implemented for similar IID lines (CEOE 2002a, page 4-15). Staff recommends Condition of Certification **TLSN-5** to ensure implementation.

## Electric and Magnetic Field Exposure

The applicant estimated the maximum field strengths possible along the routes of the proposed project lines (CEOE 2002a, pages 4-16, 4-17, and Appendix L) to assess the effectiveness of the field reduction measures to be incorporated into the proposed line design. The calculations were made for five representative line configurations to be encountered along the rights-of-way (as more fully discussed in CEOE 2002a Appendix L). Staff is in agreement with the applicant's assumptions with respect to parameters bearing on field strength dispersion and exposure levels. Originally proposed as a double-circuit line with maximum electric field strength of 2.3 kV/m within the right-of-way, the Project-to-L-line segment will now be a single-circuit line with a maximum electric field of 1.5 kV/m within the right of way. This electric field strength is expected to diminish to less than 0.1 kV/m at the edge of the lines' 150-ft right of way. This value would fall within the normal background levels. The equivalent values for the single-circuit Project-to-Midway Substation segment are 1.51 kV/m within the right-of-way, diminishing to 0.1 kV/m at the edge of this 150-ft right-of-way. These field strength values are within the values staff would expect for IID lines of the same design and voltage rating. The value of less than 0.1-kV/m values at the rights-of-way could be

compared with values of between 1.0 kV/m and 2.0 kV/m for the edges of rights-of-way in states with regulatory limits.

The maximum magnetic field within the right-of-way for the Project-to-L-line segment, by itself, was estimated as 56.5 mG, diminishing to 6.1 mG at the edge of the 150-ft right-of-way. The maximum value at the point of maximum addition to fields from nearby lines (in this case, a nearby 92 kV single-circuit line, and a 34.5 kV single-circuit line) was calculated as 62.2 mG, diminishing to 5.8 mG at the edge of the 150-ft right-of-way. The values for the Project-to-Midway Substation segment were calculated as 92.4 mG, diminishing to 7.7 mG at the edge of the right-of-way. The maximum value at the point of maximum interaction with nearby fields (in this case a 161 kV double-circuit line) was calculated as 54.3 mG, diminishing to 3.5 mG at the edge of the right-of-way. The lines' maximum field strengths of 98.2 mG and 56.5 mG are within the range staff would expect for similar IID lines. The 7.7 mG and 5.8 mG (edge of right-of-way) values are much lower than the 150 mG to 250 mG specified by the few states with specific regulatory limits.

The calculated field strengths reflect the effectiveness of IID's standard field reduction measures as applied with respect to the following:

- distance between the conductors and the ground;
- spacing between conductors on the same line;
- distance between conductors in nearby lines;
- line current levels; and
- current flow alignment for effective field cancellation.

Since these measures are usually applied to the extent IID considers to be without impacts on line safety, efficiency, reliability, and maintainability, staff considers further mitigation to be unnecessary, but recommends Condition of Certification **TLSN-3** to allow for validation of the reduction efficiency attributable to the design in question. The need for further mitigation would be assessed by comparing the measured field strengths with fields from IID lines of the same voltage and current-carrying capacity.

## CUMULATIVE IMPACTS

Since the previously noted magnetic fields of 62.2 mG and 54.3 mG were calculated respectively, for the proposed lines' points of maximum interaction with nearby lines, they should be seen as representing the maximum post-project exposures of a cumulative nature. As reflected in the calculated values, the lines' potential contribution to any area exposures would be similar to those associated with area IID lines of the same voltage and current-carrying capacity. It is this similarity in field intensity (which reflects the effect implementation of the applicable field strength-minimizing measures) that constitutes compliance with existing CPUC requirements. The field strength measurement requirements in Condition of Certification **TLSN-3** would allow for assessment of the field strength reduction efficiency assumed by the applicant.

## ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population as greater than 50 percent within a six-mile radius of the proposed SSU6 Project (please refer to **Socioeconomics Figure 1** in this staff assessment). Census 2000 information suggests the population of the low-income individuals in the area as presently less than 50 percent, meaning that there would be no issue of environmental justice (on the basis of income) for the field impacts of concern in this analysis. The above noted minority profile caused staff to conduct a screening level analysis for potential environmental justice issues on the basis of minority status. Since, (a) staff found the field levels at issue to be at normal background levels at the estimated values of less than 1.0 kV/m, and (b) the proposed field reduction designs are standard IID designs that are applied throughout the IID service area without regard to minority status, staff regards the field exposure aspect of the environmental justice issue as insignificant for the proposed lines.

## COMPLIANCE WITH LORS

The magnitude of the line impacts of concern in this analysis are within the limits associated with similar transmission lines designed and operated in compliance with IID's field strength reduction guidelines that reflect compliance with present CPUC requirements. Staff, therefore, considers the proposed project transmission line design and operational plan to be in compliance with the health, safety, and design LORS of concern in this analysis.

## RESPONSE TO AGENCY AND PUBLIC COMMENTS

### Mr. Tim Asamen

Mr. Asamen, who lives and farms along Bannister Road, expressed specific concerns about one of the connecting project lines in his e-mail messages to the Energy Commission. The segment in question is the one to be located along the south side of Bannister Road, where his farm property is also located. His questions are paraphrased and indexed as follows:

**TA-1**: Has California established a standard or regulation that limits field strengths within transmission line rights-of-way?

**STAFF'S RESPONSE**: The State of California does not regard the present health concern as adequate to warrant establishing numerical limits on the fields from power lines. The state considers it most appropriate instead for all new or retrofitted lines to be designed to limit field strengths to the extent feasible without impacting safety, reliability, maintainability, and efficiency. All project proponents currently design new or modified lines in keeping with this state policy.

**TA-2**: Based on the statements and analysis in the PSA, is my residence considered not to be in the "immediate vicinity" of the proposed right-of-way for the proposed line? If

so, based upon the analysis in the PSA (pages 4.11-8 and 4.11-9), should I expect interference with residential radio, television, or computer components and functions?

**STAFF'S RESPONSE**: The immediate vicinity of a typical transmission line is the area within the right-of-way as established to ensure safety, and adequate maintenance space. As noted in this testimony, this zone is 150 ft wide for this line segment but usually varies according to space availability. This corridor is usually chosen as feasible to avoid residences or other potentially conducting objects. The radio and television interference that is discussed in staff's testimony is usually associated with lines of much higher voltage than proposed for this project. As noted by staff, the residence of specific concern for this project is located approximately 200 feet from the centerline and therefore, beyond the edge-of the right-of-way. Therefore, staff considers it to be beyond the immediate vicinity of the line as considered in assessing the potential for significant field impacts. The field strengths at the 200-ft distance would be unlikely to contribute significantly to normal background levels. At these resulting levels, staff would not expect any significant field impacts on either television or radio signal reception, or the functioning of any other electrical appliances. As noted in staff's testimony, the line owner is responsible under FCC regulations for mitigating any such impacts to the satisfaction of the complainant. One of staff's recommended Conditions of Certification (**TLSN-2**) is intended to ensure compliance with this requirement.

**TA-3**: What are permissible and prohibited uses within the right-of-way of the proposed line, and are these determined by the state or by the Imperial Irrigation District?

**STAFF'S RESPONSE**. As reflected in one of staff's recommended conditions of certification (**TLSN-5**) the potential for nuisance and hazardous shocks is the most important reason for limiting the use of the area immediately around high-voltage lines. Since each project owner is responsible for minimizing the potential for these hazards (through appropriate distancing from buildings and other conducting objects, or appropriate grounding of conducting objects), the Imperial Irrigation District would be responsible for informing property owners along the line route about safe and unsafe uses of the areas along the route. This is standard industry practice.

## CONCLUSIONS AND RECOMMENDATIONS

## CONCLUSIONS

Since electric or magnetic field health effects have neither been established nor ruled out for overhead or underground lines, the public health significance of any SSU6-related field exposures cannot be characterized with certainty. The long-term, mostly residential magnetic exposure at the root of the present health concern would be insignificant during operations, given the general absence of residences in the lines' field impact areas. On-site worker or public exposures would be short-term and at levels associated with IID lines of similar designs and current-carrying capacity. Such exposures are well understood and have not been established as posing a health hazard to humans.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures applied to all IID lines. The proposed line support structures are neither tall enough nor close enough to area airports to pose a significant collision hazard. The use of low-corona line design together with appropriate corona-minimizing construction practices would minimize the potential for corona noise and its related interference with radio-frequency communication anywhere in the project area.

## RECOMMENDATIONS

Since the proposed 161 kV project lines would be designed and operated to minimize the safety and nuisance impacts of specific concern to staff (while also located away from area residences), staff does not recommend any changes to the proposed power transmission plan. If the proposed power plant is approved, staff would recommend adoption of the conditions of certification specified below to ensure implementation of the measures necessary for the field reduction and safety assumed by the applicant.

## CONDITIONS OF CERTIFICATION

**TLSN-1** The project owner shall ensure that the proposed 161 kV lines are designed and constructed according to the requirements of CPUC's GO-95, GO-52, the applicable sections of Title 8, California Code of Regulations section 2700 et seq., and IID's EMF reduction guidelines arising from CPUC Decision 93-11-013.

**Verification:** Thirty days before starting construction of the SSU6 transmission lines or related structures and facilities, the project owner shall submit to the CPM a letter signed by a California registered electrical engineer affirming compliance with this requirement.

**TLSN-2** The project owner shall ensure that every reasonable effort will be made to identify and correct, on a case-specific basis, any complaints of interference with radio or television signals from operation of the project-related lines and associated switchyards.

The project owner shall maintain written records for a period of five years, of all complaints of radio or television interference attributable to operation of the plant and the corrective action taken in response to each complaint. 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 for the project-related lines and included for the first five years of plant operation in the Annual Compliance Report.

**TLSN-3** The project owner shall ensure engagement of a qualified consultant to measure the strengths of the line electric and magnetic fields before and after the lines are energized. Measurements should be made according to IEEE measurement protocols at the representative points within and along the edges of the rights-of-way for which the applicant provided field strength estimates.

**Verification:** The project owner shall file copies of the pre-and post-energization measurements with the CPM within 30 days after completion of the measurements.

**TLSN-4** The project owner shall ensure that the right-of-way of the project-related lines are kept free of combustible material according to existing IID practices reflecting compliance with the provisions of Section 4292 of the Public Resources Code and Section 1250 of Title 14 of the California Code of Regulations.

**Verification:** At least 30 days before the line is energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

**TLSN-5** The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards.

**Verification:** At least 30 days before the line is energized, the project owner shall transmit to the CPM a letter confirming the intention to comply with this condition.

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# VISUAL RESOURCES

Testimony of James Adams and Dale Edwards

## INTRODUCTION

Visual resources are the natural and cultural features of the environment that can be viewed. This analysis focuses on whether SSU6 Project would cause significant adverse visual impacts and whether the project would be in compliance with applicable laws, ordinances, regulations, and standards. 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). The results of staff's analysis are summarized in **Visual Resources Appendix VR-1**. James Adams conducted the visual analysis for the proposed project's structures, and Dale Edwards conducted the visual analysis for the project's water vapor plumes. This analysis is organized as follows:

- Description of analysis methodology;
- Description of applicable laws, ordinances, regulations and standards;
- Description of the project aspects that may have the potential for significant visual impacts;
- Assessment of the visual setting of the proposed power plant site and linear facility routes;
- Evaluation of the visual impacts of the proposed project on the existing setting;
- Evaluation of compliance of the project with applicable laws, ordinances, regulations, and standards;
- Identification of measures needed to mitigate any potential significant adverse impacts of the proposed project and to achieve compliance with applicable laws, ordinances, regulations, and standards.
- Conclusions and Recommendations; and
- Proposed Conditions of Certification

## ANALYSIS METHODOLOGY

Visual resources analysis has an inherently subjective aspect. However, the use of generally accepted criteria for determining impact significance and a clearly described analytical approach aid in developing an analysis that can be readily understood.

## SIGNIFICANCE CRITERIA

Commission staff considered the following criteria in determining whether a visual impact would be significant.

### State

The CEQA Guidelines define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions

within the area affected by the project including...objects of historic or aesthetic significance" (Cal. Code Regs., tit.14, § 15382).

Appendix G of the Guidelines, under Aesthetics, lists the following four questions to be addressed regarding whether the potential impacts of a project are significant:

1. Would the project have a substantial adverse effect on a scenic vista?
2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
4. Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

### Local

Energy Commission staff considers any local goals, policies, or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts. See the section on Laws, Ordinances, Regulations, and Standards.

## IMPACT DURATION

The visual analysis typically distinguishes three different impact durations. **Temporary impacts** typically last no longer than two years. **Short-term impacts** generally last no longer than five years. **Long-term impacts** are impacts with a duration greater than five years.

## VIEW AREAS AND KEY OBSERVATION POINTS

The proposed project is visible from a number of areas in the project region. Energy Commission staff evaluated the visual impact of the project from each of these areas. Staff used Key Observation Points[1], or KOPs, as representative locations from which to conduct detailed analyses of the proposed project and to obtain existing conditions photographs and prepare visual simulations. KOPs are selected to be representative of the most critical locations from which the project would be seen. However, KOPs are not the only locations that staff considered in each view area. Other locations included spots along local roads, residences within two miles of the proposed project, and the observation deck at the Sonny Bono Salton Sea National Wildlife Refuge.

## EVALUATION PROCESS

For each view area, staff considered the existing visual setting and the visual changes that the project would cause to determine impact significance. Staff conducted a site visit and concluded that the KOPs presented in the Application for Certification (AFC) were appropriate for this analysis, however staff requested that three new KOPs be established. Existing condition photographs and computer simulations of the project

[1] The use of KOPs or similar view locations is common in visual resource analysis. The US Bureau of Land Management and the US Forest Service use such an approach.

from each KOP are presented with all other figures in **VISUAL RESOURCES Appendix VR-4**.

## Elements of the Visual Setting

To assess the existing visual setting, staff considered the following elements.

### Visual Quality

Visual quality is an expression of the visual impression or appeal of a given landscape and the associated public value attributed to the visual resource. This analysis used an approach that considers visual quality as ranging from outstanding to low. Outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as "picture postcard" landscapes. Low visual quality describes landscapes that are often dominated by visually discordant human alterations, and do not provide views that people would find inviting or interesting (Buhyoff et al., 1994).

### Viewer Concern

Viewer concern is a measurement of the level of viewer interest regarding the visual resources in an area. Official statements of public values and goals reflect viewers' expectations regarding a visual setting. This analysis also employed land use as an indicator of viewer concern. Uses associated with 1) designated parks, monuments, and wilderness areas, 2) scenic highways and corridors, 3) recreational areas, and 4) residential areas are generally considered to have high viewer concern. However, existing landscape character may temper viewer concern on some State and locally designated scenic highways and corridors. Similarly, travelers on other highways and roads, including those in agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features. Commercial uses, including business parks, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements

### Viewer Exposure

The visibility of a landscape feature, the viewing distance to the landscape feature, the number of viewers, and the duration of the view all affect the exposure of viewers to a given landscape feature. Visibility is highly dependent on screening and angle of view. The smaller the degree of screening and/or the closer the feature is to the center of the view area, the greater its visibility is. Increasing distance reduces visibility. Viewer exposure can range from low values for all factors such as a partially obscured and brief background view for a few motorists, to high values for all factors such as an unobstructed foreground view from a large number of residences.

### Overall Visual Sensitivity

The overall level of sensitivity of a view area to impacts due to visual change is a function of visual quality, viewer concern, and viewer exposure and can range from low to high.

## Types of Visual Change

To assess the visual changes that the project would cause, staff considered the following factors:

### Contrast

Visual contrast describes the degree to which a project's visual characteristics or elements (consisting of form, line, color, and texture) differ from the same visual elements established in the existing landscape. The degree of contrast can range from low to high. The presence of forms, lines, colors, and textures in the landscape similar to those of a proposed project indicates a landscape more capable of accepting those project characteristics than a landscape where those elements are absent. This ability to accept alteration is often referred to as visual absorption capability.

### Dominance

Dominance is a measure of a feature's apparent size relative to other visible landscape features and the total field of view (scale dominance). A feature's dominance is also affected by its relative location in the field of view (spatial dominance), and the distance between the viewer and the feature. The level of dominance can range from subordinate (low) to dominant (high).

### View Disruption

View disruption describes the extent to which any previously visible landscape features are blocked, or that vertical elements screened or break up the view of higher quality background features. Disruption of higher quality landscape features by lower quality project features causes adverse visual impacts. The degree of view disruption can range from none to high.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following discussion of Federal, State, and Local laws, ordinances, regulations, and standards (LORS) is based on Section 5.12 of the Application for Certification (CEOE 2002a, AFC pages 5.12-18-19; AFC Supplement filings, and staff's review of Imperial County Planning documents.

## FEDERAL

The proposed power plant is located on private land. Therefore, the project is not subject to federal regulations pertaining to visual resources. However, the preferred L transmission line would run through U.S. Bureau of Land Management (BLM) managed lands and would require compliance with BLM aesthetic objectives. The BLM uses a Visual Resource Management (VRM) Inventory and Contrast Rating System to assess the existing visual setting and what activities or development would be appropriate. There are four classes related to the preservation of landscape character (CEOE 2002a, pg. 5.12-5):

> Class I – The objective of this class is to preserve the existing character of the landscape. Changes to the landscape character should not be evident.
>
> Class ll – The objective of this class is to retain the existing character of the landscape. Changes to the landscape may attract attention but should be subordinate to the visual setting.

Class III – The objective of this class is to partially retain the existing character of the landscape. Changes to the landscape may begin to attract attention but should not dominate the visual setting.

Class IV – The objective of this class is to allow for activities that modify the existing character of the landscape. Changes to the landscape character may attract attention and dominate the visual setting. However, these activities should minimize changes to the landscape where possible.

## STATE

There are no state designated scenic highways in the project vicinity and therefore, no state aesthetic LORS are applicable. However, a section of State Route (SR)-111 about 15 miles north of the project is designated eligible for scenic highway designation. This section extends into Riverside County. Motorists traveling south on the southern portion of the eligible scenic highway near the Salton Sea may be able to see plumes emanating from the project.

## LOCAL

The proposed generating facility site, two transmission lines, switchyard, and the water line would be located in unincorporated areas of Imperial County. Therefore, the proposed project would be subject to any local LORS pertaining to the protection and maintenance of visual resources in Imperial County. The Imperial County General Plan is the applicable document for guidelines related to development within the county. Four elements within the Plan are pertinent; Land Use; Circulation and Scenic Highways, and Geothermal and Transmission (which includes an in-depth discussion about transmission corridors that includes aesthetic considerations).

## PROJECT DESCRIPTION

The following section describes the aspects of the project that may have the potential for significant visual impacts and includes the power plant and associated facilities, switchyard, electric transmission interconnections, geothermal well pipelines, and cooling tower and dilution water heater plumes.

The proposed generating facility would occupy 80 acres of a 160-acre parcel consisting of flat land just south of the Salton Sea about six miles northwest of Calipatria. The most visible features of the proposed project would include the steam turbine generator and crane, crystallizers, two cooling towers, two dilution water heaters, and four emergency relief tanks. See **Visual Resources Table 1** below for the dimensions of these and other project components.

**Visual Resources Table 1**
**Dimensions of Key Project Components**

| **Component** | **Height** (feet) | **Length** (feet) | **Diameter Width** (feet) |
|---|---|---|---|
| Steam Turbine Generator and Crane (1) | 99 | 100 | 190 |
| Crystallizers (8) | 55 | | 17 |
| Cooling Towers (2) | 58 | 538 | 58 |
| Dilution Water Heaters (2) | 45 | | 8 |
| Emergency Relief Tanks (4) | 45 | | 17 |
| Primary Clarifiers (2) | 34 | 100 | 130 |
| Secondary Clarifiers (2) | 32 | | 130 |
| Steam Vent Tanks (4) | 30 | | 32 |
| Transmission Line Poles * | 125 | | 10 |
| Source: CEOE 2002e, Response to CEC Data Adequacy Comments, Dated September 18, 2002, pg. 120<br>* CEOE 2002a, Application for Certification, Dated July 26, 2002, pg. 3-33 | | | |

## ELECTRICAL TRANSMISSION INTERCONNECTION

Power generated by the proposed project would be transmitted over two new 161 kV transmission lines. One single circuit line would proceed southwest for 16 miles, cross SR-86 and connect with the Imperial Irrigation District's (IID) existing L-Line transmission line south of Bannister Road. The second single circuit transmission line would head south and east for 15 miles, cross SR-111 and connect to the existing IID Midway 230 kV substation. **Project Description Figure 2** in the **Project Description** section of this Preliminary Staff Assessment (PSA) shows the location of the proposed transmission lines. Both lines would be attached to 125-foot steel poles with 1,200 foot spans. Structures and conductors would be treated to reduce sun reflectivity and the new lines would parallel existing utility lines for most of their overall length (CEOE 2002a, pg. 5.12-14).

## SWITCHYARD

The applicant and IID have proposed that the switchyard be moved from the project site to a location south of Bannister Road just west (approximately 300 feet) of its intersection with SR-86, about 12.5 miles south of the SSU6 site. The applicant has provided photo-simulations from SR-86 looking toward the switchyard and the dimensions of the components. Major components include an 80-foot-tall tower communications tower, four 45-foot-tall switch substations, and a 12-foot-high control building (see **Visual Resources Figure 7**).

## WATER SUPPLY PIPELINE

The proposed 500-foot-long, 10-inch diameter underground pipeline would convey approximately 293 acre-feet of raw water per year to the service water pond from the IID Vail 4 Water Canal. The service water pond would be located at the southeast corner of the proposed project site.

## PRODUCTION AND INJECTION WELLS AND PIPELINES

Ten production wells on five new pads, located near the project site, would be used when the plant is in full operation. Two of the wells would be located on the west and northern boundaries of the project site. One would be installed further west on Obsidian Butte and another would be located about 1000 feet north of SSU6. Seven injection wells would be located about 1.25 miles southeast of the project. The wells would be about 15 feet high. Pipelines would connect the wells to the plant. The estimated combined length of the pipelines would be approximately three miles. They would be elevated to about three feet above ground.

## SETTING

## REGIONAL LANDSCAPE

The proposed project would be located approximately 1,000 feet southeast of the Salton Sea in Imperial County. The region is characterized by flat agricultural lands supported by irrigation systems that supply water from the Colorado River. The topography of the local area is generally flat with slight rolling hills, with a few rock buttes and mountain ranges on all sides of the Imperial Valley. Much of the area is below sea level. The local mountain ranges include the Santa Rosa, Fish Creek, Coyote, and Jacumba Mountains to the west; the Chocolate Mountains to the east; Algodones Sand Dunes, Pichaco Peaks, and Cargo Muchacho Mountains to the southeast; and Palo Verde peak to the northeast (CEOE 2002a, pg. 5.12-2). The closest ranges to the site are the Santa Rosa Mountains, which are approximately 10 miles to the west and have an elevation of 5,000 to 6,000 feet; and the Chocolate Mountains which are 10 miles to the east with elevations of 1500 –2500 feet (USFWS 2003).

The rock buttes or domes are noticeable features in contrast to the flat valley floor. They include Obsidian Butte, Rock Hill, Mullet Island, and Red Hill (two domes). Elevations range from approximately 35 to 100 feet above the level of the Salton Sea, which is 228 feet below sea level. The closest domes to the project site are Rock Hill, which is within a mile to the north, and Obsidian Butte, which is a quarter-mile to the west. The Salton Sea Anomaly Master Environmental Impact Report (Salton MEIR) notes that the domes and the area surrounding these features is rated as having high scenic value and this designation extends out to a two-mile radius (County of Imperial 1981, pg. 3.10-3). The high scenic value is based on the recognition that the domes are relatively unique on the floor of the Imperial Valley. However, Obsidian Butte has been mined extensively and currently is of low scenic value.

Signal Mountain, approximately 35 miles to the south, is a visible landmark and can be seen from Rock Hill and Obsidian Butte. Signal Mountain is visible most of the time during the months October through March when the vast majority (80 percent) of recreationers and bird watchers (80 percent recreationers, 20 percent bird watchers) visit Rock Hill. Views of Signal Mountain are one of the highlights for recreationers (USFWS 2003b).

The Sonny Bono Salton Sea Wildlife Refuge is less than a mile to the north of the proposed power plant site. The Red Hill Recreation Area is approximately two miles to

the north and lies on the southeast shore of the Salton Sea (CEOE 2002a, pp. 1-3 and 5.12-8). Two small rivers flow through the general area. The Alamo River is approximately five miles southwest of the site and the New River is nearly three miles to the east. There are nine geothermal power plants within a two-mile radius of the proposed power plant site.

## PROJECT VIEWSHED

The distance zones used within this analysis are defined as *foreground* (0 to 1/2 mile), *middleground* (1/2 to 2 miles), and *background* (beyond 2 miles). Within these zones of influence are a number of viewing opportunities. Most foreground to middleground views of the proposed project would be limited to adjacent and nearby roadways, agricultural lands and buttes. The power plant would be noticeably visible from, Severe, Peterson, Gentry, Grubel, McKendry, Boyle, and Kuns/Montgomery Roads. Viewers would typically be agricultural workers and residents traveling in directions toward the project site. There are eight residences within three miles of the proposed project, two of these are within two miles (CEOE 2002a, Figure 5.12-1). At least a couple of these residences would be able to see the proposed project, particularly the dilution water heater plumes. The project would also be visible from the trail up to Rock Hill. **Visual Resources Figure 1** shows the project site, the Salton Sea, roads, KOPs and other features within the local area.

## IMMEDIATE POWER PLANT VICINITY

The visual character of the immediate project vicinity reflects two types of human use. In addition to being an agricultural landscape devoted to large-scale crop production, it is also a landscape with an industrial character due to the presence of nine geothermal power plants. These uses are visible in the open, panoramic agricultural scene on a flat landscape with mountain ranges in the background. The IID water canal runs by the southeast corner of the proposed site.

The immediate vicinity also includes a residence approximately three-quarters of a mile to the northeast within the Refuge Headquarters, and the Rock Hill public viewing area is about a mile north of the proposed site. The Refuge Headquarters has a thick mass of vegetation on the south side of the property facing the project site.

## CONSTRUCTION LAYDOWN AREAS

The proposed construction parking and laydown areas would be located within the 160 acre parcel which includes the power plant.

## VIEWING AREAS AND KEY OBSERVATION POINTS

Staff evaluated the proposed key observation points (KOPs) chosen by the applicant and determined that three additional KOPs were necessary for this analysis. The first additional KOP (KOP 4) is the view looking south from the top of Rock Hill toward the project site and the vista beyond. The second (KOP 5) is a view of the L-Line interconnection transmission line as it crosses SR-86, about 12.5 miles southwest of the project site. The third (KOP 6) is a view of the IID Midway interconnection transmission line as it crosses SR-111, about seven miles east of the project site.

Each of these key observation points is shown on **Visual Resources Figure 1**. At each KOP a visual analysis was conducted, a summary of which is presented in **Appendix VR-1**. Existing condition photographs and photo-simulations from each KOP are presented in **Appendix VR-4**. A discussion of the visual setting for each KOP is presented in the following paragraphs.

## KOP 1-Entrance to Sonny Bono Wildlife Refuge

**Visual Resources Figure 1A** shows the view from an agricultural access road off Sinclair Road near the Wildlife Refuge headquarters, located about 4,000 feet from the site. The entrance to the refuge is about 600 feet to the east (or left) of the KOP. Visitors entering the Refuge see the site, but only very briefly because the site is screened by trees and other vegetation as visitors approach or leave the Refuge. Figure 1A is somewhat representative of the existing view experienced by people entering the Refuge. Although, because the photo was taken 600 feet to the west of the entrance, the project site appears closer than it really is from the entrance.

### Visual Quality

The most prominent features from this KOP are the canal, agricultural fields, existing geothermal units to the south and west, the Cargo Muchacho Mountains, and the sky. Other visible features are the dirt berm on the opposite side of the canal, low growing vegetation and telephone poles, and the berm and vegetation on the horizon. Visual quality is low to moderate.

### Viewer Concern

The predominant viewers at KOP-1 would be visitors to the Refuge and the agricultural workers who use the access road. Viewers anticipate seeing existing geothermal units. Viewer concern would be low to moderate.

### Viewer Exposure

Although the power plant site is in middleground (0.75-mile) from this KOP, visibility is low because trees block most of the view toward the site as visitors enter or leave the Refuge. The number of viewers is moderate given the 13,000 to 17,000 visitors to the Refuge each of the past two years (USF&W 2002a). Duration of view is very short and would be experienced when the visitors turn off Sinclair Road to enter the Refuge. Overall viewer exposure is low.

### Overall Visual Sensitivity

For KOP-1, the low to moderate visual quality, low to moderate concern and low viewer exposure results in a low to moderate overall visual sensitivity.

## KOP 2-Red Island Recreational Area

KOP-2 represents the view from the Red Island Recreation Area approximately two miles north of the project site. This viewpoint was selected because of the number of visitors (40,000 to 60,000 annually) that use the Recreation Area. **Visual Resources Figure 2A** shows the existing view from KOP-2 to the southwest toward the project site.

### Visual Quality

The most prominent features in this view are the recreation area in the foreground, Salton Sea in the middleground, Rock Hill and an agricultural area in the middleground, and Santa Rosa Mountain range in the background. Other features visible to viewers from KOP-2 are existing geothermal facilities in the middleground. Visual quality is high.

### Viewer Concern

The large number of visitors to the recreation area at KOP-2 would anticipate seeing a scenic vista of the Salton Sea and mountain ranges with some geothermal power plants. Viewer concern is moderate to high.

### Viewer Exposure

Visibility of the project is low to moderate given the distance from the recreation area and partial view blockage by Rock Hill. The number of visitors is high and the duration of the view is moderate. Overall exposure is moderate.

### Overall Visual Sensitivity

For KOP-2, the high visual quality, the moderate to high viewer concern and moderate viewer exposure result in a moderate overall visual sensitivity.

## KOP 3-Utility Building on Lack Road

KOP-3 is the view from a utility building on the west side of Lack Road looking northeast toward the project which is approximately three miles away. This viewpoint was selected to represent views of the L-Line interconnection transmission line which would head south from the project on the east side of Lack Road and would be visible from the four residences further south along, and motorists using, Lack Road. **Visual Resources Figure 3A** shows the existing view from KOP-3 looking northeast toward the project site.

### Visual Quality

The most prominent features in this view are Lack Road, the canal on the west side of Lack Road and the Chocolate Mountain ranges in the background. Other visible features include the existing utility line, agricultural lands west and east of Lack Road, and existing geothermal facilities in the far middleground to background. Overall visual quality is low to moderate.

### Viewer Concern

The predominant viewers from KOP-3 are the few workers who drive on Lack Road on a daily basis and residents of a few houses further south on Lack Road. They anticipate a view of agricultural and geothermal activities as well as roadside wood pole utility lines. Viewer concern is high from residences. Because of the low to moderate visual quality, viewer concern is moderate.

### Viewer Exposure

Visibility of the project transmission line is high because it would run along the east side of Lack Road for three miles. The number of residents is low. The number of motorists is also quite low (160 vehicles per day [CEOE 2002a, pg. 5.12-7]). Duration of view for the residents on Lack Road is high. Duration of the view for motorists is moderate. Overall viewer exposure is moderate.

### Overall Visual Sensitivity

For KOP-3, the low to moderate visual quality, the moderate viewer concern, and the moderate to high viewer exposure result in a moderate visual sensitivity.

## KOP 4 – Top of Rock Hill

KOP 4 was selected to represent the view to the south from the top of Rock Hill within the Sonny Bono Wildlife Refuge. This viewpoint is approximately one mile north of the proposed site. **Visual Resources Figure 4A** shows the existing view from KOP-4 looking south toward the project site.

### Visual Quality

From this viewpoint, the most prominent features in the existing landscape are the Salton Sea in the fore and middleground, the Rock Hill Trail, two existing geothermal plants with continuous white steam plumes in the middleground, and agricultural areas to the east and south. The background view encompasses the Cargo Muchacho Mountains to the south and southeast, including Signal Mountain in Mexico, approximately 35 miles away. The Salton Sea and the Santa Rosa Mountains are visible to the west and there are existing geothermal units to the southwest. The view to the north includes the Salton Sea and the Palo Verde Mountains. The Salton Sea, Chocolate Mountains, agricultural areas, and two existing geothermal power plant sites are visible to the east. As noted earlier, the Salton MEIR considers the area within two miles of Rock Hill to have high scenic value. The overall landscape character looking south from KOP-4 is a combination of rural agricultural and industrial with a portion of the Salton Sea to the south and west. Visual quality is moderate to high.

### Viewer Concern

Rock Hill is within the Salton Sea Wildlife Refuge and the proposed project, as well as existing geothermal projects, would be visible to visitors and recreationers from the top of Rock Hill. There are a number of interpretive signs at the top of Rock Hill including one that identifies Signal Mountain on the horizon and notes that it is in Mexico. Viewers would also anticipate having an unobstructed view of Signal Mountain. As noted in the **Setting** section of this analysis, 80 percent of the visitors are recreationers who would go to Rock Hill to enjoy the 360 degree view that includes Signal Mountain. Viewer concern is high.

### Viewer Exposure

Visibility of the project site is moderate to high from KOP-4, with the proposed site in the near middleground of the view. Between 13,000 and 17,000 people have visited the Wildlife Refuge Headquarters each of the last two years and the vast majority (98 percent) take the trail to Rock Hill (USF&W 2003). The view of the site from KOP 4 is

open and unobstructed. The number of viewers is moderate. The duration of view is moderately high considering most viewers would likely spend much of their time looking toward the west and north at the Salton Sea and nearby mountains. Overall viewer exposure is moderate to high.

### Overall Visual Sensitivity

For KOP-4, the moderate to high visual quality combines with the high viewer concern and moderate to high exposure, resulting in a moderate to high overall visual sensitivity.

## KOP 5 – L-Line Interconnection Transmission Line

KOP 5 represents the view to the northwest from westbound motorists on SR-86, near the intersection with Bannister Road. This viewpoint is taken approximately 600 feet southeast from the location where the L-Line interconnection line crosses SR-86. From this location and a similar location 600 feet west of the transmission line crossing, the proposed transmission line would be located prominently within the view of motorists traveling in either direction. SR-86 has an estimated ADT of 8,100 vehicles per day (CEOE 2002a, pg. 5.10-21). **Visual Resources Figure 5A** shows the existing view from KOP-5 looking northwest at SR-86.

### Visual Quality

From this viewpoint, the most prominent features in the existing landscape are the flat, open agricultural fields that occupy much of the foreground and middleground to the left (west) and right (east) of the highway. SR-86 occupies the center of the view along with electric transmission lines running along side the highway. Depending on weather conditions, the Santa Rosa Mountains may be visible. Visual quality of this rural agricultural landscape is moderate.

### Viewer Concern

Northwest bound motorists on SR-86 anticipate a foreground to middleground rural agricultural landscape view with mountains in the background. Transmission lines parallel the highway and are part of the scenery. A new transmission line that crosses SR-86, and new large steel poles next to the highway, could be perceived as a mildly adverse visual change. There are no residences associated with this KOP. Overall viewer concern is moderate.

### Viewer Exposure

Visibility of the project's L-Line interconnection line where it crosses SR-86 is moderate to high because the transmission steel poles on either side of the highway would be in the center of motorist's view. Their visibility and size would increase as motorists approached the transmission line crossing. The number of motorists, 8,100 per day, is moderate to high and duration of view is low because vehicles would approach and pass the transmission line crossing quickly. The moderate to high number of motorists with a low duration of view and moderate to high visibility results in a moderate viewer exposure.

### Overall Visual Sensitivity

For northwest bound motorists on SR-86, the moderate visual quality, moderate viewer concern, and moderate to high viewer exposure result in a moderate visual sensitivity for KOP-5.

## KOP 6 – IID Midway Interconnection Transmission line

KOP 6 represents the view to the north as seen by northbound motorists on SR-111, near the intersection with Hoober Road. This viewpoint is approximately 600 feet south from the place where the transmission line crosses SR-111. From this location and a similar location 600 feet north of the transmission line crossing, the proposed transmission line would be located within the view of motorists traveling in either direction. SR-111 has an estimated ADT of 7,100 vehicles per day (CEOE 2002a, pg. 5.10-21). **VISUAL RESOURCES Figure 6A** shows the existing view from KOP-6.

### Visual Quality

From this viewpoint looking north, the most prominent features in the existing landscape are the flat desert to the east and west, and the Chocolate Mountains in the background. SR-111 occupies the center of the view along with telephone lines running along side the highway. Visual quality from KOP-6 is moderate.

### Viewer Concern

Northwest bound motorists on SR-111 anticipate a desert landscape view with mountains in the background. Transmission lines parallel the highway and are part of the scenery. A new transmission line that crosses over, and steel poles on either side of SR-111 could be perceived as a mildly adverse visual change. There are no residences associated with this KOP. Viewer concern is moderate.

### Viewer Exposure

Visibility of the project is moderate to high because the transmission steel poles on either side of the highway would be in the center of motorist's view. However, the steel poles could be seen from one or two miles away though they would appear low on the horizon and subordinate to the Santa Rosa Mountains. Their visibility and size would increase as motorists approached the transmission line crossing. The number of viewers, at least 7,100, is moderate to high and duration of view is low because vehicles approach and pass the transmission line crossing quickly. Viewer exposure is moderate.

### Overall Visual Sensitivity

For northwest bound motorists on SR-111, the moderate visual quality, moderate viewer concern, and moderate viewer exposure result in an overall moderate visual sensitivity.

## IMPACTS

## CONSTRUCTION IMPACTS

Construction of the proposed power plant and linear facilities would cause temporary adverse visual impacts due to the presence of equipment, materials, and workforce. Construction would involve the use of cranes, heavy construction equipment, temporary storage and office facilities, and temporary laydown/staging areas. Construction would include site clearing and grading, trenching, construction of the actual facilities, and site and rights-of-way cleanup and restoration. The proposed project construction would occur over a 26-month period. Construction would occur during a single-shift, 10 hour day, five days a week (CEOE 2002a, pg. 5.9-7). Due to the relatively short-term nature of project construction, the adverse visual impacts that would occur during construction would not be significant. However, this conclusion assumes that complete restoration of construction areas and rights-of-way is accomplished. Condition of certification **VIS-1** would ensure that the visual impacts associated with project construction remain less than significant.

## OPERATION IMPACTS

An analysis of operation impacts was conducted for the view areas represented by the KOPs selected for in-depth visual analysis. The results of the operation impact analysis is discussed below, by KOP, and presented in the Visual Analysis Summary table included as **Visual Resources Appendix VR-1**. The visual impacts of vapor plume formation and night lighting are discussed in separate sections of this analysis. For each KOP, an evaluation of visual contrast, project dominance, and view disruption is presented with a concluding assessment of the overall degree of visual change caused by the proposed project.

### Impacts of Power Plant Structures

As noted earlier, the most visible features of the proposed project would include the 99-foot tall steam turbine generator and crane, eight 55-foot tall crystallizers, two 58-foot tall cooling tower arrays approximately 700 feet long, two 45-foot tall dilution water heaters, and four 45-foot tall emergency relief tanks.

#### KOP 1 – Entrance to national wildlife refuge

**Visual Resources Figure 1B** presents a visual simulation of the proposed project as viewed from KOP 1 at a point approximately 600 feet west of the entrance to the Refuge Headquarters. This simulation roughly depicts what viewers at the entrance to the Refuge headquarters would see. Staff's **Visual Resources Figure 1C** shows the view from the entrance to the Refuge. Staff evaluated the potential view of the project when visitors approach and enter the refuge. Due to the presence of trees, the project would only be visible for a very short period of time.

##### *Visual Contrast*

The proposed project would introduce the prominent geometric forms and vertical and horizontal lines of the various structures and stacks. These structural characteristics would be consistent with the forms and lines related to the existing geothermal plants.

The proposed tan color of the project structures would blend in with color of existing geothermal plants but would contrast with green color of the agricultural fields in the local area. The resulting visual contrast would be moderate.

### *Project Dominance*

The rural agricultural landscape visible from KOP 1 is dominated by the flat, horizontal form of the valley floor, the existing geothermal unit in the middleground (one-half mile from the viewpoint), and the mountain range in the background. There are other geothermal units approximately two miles away in the middle background. The proposed power plant facilities would be approximately .75-mile away and spatially prominent in the center of the view of this highly exposed site. The project would appear co-dominant with the existing landforms in the view. Overall project dominance is moderate.

### *View Disruption*

From KOP 1 the vertical structures and stacks and horizontal structures (lower quality landscape features) would disrupt the view of portions of the mountain range in the background (higher quality landscape features). However, this noticeable view disruption would be of short duration as a vehicle's position relative to the project site changes. Also, most of the mountain range would be visible and the berm and trees along the north side of the irrigation canal would block much of the view quickly for viewers entering the Refuge Headquarters. The resulting view disruption would be low.

### *Overall Visual Change*

From KOP 1, the overall visual change caused by the proposed project would be low to moderate due to the moderate degree of contrast, the project's co-dominate relation with existing land features, and low degree of view disruption of higher quality landscape features.

### *Visual Impact Significance*

The overall low to moderate visual sensitivity of the existing landscape and viewing characteristics, and the low to moderate visual change that would be perceived from KOP 1 would cause an adverse but less than significant visual impact.

## KOP 2 –Red Island Recreation Area

**VISUAL RESOURCES Figure 2B** presents a visual simulation of the proposed project as viewed from KOP 2, from the Red Island Recreation Area, about two miles north of the project site. The presence of Rock Hill between KOP-2 and the site would partially screen the new geothermal unit. Also, the project would blend in to some degree with other geothermal power plants in the area.

### *Visual Contrast*

The proposed project would introduce another geothermal unit with geometric forms and vertical and horizontal lines into the view to the south from KOP-2. These structural characteristics would be consistent with the existing forms and lines established by the adjacent geothermal unit. The project structures would contrast with the forms and lines of the Salton Sea and the Cargo Muchacho Mountain Range which are flat and

horizontal. Because of the distance to the project site from this KOP, the tan color of the structures would blend in with surrounding land features. The resulting visual contrast would be low.

### *Project Dominance*

The landscape visible from KOP 2 is dominated by the Recreational Area in the foreground and the Salton Sea in the middle and background. In addition, the mountain ranges in the background are a noticeable feature of the landscape from this KOP. The proposed power plant facilities would not be spatially prominent because of the low profile on the horizon and the mountains in the background. Also, the scale of these introduced forms and structural masses would be substantially the same as other developed features in the immediate project vicinity. The project would appear subordinate to the overall landscape. Overall project dominance would be subordinate or low.

### *View Disruption*

From KOP 2 the proposed project structures (lower quality landscape features) would not disrupt the view of the Salton Sea or the mountain range in the background because the project is two miles away and would appear low on the horizon. The proposed project's resulting view disruption would be low.

### *Overall Visual Change*

From KOP 2, the overall visual change caused by the proposed project would be low due to the low degree of contrast, subordinate structures, and low degree of view disruption.

### *Visual Impact Significance*

When considered within the context of the overall moderate visual sensitivity of the existing landscape and viewing characteristics, the low visual change that would be perceived from KOP 2 would cause an adverse but less than significant visual impact.

## KOP 3 – Utility Building on Lack Road

**Visual Resources Figure 3** presents a visual simulation of the proposed project as viewed from KOP 3, a utility building on the west side of Lack Road, approximately three miles from the project site. This KOP also represents the view for motorists traveling northbound on Lack Road, and residences about three to four miles further south on Lack Road. The most obvious change to the landscape would be the introduction of a new transmission line and supporting steel poles along Lack Road for approximately six miles. The resulting structural mass would be noticeably greater than that of the existing wood pole utility line along the west side of Lack Road.

### *Visual Contrast*

The project would introduce the horizontal form of the transmission lines and several prominent vertical electric transmission steel poles. These structural characteristics would be somewhat consistent with the existing forms and lines established by the adjacent utility line, although inconsistent with the generally horizontal agricultural land. The gray color of the steel poles would contrast highly with the tan and brown color of

the Chocolate Mountains, and moderately with the blue sky. The overall visual contrast would be moderate.

### *Project Dominance*

The rural agricultural landscape visible from KOP 3 is dominated by the flat, horizontal form of the valley floor, including Lack Road, agricultural fields, and the vertical form of roadside utility poles. The project transmission line and steel poles would be spatially prominent for viewers traveling on Lack Road and the occupants of the residences along Lack Road. The scale of the new steel poles relative to existing utility lines would range from low for distant steel poles to moderate for steel poles closer to the viewer. The sky and mountain range backdrop to the nearest steel poles and line would contribute to their structural prominence. If steel poles were located near the residences, they would dominate the existing landscape features. Overall project dominance would be co-dominant (moderate).

### *View Disruption*

From KOP 3 the proposed transmission line and steel poles closest to Lack Road would disrupt a small portion of the view of the sky and valley floor near the horizon line. The steel poles, particularly the ones close to the residences on Lack Road, would disrupt the viewshed and divide up the sky. The proposed project's resulting view disruption would be moderate to high.

### *Overall Visual Change*

From KOP 3, the overall visual change caused by the proposed transmission lines and steel poles would be moderate due to the moderate degree of contrast, moderate dominance (co-dominant), and moderate to high degree of view disruption of the sky.

### *Visual Impact Significance*

When considered within the context of the overall moderate visual sensitivity of the existing landscape and viewing characteristics, the moderate visual change that would be perceived from KOP 3 would cause an adverse but less than significant visual impact.

## KOP 4–View from Rock Hill

**Visual Resources Figure 4B** presents a visual simulation of the proposed project from KOP 4 on top of Rock Hill. The simulation is looking south toward the project site about one mile away. The most obvious change to the landscape would be the introduction of a new and larger geothermal unit in a predominately rural agricultural area, with other geothermal units, adjacent to the Salton Sea. The simulation shows plumes from the existing projects on a dry day when the temperature was approximately 85ºF, and the plume for the SSU6 would occur when the temperature was about 60ºF (see visible plume analysis below). The SSU6 plume would be somewhat smaller on a day when the temperature is 85ºF.

### *Visual Contrast*

The project would introduce horizontal and vertical lines and geometric forms similar to the existing geothermal units in the view. The project structures would differ from the

natural features of the landscape such as the agricultural fields, mountain range, and the Salton Sea. The tan color of the project structures would contrast with the green agricultural areas, the tan and brown color of the Cargo Muchacho Mountains, and the blue Salton Sea. The resulting visual contrast for the structures would be moderate to high.

#### *Project Dominance*

The rural landscape from KOP 4 is dominated by the Salton Sea in the fore and middleground, the large expanse of open space agricultural land in the middle and background, and the Cargo Muchacho Mountain range and Signal Mountain in the background. The proposed project would be spatially prominent, in the center of the view for viewers looking at Signal Mountain and the mountain range to the south. The mountain range and agricultural backdrop to the project would reduce the structural prominence of the proposed facilities. The scale of the project would appear co-dominate with the existing landscape features. Overall project dominance would be co-dominant (moderate).

#### *View Disruption*

From KOP 4, the full length and form of the new geothermal unit structures (lower quality landscape features) would be visible. The proposed project would block a substantial portion of the view of agricultural fields and the horizontal landscape to the south from KOP 4. Vertical structural elements would break up the view of the Cargo Muchacho Mountains to a small extent. Any additional viewer disruption of the surrounding mountains would be perceived as an adverse visual change (USFWS 2003). Overall view disruption would be moderate.

#### *Overall Visual Change*

From KOP 4, the overall visual change caused by the proposed project would be moderate due to the moderate to high change in contrast, the co-dominance of the new unit, and the moderate disruption.

#### *Visual Impact Significance*

When considered within the context of the overall moderate to high visual sensitivity, and the moderate overall visual change, the project would cause an adverse and significant impact from KOP 4. Staff has proposed condition of certification **VIS-2** to mitigate this impact to a less than significant level.

### KOP 5 Transmission Line Crossing of SR-86

**Visual Resources Figure 5B** presents a visual simulation of the interconnection transmission line crossing SR-86 about 12 miles southwest of the project site. The site of the simulation is about 600 feet south of the highway crossing. The major change to the landscape would be the introduction of the new transmission lines and supporting steel poles. The poles would be substantially larger than the existing utility poles that run along side SR-86.

### *Visual Contrast*

The proposed project would introduce the prominent vertical forms of transmission line poles and the horizontal oriented transmission lines. This would contrast with horizontal forms and line of the desert landscape in the fore and midground, and the Santa Rosa Mountains in the background. The silver/gray color of the new poles would contrast highly with the brown utility poles, tan desert floor, dark mountains, and contrast moderately with the blue sky. The resulting visual contrast would be moderate to high.

### *Project Dominance*

The rural landscape visible from KOP 5 is dominated by SR-86 and the flat desert landscape in the fore and middleground, with the Santa Rosa Mountain range in the background. An existing utility line and poles runs along the north side of SR-86. The project transmission line and poles would cross over the highway and would be spatially prominent within motorists primary view direction. The sky backdrop to the transmission poles and line would contribute to their structural prominence. The transmission poles would be spatially dominant within motorists primary view direction. The scale of the new poles and line would briefly appear dominant in the view for viewers traveling on SR-86. Overall, the transmission line and poles would be co-dominate.

### *View Disruption*

From KOP 5, the transmission line and steel poles would disrupt a small portion of the view of the landscape and sky. Motorists traveling in either direction would notice the transmission poles a mile or two before arriving at KOP 5. The poles would appear larger as motorists approached the area where the line crosses SR-86. The poles would disrupt a small portion of the view of the landscape for a short period of time until motorists passed underneath the transmission line. The resulting blockage and disruption would be low to moderate.

### *Overall Visual Change*

From KOP 5, the overall visual change would be moderate due to the moderate to high degree of contrast that would occur from the project's co-dominant structures, combined with low to moderate degree of disruption.

### *Visual Impact Significance*

When considered within the context of the low to moderate sensitivity of the existing landscape and viewing characteristics, the moderate to high visual change would cause an adverse but less than significant visual impact.

### KOP 6 - Transmission Line Crossing of Sr-111

**Visual Resources Figure 6B** presents a visual simulation of the interconnection transmission line crossing SR-111 about six miles east of the project site. The viewpoint depicted in the simulation is about 600 feet south of the highway crossing. The major change to the landscape would be the introduction of the new transmission lines and vertical supporting steel poles. The poles would be substantially larger than the existing utility poles that run along the eastside of SR-111.

### *Visual Contrast*

The proposed project would introduce the prominent vertical forms of transmission line poles and the horizontal oriented transmission line. The forms and line of the new poles and transmission lines would be similar to existing utility poles and line but noticeably different than the flat horizontal form of the agricultural fields. The silver/gray color of the new poles would contrast highly with the brown utility poles, and tan desert floor, and contrast moderately with the blue sky. The resulting visual contrast would be moderate to high.

### *Project Dominance*

The rural landscape visible from KOP 6 is dominated by SR-111 and the flat desert landscape in the fore and midground, with the Chocolate Mountain range in the background. The project transmission line and poles would cross over the highway and would be spatially prominent within motorist's primary view direction. The sky backdrop to the transmission poles and lines would contribute to their prominence. The scale of the new poles and lines would briefly appear dominant relative to desert landscape, Santa Rosa Mountains and the total view. Overall, the transmission line and poles would co-dominate the major features of the landscape.

### *View Disruption*

From KOP 6, the transmission lines and poles would block a small portion of the view of the landscape and sky. Motorists traveling in either direction would notice the transmission poles. The poles would disrupt the view of a small portion of the landscape for a short period of time until motorists passed underneath the transmission lines. The poles would cause a small degree of disruption of the scenic vista of desert landscape and Santa Rosa Mountains as motorists approached the transmission line crossing. The resulting blockage and disruption would be low to moderate.

### *Overall Visual Change*

From KOP 6, the overall visual change would be moderate due to the moderate to high degree of contrast, co-dominant nature of the poles, combined with the project's low to moderate degree of disruption of higher quality landscape features (sky and mountains).

### *Visual Impact Significance*

When considered within the context of the low to moderate sensitivity of the existing landscape and viewing characteristics, the moderate visual change would cause an adverse but less than significant visual impact.

## Linear Facilities

The proposed project involves associated facilities such as the interconnection transmission lines, injection and production wells, and associated pipelines. This analysis will discuss the potential visual impacts related to these facilities.

### Interconnection Transmission Lines

The project would have two interconnection transmission lines; one single-circuit line will proceed southwest for 16 miles, cross SR-86 and connect with the IID's L-Line

transmission line south of Bannister Road. The second single-circuit transmission line would head south and east of the project for 15 miles, cross SR-111 and connect to the existing IID Midway 230 kV substation. The applicant intends to build the new transmission lines parallel to existing linear facilities to the extent possible (CEOE 2003a, pg. 5.12-14). Staff analyzed the potential impacts of these two transmission line crossings in KOP 5 and 6 above.

### Switchyard

The switchyard site is in a flat, sandy, desert-like area with berms and shrub vegetation next to the highway. In the background to the east is the Chocolate Mountains, and to the west is the Santa Rosa Mountains. The visual quality is low to moderate. Motorists on SR-86 anticipate a foreground to middleground rural agricultural landscape view with mountains in the background. There are exiting utility lines running parallel to the highway. A new switchyard, 300 feet off the highway could be viewed as a mildly adverse visual change. The equipment would take up a space 100' by 300' with most structures being less than 30 feet. The communication dish would be approximately 80 feet high. Overall viewer concern is low to moderate.

The visibility of the switchyard is moderate, the number of travelers is high (ADT 8,100), but the switchyard equipment is relatively narrow and unobtrusive. The duration of the view is low to moderate because vehicles traveling at approximately 60 mph would see the switchyard for a brief period of time. The overall viewer exposure is moderate. For motorists on SR-86, the low to moderate visual quality, low to moderate viewer concern, and moderate viewer exposure result in a moderate visual sensitivity.

#### *Switchyard Construction Impacts*

Construction of the switchyard would cause minor adverse visual impacts due to the presence of equipment, materials and workforce. Construction would include site clearing and grading, trenching, construction of the actual facilities and rights-of way cleanup. The switchyard construction would occur over a three month period. Due to the relatively short-term nature of the construction of this linear, the adverse visual impacts that would occur due to construction would not be significant. Condition of Certification **VIS-1** would ensure that the visual impacts associated with the switchyard construction remain less than significant.

#### *Switchyard Operation Impacts*

An analysis of the operation impacts was conducted for the view area represented by **Visual Resources Figure 7**. For this analysis, an evaluation of visual contrast, project dominance, and view disruption is presented with a concluding assessment of the overall degree of visual change caused by the switchyard.

The proposed switchyard would introduce vertical and horizontal lines exhibited by the switching stations and related equipment and buildings. This would contrast with the horizontal forms and line of the desert landscape in the fore and middleground, and the Chocolate Mountains in the background. It would blend in somewhat with the existing utility lines. The color of the switchyard as depicted in **Figure 7** is white and black which contrast with the tan, green and blue colors of the desert, vegetation and sky, respectively. The resulting visual contrast would be moderate to high.

The rural landscape around the switchyard site is dominated by SR-86 and the flat desert landscape in the fore and middleground, with the Chocolate Mountains to the east, and the Santa Rosa Mountains to the west. An existing utility line runs along the north side of SR-86. The switchyard would be spatially prominent as motorists approached the site. The sky backdrop to the linear would contribute to its structural prominence. The switchyard would be spatially co-dominant within motorists primary view direction. The scale of the new facility would briefly appear co-dominant. Overall, the switchyard would be co-dominant.

From the view at **Figure 7**, the switchyard would disrupt a small portion of the view of the landscape and sky. Motorists traveling in either direction would notice the facility as they approach the site. The switchyard would disrupt a small portion of the view of the landscape for a short period of time until motorists passed by the facility. The resulting blockage and disruption would be low to moderate.

From the view displayed in **Figure 7**, the overall change would be moderate due to the moderate to high contrast that would occur from the switchyards co-dominant structures, combined with low to moderate degree of disruption.

When considered within the context of the low to moderate sensitivity of the existing landscape and viewing characteristics, the low to moderate visual change would cause an adverse but less than significant impact.

**Production/Injection Wells and Associated Pipelines**

The proposed project involves production and injection wells that capture the geothermal effluent for extracting steam and minerals, and for returning the brine solution to the subsurface where it migrates back to the production area. There would be 10 production wells on five well pads that would be within approximately 1,000 feet of the power plant. One of the injection well pads is proposed to be located on Obsidian Butte. The fluid would flow through above ground pipes, three feet above ground, to the power plant (CEOC 2002a, pg.3-4).

Six injection wells on three well pads would be located within two miles of the power plant. The brine effluent would be transported from the plant to the injection wells via three-mile long, 24-or 30-inch diameter above ground pipes about three feet above grade (CEOC 2002a, pg. 3-11 & 28). The production and injection wells are approximately 15 feet high.

The wells and pipelines would be visible to motorists and agricultural workers in the local area, particularly if they are incased in shiny aluminum jackets or are painted with reflective paint. The production wells are located in a relatively remote corner of the agricultural area. Obsidian Butte is owned by IID and is used as a gravel source. The wells may partially disrupt part of the panoramic view. Given the size of the wells and pipelines, and the relatively low number of residents and motorists, the visual change would be low to moderate. Therefore, the visual impact would be adverse but less than significant.

## Lighting

The proposed project would be located in a rural agricultural area, which has relatively minimal existing night lighting except for clusters of lights at the existing geothermal power plants. The proposed project would require nighttime lighting for operational safety and security though the project would not be required to have FAA beacons. Lighting would be directed on site to avoid back-scatter, and shielded from public view to the extent practical. (CEOE 2002a, p. 5.12-12 & 13). High illumination areas not occupied on a regular basis would be provided with switches or motion detectors to light these areas only when occupied.

Glare from night lighting is currently generated by existing geothermal units and the incremental increase from the new power plant is not expected to significantly increase night lighting, back-scatter light, or glare. However, the applicant states that during construction, slightly higher amounts of back-scatter lighting may be apparent to a nearby observer (CEOE 2002a, pg. 5.12-12). Staff's proposed condition of certification **VIS-4** would reduce offsite light trespass to a minimum.

## Visible Plumes

Staff conducted an independent modeling analysis of project water vapor plumes associated with the proposed cooling tower and dilution water heater stacks (Aspen 2003a and b). To model the cooling tower and dilution water heater plumes, staff used the following information provided by the applicant: a) CEOE 2002a, pg 5.1-28; and b) Data Responses Set 1 (CEOE 2002l, p. 88). The following discussion is a summary of the plume analysis. For the complete analysis please see **Appendix VR-2**.

### Cooling Towers

Staff performed an independent dispersion modeling analysis to predict the frequency and dimensions of visible plumes from the project's proposed unabated cooling towers. For the SACTI modeling, even though the project would have two 10-cell cooling towers, a single tower was modeled to show the expected plume results for either tower because with the towers being separated by approximately 766 feet (233 meters), the plumes will not influence each other. Staff's SACTI modeling visible plume dimension results, for a single tower, using a five-year (1995-1999) meteorological data set from the Imperial County Airport and upper air data from Tucson, AZ, are provided in **Visual Resources Table 2**.

**Visual Resources Table 2**
**Staff Results of Cooling Tower Visible Plume Dimensions**
**Imperial County Airport 1995-1999 Meteorological Data**

| Case | Model | Percentile | 50% | 10% | 5% | 1% | Maximum |
|---|---|---|---|---|---|---|---|
| All Hours | SACTI | Length (ft)** | 66-98 | 164-197 | 164-197 | 656-984 | 1968-2296 |
| | CSVP | | No Plume | 29 | 253 | 702 | 682 |
| | SACTI | Height (ft)* | 10-20 | 40-50 | 40-50 | 60-70 | 600-700 |
| | CSVP | | No Plume | 33 | 99 | 261 | 733 |
| | SACTI | Width (ft) | 20-40 | 40-60 | 40-60 | 80-100 | 400-600 |
| | CSVP | | No Plume | 40 | 55 | 66 | 86 |
| Daytime No Rain / No Fog | SACTI | Length (ft)** | 10-20 | 20-30 | 40-50 | 60-70 | 900-1,000 |
| | CSVP | | No Plume | No Plume | No Plume | 50 | 357 |
| | SACTI | Height (ft)* | 10-20 | 20-30 | 20-30 | 20-30 | 300-400 |
| | CSVP | | No Plume | No Plume | No Plume | 112 | 598 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | SACTI | Width (ft) | 20-40 | 20-40 | 20-40 | 20-40 | 120-140 |
| | CSVP | | No Plume | No Plume | No Plume | 54 | 76 |
| Seasonal Daylight No Rain / No Fog | SACTI | Length (ft)** | 10-20 | 20-30 | 50-60 | 60-70 | 900-1,000 |
| | CSVP | | No Plume | No Plume | 11 | 92 | 357 |
| | SACTI | Height (ft)* | 10-20 | 20-30 | 20-30 | 30-40 | 300-400 |
| | CSVP | | No Plume | No Plume | 44 | 196 | 598 |
| | SACTI | Width (ft) | 20-40 | 20-40 | 20-40 | 40-60 | 120-140 |
| | CSVP | | No Plume | No Plume | 44 | 61 | 76 |
| Seasonal Daytime "Clear" | SACTI | Length (ft)** | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 59 | 334 |
| | SACTI | Height (ft)* | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 129 | 471 |
| | SACTI | Width (ft) | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 57 | 76 |

Seasonal = November through April (day 120-304).
*SACTI Plume height does not include the height (17.68 meters) of the cooling tower (release point).
**Plume length from tower. Each of the two towers are 164 meters long, so the actual plume length will also include some component of the tower length.

As **Visual Resources Table 2** shows, the Combustion Stack Visible Plume (CSVP) model predicts no plumes 50 percent of the time for all cases. Additionally, the CSVP model only predicts plumes 10 percent of the time for all hours. Predicted plume sizes from CSVP are similar to those predicted by the SACTI model, except for the width, which is much smaller than the widths predicted by SACTI. While the CSVP model does have certain limitations, such as no specified mixing height to limit maximum plume heights, it uses actual hourly meteorological data and can model "calm" hours assuming a minimum wind speed; while the SACTI model groups the meteorological data and does not process "calm" hours. Therefore, staff concludes that the CSVP modeling results, which also includes the variable load characteristics of the cooling tower with respect to variable ambient conditions, should provide more realistic visible plume characteristics.

A plume frequency threshold of 10 percent of seasonal (November through April) daylight no rain/fog high visual contrast (i.e. "clear") hours analysis is used to determine potential plume impact significance. The high visual contrast hours analysis methodology is provided below:

The Energy Commission management has identified a "clear" sky category during which plumes have the greatest potential to cause adverse visual impacts. For this project the meteorological data set[2] used in the analysis categorizes total sky cover and opaque sky cover in six categories. Staff has included in the "clear" category a) all hours with total sky cover categorized as clear b) half of the hours with sky cover categorized as scattered or broken. Hours with total sky cover categorized as overcast, partially obscured or obscured were not considered "clear" hours. The rationale for including these three sky cover categories is as follows: a) plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or less than 10 percent, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and b) for a substantial portion of the time when total sky cover is 20-100 percent and the opacity of sky cover is relatively low (equal to or less than 50 percent), clouds do not substantially reduce contrast with plumes; staff has estimated that approximately half of the hours meeting the latter sky cover and sky

[2] This analysis uses a TD3280 data set.

opacity criteria can be considered high visual contrast hours and are included in the "clear" sky definition.

The CSVP model predicts plume frequencies less than 10 percent of seasonal daylight "clear" hours. Therefore, no further study of the visual impacts of the cooling tower plumes have been performed (i.e. contrast, dominance, blockage).

**Dilution Water Heater**

Staff evaluated the applicant's AFC (CEOE 2002a, AFC Sections 5.1.2.5.6 and 5.12.2.2.1) and Data Request Response #95 (CEOE 2002l), and performed an independent psychrometric analysis and dispersion modeling analysis. The CSVP model was used to estimate the worst-case potential plume frequency, and provide data on predicted plume length, width, and height for the dilution water heater exhausts.

***Dilution Water Heater Visible Plume Modeling Analysis***

Staff modeled the dilution water heater plumes using the CSVP model with a five-year (1995-1999) meteorological data set from Imperial County Airport. The CSVP model predicted visible plumes to occur under all conditions, even the most extreme hot and dry days. **Visual Resources Table 3** provides staff's CSVP modeling analysis visible plume dimension results.

**Visual Resources Table 3**
**Staff Results of Dilution Water Heater Visible Plume Dimensions**
**Imperial County Airport 1995-1999 Meteorological Data**

| Case | PERCENTILE | 50% | 10% | 5% | 1% | Maximum |
|---|---|---|---|---|---|---|
| All Hours (43,824 hours) (8,765 hrs/year) | Length (ft) | 305 | 1246 | 1633 | 2444 | 4,602 |
| | Height (ft) | 134 | 298 | 1109 | 1709 | 1066 |
| | Width (ft) | 46 | 89 | 105 | 141 | 233 |
| Daytime No Rain/No Fog (21,890 hours) (4,378 hrs/year) | Length (ft) | 151 | 459 | 659 | 1256 | 3454 |
| | Height (ft) | 102 | 298 | 364 | 581 | 1066 |
| | Width (ft) | 39 | 72 | 85 | 115 | 184 |
| Seasonal Daytime No Rain/No Fog (9,936 hours) (1,987 hrs/year) | Length (ft) | 216 | 607 | 863 | 1542 | 3454 |
| | Height (ft) | 131 | 354 | 462 | 689 | 1066 |
| | Width (ft) | 52 | 85 | 98 | 128 | 184 |
| Seasonal Daytime "Clear" (9,936 hours) 1,987 hrs/year) | Length (ft) | 98 | 439 | 663 | 1355 | 3454 |
| | Height (ft) | 69 | 275 | 354 | 581 | 1066 |
| | Width (ft) | 33 | 72 | 89 | 118 | 184 |

Seasonal = November through April (day 120-304).

These results confirm that visible plume formation occurs under all conditions. The largest plumes would form at night or early morning and during the cold weather months.

Staff has provided a visual simulation of the proposed project with a 10$^{th}$ percentile dilution water heater plume as it would appear to viewers from Rock Hill. Staff has incorporated this simulation as **Visual Resources Figure 4B**. Because the dilution water heater plumes exceed staff's 10 percent frequency threshold for conducting an

impact assessment, staff has evaluated the impact of the 10th percentile plume on viewers from KOP 4, the top of Rock Hill.

As discussed earlier, the overall sensitivity for viewers at KOP 4 is moderate to high. The dimensions of the dilution water heater plumes at the 10th percentile for seasonal daytime clear hours are 439 feet long, 275 feet high, and 72 feet wide. Dilution water heater plumes would be similar in size to the dilution water heater plumes from existing projects more than half of the daylight hours. Due to a typical low horizon haze, plumes viewed from the elevated position at the top of Rock Hill would have moderate to high contrast with the Cargo Muchacho Mountains and the sky. Because of the unobstructed panoramic views from Rock Hill to the south, view disruption caused by the dilution water heater plumes from KOP 4 would be low to moderate. The dilution water heater plumes would appear co-dominant in the view from KOP 4 more than 90 percent of the time. Therefore, considering the moderate to high overall sensitivity, co-dominance of the plumes, moderate to high contrast and low to moderate view disruption, the visual impact of the dilution water heater plumes would be adverse but less than significant from KOP 4.

## CONSIDERATION OF IMPACTS IN RELATION TO CEQA SIGNIFICANCE CRITERIA

This analysis considered the potential impacts of the proposed project in relation to the four significance criteria for visual resource impacts listed in Appendix G of the CEQA Guidelines, under Aesthetics, specified below.

### Would the project have a substantial adverse effect on a scenic vista?

Scenic vistas in the project region would be available from Rock Hill (about one mile to the north of the site), and the observation deck at the Salton Sea Wildlife Headquarters (approximately 6,000 feet to the east of the site). As discussed earlier, the Salton MEIR considers the buttes and hills to be of high scenic value. Obsidian Butte is approximately 6,000 feet to the west, however, as noted earlier, this area is an IID rock quarry. In addition, the project structures and the dilution water heater plumes would be prominent features in the view to the south from Rock Hill. There would be a substantial adverse effect on the overall view from Rock Hill toward the south. However, there would not be a substantial adverse effect on views of Signal Mountain and the Cargo Muchacho Mountains from Rock Hill or other viewpoints in the vicinity. Therefore, the project would result in a significant visual impact under this criterion without mitigation.

### Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

The proposed structures are not located within the viewsheds of any state designated scenic routes. However, there is a section of SR-111 that is eligible for scenic highway status that begins about 15 miles north of the project site and continues north into Riverside County. Motorists on occasion may be able to see the dilution water heater stack plumes, but they would be low on the horizon and would not substantially affect the scenic vista. Therefore, project structures and plumes would not result in significant visual impacts under this criterion.

**Would the project substantially degrade the existing visual character or quality of the site and its surroundings?**

As discussed in a previous section of this analysis, the proposed project would introduce additional prominent structures of industrial character into the middleground views from two residences and sections of local roadways within approximately two miles of the proposed site. Also, the proposed project's unabated dilution water heater plume would be a somewhat prominent and persistent feature in the views from sections of local roads and the two residences. The area has already been degraded by several existing geothermal power plants, unpaved roads, and power lines. The proposed project would not substantially degrade the existing visual quality of the site or its surroundings as viewed from the two residences within two miles or for travelers on local roads. However, the proposed project would substantially degrade the existing visual quality and its surroundings as viewed from KOP 4. Therefore, there would be a significant visual impact under this criterion without mitigation.

**Would the project create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?**

The project has the potential to create an additional source of substantial light that would adversely affect nighttime views in the area but, due to the low number of residences and other viewers at night, the project would result in a less than significant visual impact under this criterion.

## CUMULATIVE IMPACTS

Cumulative impacts to visual resources could occur where project facilities or activities (such as construction) occupy the same field of view as other built facilities or impacted landscapes. It is also possible that a cumulative impact could occur if a viewer's perception is that the general visual quality of an area is diminished by the proliferation of visible structures (or construction effects such as disturbed vegetation), even if the new structures are not within the same field of view as the existing structures. The significance of the cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) visual access to scenic resources is impaired; (3) visual quality is diminished; or (4) the project's visual contrast is increased.

Staff has not identified any other planned project in the viewshed that may contribute to cumulative impacts.

As discussed in the **Setting** section of this analysis, there are nine geothermal units within a two-mile radius. The project area has been altered over time by the incremental introduction of visually degrading elements until the quality and sensitivity of the views has been substantially diminished.

The County of Imperial designation for the project site and surrounding area is agricultural with a geothermal overlay (A-G-3). The SSU6 would add to the number of visible structures (power plant, transmission lines and poles) in the viewshed from KOPs 1, 3, and 4. The proposed project would be located prominently, along with other existing geothermal projects, in the view to the south from KOP 4 (Rock Hill). The proposed geothermal unit would appear larger than the existing units. The addition of

the proposed project to area views would further degrade visual quality. From KOP 4, the overall visual impact of the proposed project combined with existing geothermal projects would be cumulatively considerable, and thus significant (see **Visual Resources Figure 4B**). The proposed project would also add lighting to a nighttime landscape that is already significantly impacted by the lights of the existing geothermal units.

The impact of project structures will be reduced to less than significant with appropriate painting (see staff proposed condition of certification **VIS-2**). The impact from project plumes was found to be less than significant. With implementation of the applicant's proposed lighting mitigation, consistent with staff's proposed condition of certification **VIS-4**, the project's contribution to the significant cumulative lighting impact would be less than significant.

With implementation of the above mitigation measures as contained in staff's proposed visual conditions of certification, the proposed project would still result in a cumulatively considerable visual impact due to its appearance and location in the landscape as viewed from KOP 4. However, with implementation of staff's proposed tree planting on the north side of the project as described in staff's proposed condition of certification **VIS-3**, the project's contribution to the cumulative impact would be reduced to a less than cumulatively considerable (less than significant impact) level.

## ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is more than fifty percent (66 percent) within a six-mile radius of the proposed project (please refer to **Socioeconomics Figure 1** in this Staff Analysis). The Census data also shows the low income population within the same radius is less than fifty percent (18.5 percent).

As noted in the **Setting** section of this analysis, there are eight residences within three miles of the proposed project site. Staff has determined that the visual impacts would be adverse but less than significant with full and effective implementation of the applicant's proposed mitigation measures as augmented by staff's mitigation measures and conditions of certification. Therefore, there are no visual environmental justice issues related to the project.

## FACILITY CLOSURE

There are at least three circumstances in which a facility closure can take place, planned closure, unexpected temporary closure and unexpected permanent closure**.**

Planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence. The closure plan that the project owner is required to prepare will address removal of the power plant structures.

Unexpected temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a

natural disaster, or an emergency. No special conditions regarding visual resources are expected to be required to address temporary 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 will address removal of the power plant structures.

## COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

### FEDERAL

The L-Transmission line would run through Bureau of Land Management (BLM) managed lands and therefore should comply with BLM aesthetic objectives. The applicant has stated that the installation of the interconnection transmission line, which would connect with the IID L-Line west of SR-86, is consistent with BLM's Class IV designation for Visual Resource Management. As noted earlier in the LORS section of the setting analysis, Class IV allows activities that modify the existing character of the landscape as long as the changes are minimized to the extent possible. Staff believes there is a potential for transmission poles to be erected directly across the street from residences along Lack and Bannister Roads which would create an adverse visual impact for the residents. Staff is proposing a condition of certification to ensure this impact does not occur. With the full and complete mitigation proposed, staff agrees that the interconnection transmission line would be an appropriate activity for the Class IV designation.

### STATE

There is a section of SR-111 that is eligible for scenic highway status that begins about 15 miles north of the project site and continues north into Riverside County. Motorists driving south adjacent to the Salton Sea may be able to see the steam plume from the water heater dilution stack. However, the plume would appear low on the horizon and would not degrade the visual quality of the viewshed significantly. In any case, the project is in compliance with the Caltrans Scenic Highway designation.

### LOCAL

**Visual Resources Table 4** provides a listing of the applicable LORS for Imperial County. Twelve LORS were found to pertain to the enhancement and/or maintenance of visual quality and the protection of views. Based on staff's analysis, it appears that the proposed project would be inconsistent with one of these LORS. However, with implementation of staff's proposed conditions of certification, the proposed project would be substantially consistent with this General Plan objective.

**VISUAL RESOURCES Table 4**
**Proposed Project's Consistency with**
**Local LORS Applicable to Visual Resources**

| LORS | | Consistency Determination Before Mitigation/ Conditions | Basis for Consistency |
|---|---|---|---|
| **Source** | **Description of Principles, Objectives, and Policies** | | |
| | | | |
| Imperial County General Plan, Land Use Element | Goal 3 - Land Use Regional Vision<br><br>Achieve balanced economic and residential growth while preserving the unique, natural, scenic, and agricultural resources of Imperial County | CONSISTENT | The proposed power plant is located in an area that has an agricultural and industrial character within the Known Geothermal Resource Area (KGRA). The regional setting includes several mountain ranges, the Salton Sea, and nine other geothermal units. The project's structures and dilution stack plumes would degrade to a small degree views of the mountain ranges and sky. Therefore the TPP is considered consistent with this policy. Staff is proposing conditions of certification **VIS 2** and **3** which would require painting and landscaping, which will improve the consistency with this goal. |
| Imperial County General Plan, Land Use Element | Objective 3.4<br><br>Protect and improve the aesthetics of Imperial County and its communities | INCONSISTENT | The project would add another industrial facility to the local area, which detracts from the rural agricultural character of the landscape. SSU6 does not improve the aesthetics of the local setting. Therefore, the project is inconsistent with this objective. With staff's proposed conditions of certification **VIS 2** and **3**, the project will be substantially consistent with this objective. |

**VISUAL RESOURCES Table 4**
**Proposed Project's Consistency with**
**Local LORS Applicable to Visual Resources**

| LORS | | Consistency Determination Before Mitigation/ Conditions | Basis for Consistency |
|---|---|---|---|
| **Source** | **Description of Principles, Objectives, and Policies** | | |
| Imperial County General Plan, Circulation and Scenic Highways Element | Objective 4.5<br><br>Develop standards for aesthetically valuable sites. Design review may be required so that structures, facilities, and activities are properly merged with the environment | CONSISTENT | The project site is not aesthetically valuable due to the presence of nine geothermal units within two miles. Therefore, the project is consistent with this objective. |
| Imperial County General Plan, Geothermal and Transmission Element | Objective 5.1<br><br>Require all major transmission lines to be located in designated corridors. | CONSISTENT | Project transmission lines are not considered major transmission lines (they are less than 260 kV). The interconnection lines would parallel other lines to the extent possible, use existing rights-of-way along roads, and minimize impacts on agricultural lands. The project is consistent with this objective. |
| Imperial County General Plan, Geothermal and Transmission Element | Objective 5.2<br><br>Design lines for minimum impacts on agriculture, wildlife, urban areas, and recreational activities | CONSISTENT | Project transmission structures would be treated to reduce sun reflectivity and viewer exposure. The lines would parallel existing linear features and will be located in designated transmission corridors. The lines would not have a significant affect on recreational activities because they will be routed along roads or agricultural areas. The project is consistent with this objective. |

**VISUAL RESOURCES Table 4**
**Proposed Project's Consistency with**
**Local LORS Applicable to Visual Resources**

| LORS | | Consistency Determination Before Mitigation/ Conditions | Basis for Consistency |
|---|---|---|---|
| **Source** | **Description of Principles, Objectives, and Policies** | | |
| Imperial County General Plan, Geothermal and Transmission Element | Policy G<br><br>Transmission Corridors<br><br>To minimize, as much as possible, the impact of transmission steel poles and lines upon our aesthetic environment by encouraging appropriate location and design features. | CONSISTENT | In general, the location and design features of the transmission poles and lines minimize aesthetic impacts. Staff is proposing condition of certification **VIS 2** which would require that transmission poles not be constructed near residences, ensuring project consistency with this policy. |

## MITIGATION

## APPLICANT'S PROPOSED MITIGATION MEASURES

The applicant has proposed three mitigation measures to be incorporated into the project design to minimize visual impacts associated with the operation of the facility (CEOE 2002a, pg. 3-64).

1. Project structures would be painted tan where appropriate to blend in more naturally with the brown and tan hues within the existing setting.
2. Fencing would be constructed of non-reflective materials or would be treated or painted to reduce visual effects on sensitive viewing areas, and reflectivity of surfaces would be reduced by using non-reflective elements where possible.
3. Lighting on the project site would be limited to areas required for operations or safety, will be directed onsite to avoid back-scatter, and will be shielded from public view to the extent practical. Lighting that is not required to be on during nighttime hours would be controlled with sensors or switches operated such that lighting will be on only when needed.

## ADDITIONAL MITIGATION PROPOSED BY STAFF

Energy Commission staff generally agrees with the applicant's proposals. However, staff's position is that additional mitigation is needed to reduce project impacts to a less than significant level.

## Power Plant

As noted in the discussion about impacts related to CEQA significance criteria, the scenic vistas from Rock Hill would be adversely and significantly impacted by the power plant structures. Staff is proposing condition of certification **VIS-2** which would require painting with a color that blends with the predominant background color. **Visual Resources Figures 4C, 4D, 4E and 4F** are photo-simulations that depict the project with appropriate painting (green), and landscaping (five and twenty years after planting) at site level and on top of an eight foot high berm, respectively.

## Project Linears

The applicant has proposed mitigation for specific project structures and linears (CEOE 2002a, pg. 14). After the geothermal brine pipelines and water pipelines are constructed, the area stripped of vegetation would be re-vegetated or returned to agricultural use. Transmission structures and conductors would be treated to reduce sun reflectivity, and new transmission lines would parallel existing linear features, to the extent practical, for most of their overall length. The construction lay-down area would be returned to agricultural use or re-vegetated.

Staff is proposing additional mitigation regarding the transmission line structures. Transmission steel poles should be located in transmission line corridors whenever possible and should not be constructed in front of or in close proximity to residences. The production and injection wells should be screened to reduce visibility and related pipelines should be painted in dark green hues or wrapped in non-reflective material (See condition of certification **VIS-2**).

## Mitigation of Impacts in Relation to CEQA Significance Criteria

As discussed previously, the proposed project as viewed from KOP 4 would cause a significant adverse visual impact (both directly and cumulatively) with respect to Criterion 1 and 3 of the CEQA Guidelines. Effective implementation of the staff's proposed conditions of certification **VIS-2** and **VIS-3** would reduce the visual impact to a less than significant level.

The project's night lighting has the potential to create a new source of substantial light that would adversely affect nighttime views in the area and result in a significant visual impact. However, the exterior lighting control measures proposed by the applicant and staff's proposed condition of certification **VIS-4** would ensure that lighting impacts would be less than significant with regard to Criterion 4.

## Mitigation of Cumulative Impacts

As noted earlier, staff is recommending painting with a color that best blends with background colors to reduce the direct visual impact of the project structures, and lighting controls and landscaping to reduce the cumulative impact. In total, these mitigation measures would reduce the project's contribution to the significant cumulative impact to a level that would not be cumulatively considerable.

## RESPONSE TO PUBLIC AND AGENCY COMMENTS

## U.S. FISH AND WILDLIFE SERVICE

**USFWS (5-23)-1**: In a letter dated May 23, 2003, the Senior Wildlife Biologist (Charles Pelizza) commented on, among other things, staff's proposed visual resources mitigation for the SSU6. The Salton Sea Refuge staff unanimously support the proposed mitigation of reducing the profile of the plant, removing the [water heater dilution] plume, and the addition of landscaping to reduce the visual impact that the plant will have.

Staff response: Staff acknowledges the information provided in the May 23, 2003 letter. The development of this visual **Final Staff Assessment** has resulted in some findings, regarding the impact from and necessary mitigation for the proposed project, that differ from those presented in the **Preliminary Staff Assessment**. For reasons explained in this analysis, staff is no longer recommending a change to the project profile or the dilution water heater plume.

**USFWS (5-23)-2**: Native trees and shrub species should be planted on both sides of McKendry Road to take advantage of the higher elevation on the north side. The Refuge does have a native plant nursery and a local source of native plant seeds.

Staff response: This information will be integrated into the landscaping plan referred to in staff's proposed condition of certification **VIS-3**, to the extent practical.

## IMPERIAL COUNTY PLANNING/BUILDING DEPARTMENT

**ICP/B (5-5)-1**: In a letter dated May 5, 2003, the Planning Director (Jurg Heuberger) noted that visual impact was created when the first power plant was sited in the Salton Sea in the 1980's. Subsequently, more geothermal plants were sited based on where the geothermal resource was located.

Staff response: The siting of ten geothermal plants has altered the appearance of the landscape by introducing industrial lines and forms that contrast with agricultural appearance in the local area and with mountain ranges in the background. The proposed project would introduce an industrial facility that is larger than existing geothermal units and its location would degrade the scenic vista from Rock Hill. The impact would be adverse and significant, but with staff proposed mitigation the impact can be reduced to less than significant.

**ICP/B (5-5)-2**: The Final Master EIR for the Salton Sea Anomaly did not preclude the siting of geothermal power plants due to their aesthetics and visual impacts.

Staff response: Staff is recommending painting and landscaping to reduce the proposed **project's** significant adverse visual impact to a less than significant level. This mitigation is consistent with mitigation suggested in the MEIR.

**ICP/B (5-5)-3**: Since 1971, when the County Board of Supervisors developed the "Terms, Conditions, and Standards" for geothermal development, the County has consistently supported their full development.

Staff response: Staff supports geothermal development and has reviewed the Terms, Standards, and Conditions within the Conditional Use permits (CUPs) for the existing units. About half of the CUPs have provisions for landscaping. Staffs mitigation is consistent with these provisions.

**ICP/B (5-5)-4**: The PSA recommendation to change the power plant layout and footprint to mitigate visual impacts would be cost prohibitive and the viewshed would not change significantly in any event due to the existing power plants south of the proposed site.

Staff response: Staff is no longer recommending a change to the power plant layout.

## CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that with the applicant's proposed mitigation measures and staff's proposed conditions of certification (below), the proposed project would not cause adverse and significant visual impacts. Staff also concludes that with full, effective, and timely implementation of all of staff's conditions of certification, the project would conform with all applicable laws, ordinances, regulations, and standards.

The Energy Commission should adopt the following conditions of certification if it approves the project.

## PROPOSED CONDITIONS OF CERTIFICATION

**VIS-1** The project owner shall ensure that visual impacts of project construction are adequately mitigated. To accomplish this, the project owner shall require the following as a condition of contract with its contractors to construct the proposed project:

Laydown areas for linear facility construction shall be screened if they are visible from residences or adjacent roads within one-half mile. All evidence of construction activities, including ground disturbance due to staging and storage areas, shall be removed and remediated upon completion of construction to its pre-construction condition. Any vegetation removed in the course of construction will be replaced on a 1-to-1 in-kind basis. Such replacement planting shall be monitored for a period of three years to ensure survival. During this period, all dead plant material shall be replaced.

The project owner shall submit a plan to the CPM for review and approval for screening laydown areas and restoring the surface conditions of any staging and storage areas and rights of way disturbed during construction of underground pipelines,. The plan shall include returning laydown and linear facility work areas to the original grade, contouring and revegetation.

The project owner shall not implement the restoration plan until receiving written approval from the CPM.

**Verification:** At least ninety (90) days prior to beginning implementation of surface restoration of construction impacts, including construction of linear facilities, the project owner shall submit the restoration plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the restoration plan are needed before the CPM will approve the plan, within thirty (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 (7) days after completing the surface restoration that it is ready for inspection.

**VIS-2** Prior to start of commercial operation, the project owner shall treat project structures, buildings, production and injection wells and related pipelines, and fences visible to the public such that: their colors minimize visual intrusion and contrast by blending with the landscape; and their surfaces do not create excessive glare. A specific treatment plan shall be developed for CPM approval to ensure that the proposed colors do not unduly contrast with the surrounding landscape colors. The plan shall be submitted sufficiently early to ensure that any pre-colored buildings, structures, and linear facilities will have colors approved and included in bid specifications for such buildings or structures. Prior to submittal of the plan to the CPM, the project owner shall submit the plan to Imperial County for review and comment. The submittal to the CPM should include the County's comments. The treatment plan shall include:

a) specifications, and 11" x 17" color simulations, of the treatment proposed for use on project structures, including structures treated during manufacture;

b) a list of each major project structure, building, tank, and fence specifying the color(s) proposed for each item;

c) samples of each proposed treatment and color on the materials to which they are to be applied for major structures;

d) documentation that a non-reflective finish will be used on all project elements visible to the public;

e) a detailed schedule for completion of the treatment; and

f) a procedure to ensure proper treatment maintenance for the life of the project.

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. The project owner shall install tubular steel transmission line structures in transmission corridors whenever possible, and away from residences to the extent possible. The steel poles should be coated with a neutral gray finish. The project owner shall install non-specular conductors.

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.

**Verification:** At least ninety (90) days prior to ordering the first structures that are color treated during manufacture, the project owner shall submit its proposed plan to the CPM for review and approval and to Imperial County for review and comment.

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

Not less than thirty (30) days prior to the start of commercial operation, the project owner shall notify the CPM that all structures treated during manufacture and all structures treated in the field are ready for inspection.

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

**VIS-3** To partially screen views of the power plant from visitors to Rock Hill, native trees (i.e., palo verde, ironwood and mesquite) shall be strategically planted in sufficient density to partially screen project structures. The project owner shall work with Imperial County to widen the McKendry Road berm for the length of the project site and to plant the specified trees along the south side of the widened section on the top of the berm. If this approach is proven not to be practicable, the project owner shall provide a written explanation to the CPM along with a plan for tree planting along the north boundary within the project site.

The project owner shall submit a tree planting plan to Imperial County, the Salton Sea Refuge manager, and USFWS for review and comment and to the CPM for review and approval. The submittal to the CPM shall include the County's comments. The Plan shall include:

a) a detailed diagram showing the location and type of each tree to be planted;

b) a description of the size and age of each tree type at time of planting;

c) a description of how the trees will be watered and for how long to ensure they survive; and

d) a description of how and when dead trees will be replaced for the life of the project.

The project owner shall not implement the plan until the project owner receives approval of the submittal from the CPM. However, the planting must be completed by start of project operation.

**Verification:** Prior to start of commercial operation and at least ninety (90) days prior to tree planting, the project owner shall submit the tree planting plan to Imperial County, the Refuge manager, and USFWS for review and comment, and 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 thirty (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 (7) days after completing tree planting, that the trees are ready for inspection.

**VIS-4** Prior to start of commercial operation, 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 during both project construction and operation. The project owner shall develop and submit a lighting plan for the project to the CPM for review and approval. The lighting plan shall include:

a) lighting shall be designed so that during both construction and operation, highly directional, 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, consistent with operational safety and security;

b) high illumination areas not occupied on a continuous basis such as maintenance platforms shall be provided with switches or motion detectors to light the area only when occupied; and

c) a lighting complaint resolution form (following the general format of that in **Visual Resources Appendix VR-3**) shall be used by plant operators, to record all lighting complaints received and to document the resolution of those complaints. All records of lighting complaints shall be kept in the on-site compliance file.

**Verification:** At least 90 days prior to ordering any permanent exterior lighting, the project owner shall contact the CPM to discuss the documentation required in the lighting mitigation plan.

At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to the CPM for review and approval and to the Imperial County for review and comment a plan that describes the measures to be used and that demonstrates that the requirements of this condition will be satisfied. The submittal to the CPM shall include the County's comments. The project owner shall not order any exterior lighting until receipt of CPM approval of the lighting mitigation plan.

At least thirty (30) days prior to start of commercial operation, the project owner shall notify the CPM that the lighting has been completed and is ready for inspection.

The project owner shall document any complaints about permanent lighting using the lighting complaint resolution form and provide a copy along with a discussion of resolution measures taken in the Annual Compliance Report for that year.

## REFERENCES


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U. S. Fish and Wildlife Service (USFWS) 2003b. Letter from Charlie Pelizza, USFWS Senior Wildlife Biologist at Sonny Bono Salton Sea National Wildlife Refuge Headquarters, to the California Energy Commission, dated May 23, 2003.

U. S. Fish and Wildlife Service (USFWS) 2003c. Personal Communication between Charlie Pelizza, and James Adams on July 9, 2003.

## APPENDIX VR – 1: SUMMARY OF ANALYSIS

# APPENDIX VR 1

## SALTON SEA POWER PLANT PROJECT VISUAL RESOURCES STAFF ASSESSMENT - SUMMARY OF ANALYSIS

### CUMULATIVE IMPACT NOT SHOWN

| VIEWPOINT | | EXISTING VISUAL SETTING | | | | | | | VISUAL CHANGE | | | | | IMPACT SIGNIFICANCE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Viewer Exposure | | | | | | | | | | | |
| Key Observation Point (KOP) | Description | Visual Quality | Viewer Concern | Visibility | Number of Viewers | Duration of View | Overall Viewer Exposure | Overall Visual Sensitivity | Description of Visual Change | Visual Contrast | Project Dominance | View Disruption | Overall Visual Change | Mitigation / Conditions | Impact Significance with Mitigation |
| **KOP 1**<br>**Figure 1a, 1B** | View to the south from an access road about 600 feet west of the entrance to the Wildlife Headquarters about 4000 feet north of the proposed project. | **Low to Moderate**<br>Prominent features are the canal, agricultural fields, existing geothermal units to the east and southwest. | **Low to Moderate**<br>The predominant viewers at KOP-1 would be the agricultural workers who use the access road and the people driving into the Refuge. Viewer expectation would be moderate based on the visual quality of the view from this KOP. | **Low** | **Moderate** | **Low** | **Low** | **Low to Moderate** | The proposed project would introduce the prominent geometric forms and vertical and horizontal lines of the various structures and stacks. | **Moderate** | **Co-dominant** | **Low** | **Low to Moderate** | **none** | **Adverse but less than Significant** |
| **KOP 2**<br>**Figure 2a, 2B** | View looking south from the Red Island Recreation Area approximately two miles north of the project site | **High**<br>The most prominent features in this view are the recreation area in the foreground, Salton Sea in the middleground, Rock Hill and an agricultural area in the middleground, and mountain ranges in the background. | **Moderate to High**<br>Visitors anticipate seeing a scenic vista of the Salton Sea and mountain ranges with some geothermal plants. | **Low to Moderate** | **High** | **Moderate** | **Moderate** | **Moderate** | The proposed project would introduce another geothermal unit with geometric forms and vertical and horizontal lines into the view to the south from KOP-2. | **Low** | **Subordinant** | **Low** | **Low** | **None** | **Adverse but less than Significant** |
| **KOP 3**<br>**Figure 3a, 3B** | View from residences on Lack Road looking northeast toward the project | **Low to Moderate**<br>Features in this view are Lack Road, canal on the left and mountains in the background. Other features include the existing utility line, agricultural lands west and east of Lack Road, and existing geothermal facilities in the far middleground to background. | **Moderate**<br>Viewers would be the occupants of the residences and workers who use Lack Road. | **High** | **Low** | **Moderate to High** | **Moderate** | **Moderate** | The project would introduce the horizontal form of the transmission lines and several prominent vertical electric transmission towers. | **Moderate** | **Co-dominant** | **Moderate to High** | **Moderate** | **None** | **Adverse but less than Significant** |
| **KOP 4**<br>**Figure 4A, 4B** | View from the top of Rock Hill looking south toward the project about one mile away | **Moderate to High**<br>Features in this view are the Salton Sea in the foreground and middleground, agricultural areas and existing geothermal units in the middleground, and mountain ranges in the background | **High**<br>Viewers would be the visitors to Rock Hill. Recreational users have high visual concern | **Moderate to High** | **Moderate** | **Moderate to High** | **Moderate to High** | **Moderate to High** | The project would introduce horizontal lines, industrial geothermal forms, visible plume, and an unchanging color similar to the existing geothermal units. | **Moderate to High** | **Co-dominant** | **Moderate** | **Moderate** | **VIS-2** | **Adverse and Significant** |
| **KOP 5**<br>**Figure 5A, 5B** | View of SR-86 looking northwest about 600 feet from spot where the transmission line will cross the highway | **Moderate**<br>Prominent features are the highway in the center of the view from foreground to background, fields and surface streets on both sides of the highway, existing utility line and poles on both sides of the highway, and mountain ranges in the background | **Moderate**<br>Viewers would be motorists on the highway. | **Moderate to High** | **Moderate to High** | **Low** | **Moderate** | **Moderate** | The proposed project would introduce the prominent vertical forms of transmission line towers and the horizontal oriented transmission lines. | **Moderate to High** | **Co-dominant** | **Low to Moderate** | **Moderate** | **None** | **Adverse but less than Significant** |
| **KOP-6**<br>**Figure 6A, 6B** | View of SR-111 looking north from the spot where the transmission line would cross the highway | **Moderate**<br>Principal features are the highway in the center of the view from foreground to background, desert landscape on both sides of the highway, existing utility line on the east side of the highway, and mountain range on the background | **Moderate**<br>Viewers would be motorists on the highway | **Moderate to High** | **Moderate to High** | **Low** | **Moderate** | **Moderate** | The proposed project would introduce the prominent vertical forms of transmission line towers and the horizontal oriented transmission line. | **Moderate to High** | **Co-dominant** | **Low to Moderate** | **Moderate** | **None** | **Adverse but less than Significant** |

# APPENDIX VR-2

PLUME ANALYSIS

# VISIBLE PLUMES

William Walters and Lisa Blewitt

## INTRODUCTION

The following provides staff's assessment of the Salton Sea Unit 6 (SSU6) Project cooling tower and dilution water heater exhaust stack visible plumes. Staff completed a modeling analysis for the applicant's proposed unabated cooling tower design.

## PROJECT DESCRIPTION

The applicant has proposed two parallel linear 10-cell conventional mechanical-draft cooling towers separated by approximately 766 feet (233 meters). The applicant has not proposed to use any methods to abate visible plumes from the cooling towers.

The proposed geothermal power process includes two dilution water heaters. The exhausts from the dilution water heaters are essentially composed of steam. These units will operate at all times when the plant is in operation.

Additionally, there will be several sources of intermittent steam plumes. These include plumes from atmospheric steam vent tanks, production test units and injection test units. These plumes will occur occasionally, forecast to occur less than 350 hours per year (SSU6, 2002b, Response 98). This analysis does not model or further evaluate these intermittent steam plume sources.

## COOLING TOWER VISIBLE PLUME MODELING ANALYSIS

### EXISTING CONDITIONS

The applicant verified in Data Response (DR) #93 (SSU6 2002b) that thirteen (13) non-intermittent plume sources occur within a radius of three miles from the project site. These plume sources include Vulcan Cooling Tower and Barometric Condensers Nos. 1 and 2, Elmore Cooling Tower and Barometric Condenser, Hoch Cooling Tower and Barometric Condenser, Units 1-5 Cooling Towers, and Unit 5 Barometric Condenser. Thus, many existing facilities producing plumes are within the area of the proposed project.

The exhaust from each of the two dilution water heaters are noted to be approximately twice the relative size of any existing continuous steam plume source (SSU6 2002b, Response 93). The two project cooling towers will also be larger than any of existing cooling towers.

### COOLING TOWER DESIGN PARAMETERS

Staff evaluated the applicant's AFC (SSU6 2002a, AFC Sections 5.1.2.5.6 and 5.12.2.2.1) and Data Request Responses #93-94 (SSU6 2002b), and performed an independent psychrometric analysis and dispersion modeling analysis to predict the

frequency and dimensions of visible plumes from the project's proposed unabated cooling towers.

The cooling towers design characteristics, presented below in **Table 1**, were determined through a review of the applicant's AFC and Data Request Responses, and through additional engineering calculations.

**Table 1 – New Cooling Tower Operating and Exhaust Parameters**

| **Parameter** | | **New Cooling Tower Design Parameters** | |
|---|---|---|---|
| Number of Cells | | 20 (2 parallel - 1x 10 arrays) | |
| Stack Height | | 17.68 meters | |
| Cell Stack Diameter | | 9.75 meters | |
| Equivalent Stack Diameter | | 30.83 meters (10 cells) | |
| Maximum Design Inlet Air Flow Rate (kg/s) | | 17,962 (1) | |
| Tower Housing Length | | 164.0 meters | |
| Tower Housing Width | | 17.7 meters | |
| Maximum Heat Rejection Rate (MW) | | 763.6 (1) | |
| **Case #** (2) | **Ambient Condition** | **Exhaust Flow Rate (lbs/s/cell)** | **Exhaust Temperature (°F)** |
| 1 | 100°F, 25.8% RH | 1852.8 | 90.0 |
| 2 | 61°F, 48.4% RH | 1934.8 | 76.1 |
| 3 | 32°F, 81.1% RH | 1999.2 | 64.2 |

Source: AFC (SSU6 2002a, page 5.1-28), and Data Request Response #94 (SSU6 2002b, page 88).
Notes:
(1) Cooling tower design parameters are for the two towers combined. SACTI modeling was based on one tower (381.8 MW and 8,981 kg/s air flow rate).
(2) For CSVP modeling, values were extrapolated or interpolated between data points as necessary.

For CSVP modeling, the exhaust temperature and exhaust mass flow rate values were calculated for the hourly ambient conditions modeled through linear interpolation and extrapolation of the data provided by the applicant for the three cases presented in **Table 1**. The exhaust moisture content was determined by assuming saturated conditions at the calculated exhaust temperature.

## COOLING TOWER VISIBLE PLUME MODELING ANALYSIS

Staff modeled the cooling tower plumes using both the Combustion Stack Visible Plume (CSVP) model and the Seasonal/Annual Cooling Tower Impact (SACTI) model. The SACTI model is designed to model multiple cell cooling towers, and for the CSVP modeling analysis uses an equivalent stack diameter approach in order to model the entire exhaust water emissions of the tower. **Table 2** provides the CSVP model visible plume frequency results using a five-year (1995-1999) meteorological data set, obtained from the National Climatic Data Center, from Imperial County Airport.

**Table 2 – Staff Predicted Hours with Cooling Tower Steam Plumes**
**Imperial County Airport 1995-1999 Meteorological Data**

| | Available (hr) | Plume (hr) | Percent |
|---|---|---|---|
| All Hours | 43,824 | 4,888 | 11.15% |
| Daylight Hours | 22,217 | 743 | 3.34% |
| Nighttime Hours | 21,607 | 4,145 | 19.18% |
| Daylight No Rain/Fog Hours | 21,890 | 630 | 2.88% |
| Seasonal Daylight No Rain/Fog Hours* | 9,936 | 612 | 6.16% |
| Seasonal Daylight "Clear" Hours** | 9,936 | 287 | 2.89% |

*Seasonal conditions occur anytime from November through April.
**"Clear" hours are defined below.

These modeling results indicate that the visible plume formation would mainly occur during the cold weather months, with the majority of plume formation occurring at night or early morning. For the proposed cooling tower, the maximum temperature where a visible plume is predicted is 82°F when the relative humidity is 91%.

Staff performed an independent dispersion modeling analysis to predict the frequency and dimensions of visible plumes from the project's proposed unabated cooling towers. For the SACTI model, a single tower (10-cells) was modeled, as the two towers are separated by approximately 766 feet (233 meters). Staff's SACTI modeling analysis visible plume dimension results, for a single tower, using a five-year (1995-1999) meteorological data set from Imperial County Airport and upper air data from Tucson, AZ are provided in **Table 3**.

**Table 3 – Staff Results of Cooling Tower Visible Plume Dimensions**
**Imperial County Airport 1995-1999 Meteorological Data**

| Case | Model | Percentile | 50% | 10% | 5% | 1% | Maximum |
|---|---|---|---|---|---|---|---|
| All Hours | SACTI | Length (m)** | 20-30 | 50-60 | 50-60 | 200-300 | 600-700 |
| | CSVP | | No Plume | 9 | 77 | 214 | 682 |
| | SACTI | Height (m)* | 10-20 | 40-50 | 40-50 | 60-70 | 600-700 |
| | CSVP | | No Plume | 33 | 99 | 261 | 733 |
| | SACTI | Width (m) | 20-40 | 40-60 | 40-60 | 80-100 | 400-600 |
| | CSVP | | No Plume | 40 | 55 | 66 | 86 |
| Daytime No Rain / No Fog | SACTI | Length (m)** | 10-20 | 20-30 | 40-50 | 60-70 | 900-1,000 |
| | CSVP | | No Plume | No Plume | No Plume | 50 | 357 |
| | SACTI | Height (m)* | 10-20 | 20-30 | 20-30 | 20-30 | 300-400 |
| | CSVP | | No Plume | No Plume | No Plume | 112 | 598 |
| | SACTI | Width (m) | 20-40 | 20-40 | 20-40 | 20-40 | 120-140 |
| | CSVP | | No Plume | No Plume | No Plume | 54 | 76 |
| Seasonal Daylight No Rain / No Fog | SACTI | Length (m)** | 10-20 | 20-30 | 50-60 | 60-70 | 900-1,000 |
| | CSVP | | No Plume | No Plume | 11 | 92 | 357 |
| | SACTI | Height (m)* | 10-20 | 20-30 | 20-30 | 30-40 | 300-400 |
| | CSVP | | No Plume | No Plume | 44 | 196 | 598 |
| | SACTI | Width (m) | 20-40 | 20-40 | 20-40 | 40-60 | 120-140 |
| | CSVP | | No Plume | No Plume | 44 | 61 | 76 |
| Seasonal Daytime "Clear" | SACTI | Length (m)** | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 59 | 334 |
| | SACTI | Height (m)* | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 129 | 471 |
| | SACTI | Width (m) | --- | --- | --- | --- | --- |
| | CSVP | | No Plume | No Plume | No Plume | 57 | 76 |

Seasonal = November through April (day 120-304).
*SACTI Plume height does not include the height (17.68 meters) of the cooling tower (release point).
**Plume length from tower. Each of the two towers are 164 meters long, so the actual plume length will also include some component of the tower length.

As **Table 3** shows, the CSVP model predicts no plumes 50 percent of the time for all cases. Additionally, the CSVP model only predicts plumes 10 percent of the time for all hours. Predicted plume sizes from CSVP are similar than those predicted by the SACTI model, except for the width which is much smaller than the widths predicted by SACTI. While the CSVP model does have certain limitations, such as no specified mixing height to limit maximum plume heights, it uses actual hourly meteorological data and can model "calm" hours assuming a minimum wind speed; while the SACTI model groups the meteorological data and does not process "calm" hours. Therefore, staff concludes that the CSVP modeling results, which also includes the variable load characteristics of the cooling tower with respect to variable ambient conditions, should provide more realistic visible plume characteristics.

The Applicant also performed a SACTI analysis, but during the course of resolving data response issues regarding inconsistent exhaust flow data presented in Data Response 94 and their SACTI input files, they have informed staff that the values in Data Response 94 are correct. Therefore, the Applicant's SACTI modeling analysis does not use correct input data and is not considered valid.

Visual observation of the existing cooling towers indicates a higher than anticipated frequency of visible plumes. In particular, during a site visit on November 21, 2002, plumes were observed from some of the existing cooling towers when the ambient conditions were 81°F and 17% relative humidity. Staff is concerned that the use of the steam condensate as the cooling tower circulating water source, and/or that the addition of the noncondensable gas stream, my create conditions that cause these unexpected visible plumes. Staff requested that the Applicant provide design parameters for the existing cooling towers in order to determine if there was a reason for the observed unexpected visible cooling tower plumes. The Applicant's data indicated that existing cooling towers had a wide range of design conditions. In particular the air flow rate per megawatt of heat rejection varies greatly, as does the drift fraction. The observed plumes were from the cooling towers with low air flow rates per megawatt of heat rejection (such as the Unit 3 and Unit 5 cooling towers), while the cooling towers with the higher air flow rates either did not have visible plumes or had extremely faint plumes (such as the Vulcan or Elmore cooling towers). The SSU6 cooling tower is being designed to have a high air flow rate and a very low drift fraction, so it should perform like the existing towers with similar operating variables. However, with the available data staff cannot conclude that the use of the steam condensate, or the addition of the non-condensable gases, will not cause the visible plume frequency of the SSU6 cooling tower to be higher than modeled.

## CLOUD COVER DATA ANALYSIS METHOD

A plume frequency of 10% of seasonal (November through April) daylight no rain/fog high visual contrast (i.e. "clear") hours analysis is used to determine potential plume impact significance. The high visual contrast hours analysis methodology is provided below:

> The Energy Commission has identified a "clear" sky category during which plumes have the greatest potential to cause adverse visual impacts. For this

project the meteorological data set[1] used in the analysis categorizes total sky cover and opaque sky cover in six categories. Staff has included in the "Clear" category a) all hours with total sky cover categorized as clear b) half of the hours with sky cover categorized as scattered or broken. Hours with total sky cover categorized as overcast, partially obscured or obscured were not considered "clear" hours. The rationale for including these three sky cover categories is as follows: a) plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or less than 10%, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and b) for a substantial portion of the time when total sky cover is 20-100% and the opacity of sky cover is relatively low (equal to or less than 50%), clouds do not substantially reduce contrast with plumes; staff has estimated that approximately half of the hours meeting the latter sky cover and sky opacity criteria can be considered high visual contrast hours and are included in the "clear" sky definition.

The CSVP model predicts plume frequencies less than 10% of seasonal daylight "clear" hours. Therefore no additional study of the general visual impacts of the cooling tower plume has been performed. However, staff does have a concern regarding one viewpoint, from Rock Hill to Signal Mount, that has been evaluated separately.

## DILUTION WATER HEATER VISIBLE PLUME MODELING ANALYSIS

Staff evaluated the applicant's AFC (SSU6 2002a, AFC Sections 5.1.2.5.6 and 5.12.2.2.1) and Data Request Response #95 (SSU6 2002b), and performed an independent psychrometric analysis and dispersion modeling analysis. The Combustion Stack Visible Plume (CSVP) model was used to estimate the worst-case potential plume frequency, and provide data on predicted plume length, width, and height for the dilution water heater exhausts.

## DILUTION WATER HEATER DESIGN PARAMETERS

Based on the stack exhaust parameters anticipated by the applicant for the dilution water heaters, the frequency and size of visual plumes can be estimated. The operating data for the dilution water heaters are provided in **Table 4**.

**Table 4 – Dilution Water Heater Exhaust Parameters**

| **Parameter** | **Dilution Water Heater Exhaust Parameters** | | |
|---|---|---|---|
| Stack Height | 13.72 meters (45 feet) | | |
| Stack Diameter | 2.44 meters (8 feet) | | |
| | **Case 1** | **Case 2** | **Case 3** |
| Ambient Temp | 100°F | 61°F | 32°F |
| Ambient Relative Humidity | 25.8% | 48.4% | 81.1% |
| Exhaust Temperature | 212.9°F | 212.9°F | 212.9°F |
| Exit Velocity | Calculated for each hour modeled | | |
| Exhaust mass flow rate | 204,291 lbs/hr | 204,291 lbs/hr | 204,291 lbs/hr |
| Exhaust Molecular Weight | 18.0 lbs/lb-mol | | |
| Moisture Content (% by wt.) | 100% | 100% | 100% |

Source: AFC (SSU6 2002a), page 5.1-28, and Data Request Response #95 (SSU6 2002b, page 88).

[1] This analysis uses a TD3280 data set.

## DILUTION WATER HEATER VISIBLE PLUME MODELING ANALYSIS

Staff modeled the dilution water heater plumes using the CSVP model with a five-year (1995-1999) meteorological data set from Imperial County Airport. As can be seen in **Table 4** above, the dilution water heaters exhausts are basically steam (100% moisture content). The CSVP model predicted visible plumes to occur under all conditions, even the most extreme hot and dry days. **Table 5** provides Staff's CSVP modeling analysis visible plume dimension results.

**Table 5 – Staff Results of Dilution Water Heater Visible Plume Dimensions Imperial County Airport 1995-1999 Meteorological Data**

| Case | Percentile | 50% | 10% | 5% | 1% | Maximum |
|---|---|---|---|---|---|---|
| All Hours (43,824 hours) | Length (m) | 93 | 380 | 498 | 745 | 1,403 |
| | Height (m)* | 41 | 91 | 103 | 159 | 325 |
| | Width (m) | 14 | 27 | 32 | 43 | 71 |
| Daytime No Rain/No Fog (21,890 hours) | Length (m) | 46 | 140 | 201 | 383 | 1,053 |
| | Height (m)* | 31 | 91 | 111 | 177 | 325 |
| | Width (m) | 12 | 22 | 26 | 35 | 56 |
| Seasonal Daytime No Rain/No Fog (9,936 hours) | Length (m) | 66 | 185 | 263 | 470 | 1,053 |
| | Height (m)* | 40 | 108 | 141 | 210 | 325 |
| | Width (m) | 16 | 26 | 30 | 39 | 56 |
| Seasonal Daytime "Clear" (9,936 hours) | Length (m) | 30 | 134 | 202 | 413 | 1,053 |
| | Height (m)* | 21 | 84 | 108 | 177 | 325 |
| | Width (m) | 10 | 22 | 27 | 36 | 56 |

Seasonal = November through April (day 120-304).

These results confirm that visible plume formation occurs under all conditions, with the largest plumes forming at night or early morning and during the cold weather months. The CSVP model predicts plume frequencies greater then 10% of seasonal daylight no rain/fog high visual contrast hours, which would trigger a study of the visual impacts of the plume from the dilution water heaters. The visual impact analysis for the dilution water heater plumes is provided in the Visual Resources section of the Staff Assessment.

## SIGNAL MOUNT VIEW IMPAIRMENT ANALYSIS

The project site is aligned with a viewing point from Rock Hill to Signal Mount in Mexico. The view distance is slightly less than 40 miles. A determination of the number of hours when plumes occur and their general size distribution when the visible range is 40 miles or more has been conducted. The results of this analysis are provided in **Table 6**.

**Table 6 – Staff Predicted Hours with Dilution Water Heater Plumes and Cooling Tower Steam Plumes During Daylight High Visibility Hours Imperial County Airport 1995-1999 Meteorological Data**

| | Available (hr) | Plume (hr) | Percent |
|---|---|---|---|
| Cooling Tower Plumes | 6,349* | 218 | 3.4% |

*This is out of 40,907 hours of meteorological data with visible range data. Staff filled hours, using linear interpolation, for hours that had other data but not for hours that were completely missing from the meteorological raw data.

As noted earlier the dilution water heaters exhausts are essentially steam exhausts that will be visible under all conditions. The relative plume sizes during the high visible range hours are provided in **Table 7**.

**Table 7 – Staff Results of High Visibility Hours Plume Dimensions Imperial County Airport 1995-1999 Meteorological Data**

| Case | Percentile | 50% | 10% | 5% | 1% | Maximum |
|---|---|---|---|---|---|---|
| Dilution Water Heaters | Length (m) | 57 | 173 | 242 | 442 | 1,053 |
| | Height (m)* | 34 | 91 | 109 | 176 | 325 |
| | Width (m) | 14 | 24 | 28 | 37 | 56 |
| Cooling Tower | Length (m) | No Plume | No Plume | No Plume | 64 | 318 |
| | Height (m)* | No Plume | No Plume | No Plume | 115 | 343 |
| | Width (m) | No Plume | No Plume | No Plume | 57 | 95 |

*Statistics are based on the 6,349 daylight hours with visibility at or greater than 40 miles.

The frequency data would indicate that the cooling tower plumes would only occasionally be able to block views from Rock Hill to Signal Mount. However, this report makes no attempt to determine the quantity or significance of view blockage from Rock Hill to Signal Mount. The information provided here will be analyzed further in the Visual Resources section of the Staff Assessment.

## REFERENCES

SSU6 (Salton Sea Unit 6) 2002a. Application for Certification, Volumes 1 and 2 (02-AFC-2). Submitted to the California Energy Commission on July 26, 2002.

SSU6 (Salton Sea Unit 6) 2002b. Data Request Response Set 1. December 2, 2002.

## APPENDIX VR – 3

LIGHTING COMPLAINT RESOLUTION FORM

| |
|---|
| Salton Sea Unit 6 Project<br>Imperial County, California |
| Complainant's name and address:<br><br><br>Phone number: |
| Date complaint received:<br>Time complaint received: |
| Nature of lighting complaint: |
| Definition of problem after investigation by plant personnel:<br><br><br>Date complainant first contacted: |
| Description of corrective measures taken:<br><br>Complainant's signature: _____ Date: |
| Approximate installed cost of corrective measures: $<br><br>Date installation completed:<br>Date first letter sent to complainant: _____(copy attached)<br>Date final letter sent to complainant: _____(copy attached) |
| This information is certified to be correct:<br><br>Plant Manager's Signature: |

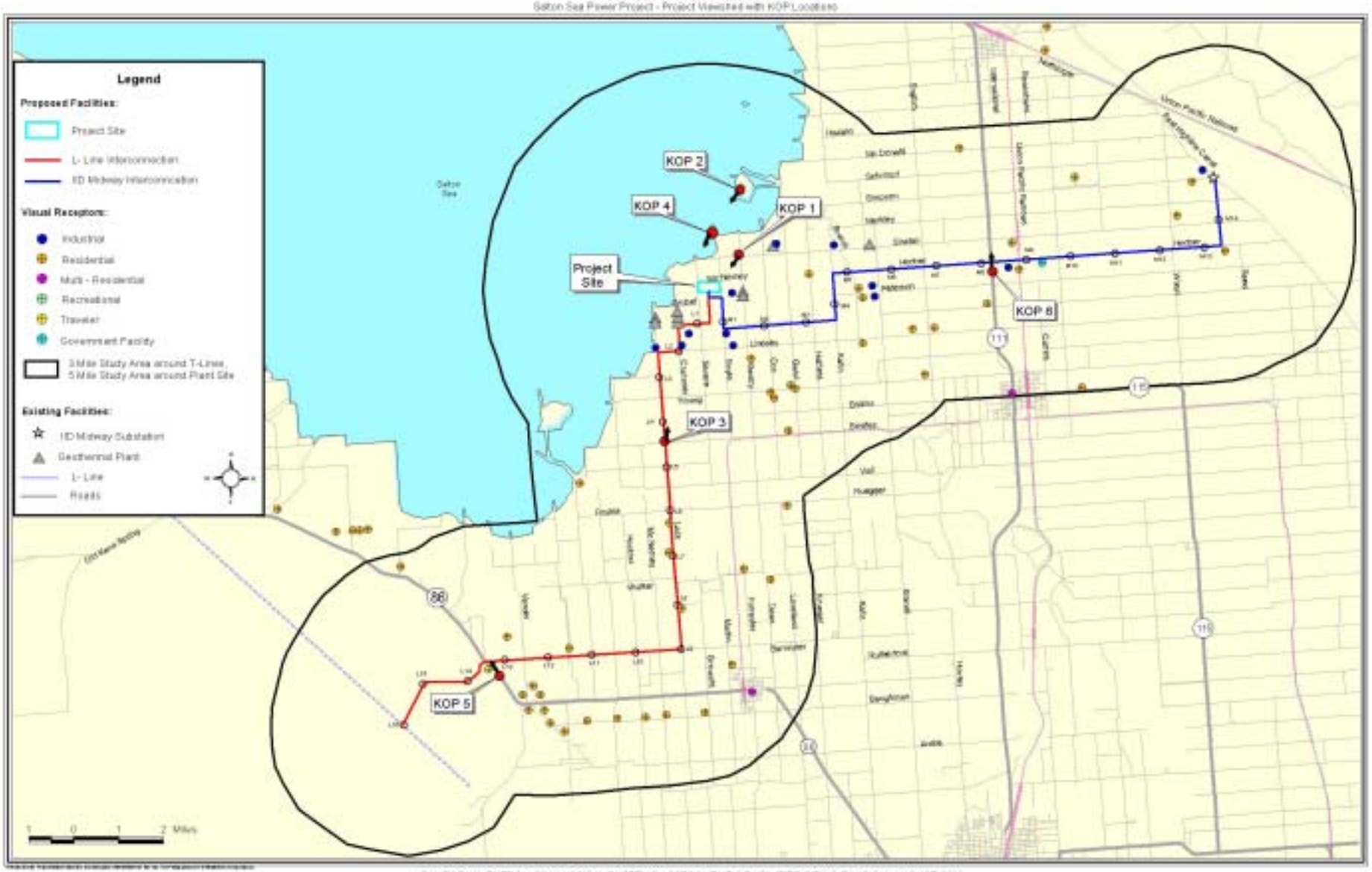
(Attach additional pages and supporting documentation, as required.)

## APPENDIX VR-4

PHOTOGRAPHS AND PHOTOSIMULATIONS

**VISUAL RESOURCES - FIGURE 1**

Salton Sea Power Project - Project Viewshed with KOP Locations




CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003
SOURCE: APC Figure 5.12-1

**VISUAL RESOURCES - FIGURE 1A**

Salton Sea Power Project - KOP 1- Existing View of Proposed Plant Site from Residence near National Wildlife Refuge

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE:AFC Figure 5.12-8A

**VISUAL RESOURCES - FIGURE 1B**

Salton Sea Power Project - KOP 1- Simulation View of Proposed Plant Site in worst-case plume conditions from Residence near National Wildlife Refuge*

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE:AFC Figure 5.12-8C

*Based on worst case plume description in AFC

**VISUAL RESOURCES - Figure 1C**

Salton Sea Power Project - Panoramic view from Refuge entrance, Hoch, Vulcan, SS Units

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: Photo by Commission Staff

**VISUAL RESOURCES - FIGURE 2A**

Salton Sea Power Project - KOP 2 - Existing View of Proposed Plant Site from Red Island Recreation Area

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: AFC Figure 5.12-9A

**VISUAL RESOURCES - FIGURE 2B**

Salton Sea Power Project - KOP 2 - Simulation View of Proposed Plant Site in worst Plume Conditions from Red Island Recreation Area*

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE:AFC Figure 5.12-9B

*Based on worst case plume description in AFC

**VISUAL RESOURCES - FIGURE 3A**

Salton Sea Power Project - KOP 3 - Existing View of Proposed Transmission Line from a Utility Building on Lack Road

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE:AFC Figure 5.12-10A

**VISUAL RESOURCES - FIGURE 3B**

Salton Sea Power Project - KOP 3 - Simulation View of Proposed Transmission Line from a Utility Building on Lack Road

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE:AFC Figure 5.12-10B

**VISUAL RESOURCES - FIGURE 4A**

Salton Sea Power Project - Looking south from atop Rock Hill, Signal Mtn. in center of photo.

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: Staff Photo taken November 19, 2002

**VISUAL RESOURCES - FIGURE 4B**

Salton Sea Power Project - View from Rock Hill looking South with project and plume

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: Data Response Set 3

**VISUAL RESOURCES - FIGURE 4C**

Salton Sea Power Project - View from Rock Hill with project, plume, painting and landscaping at site level 5 years after planting

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: Visual Consultant to Staff

**VISUAL RESOURCES - FIGURE 4D**

Salton Sea Project - View from Rock Hill with project, plume, painting and landscaping at site level 20 years after planting

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: Visual Consultant to Staff

**VISUAL RESOURCES - FIGURE 4E**

Salton Sea Project - View from Rock Hill with project, plume, painting and landscaping on berm 5 years after planting

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: Visual Consultant to Staff

**VISUAL RESOURCES - FIGURE 4F**

Salton Sea Project - View from Rock Hill with project, plume, painting and landscaping on berm 20 years after planting

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: Visual Consultant to Staff

**VISUAL RESOURCES - FIGURE 5A**

Salton Sea Power Project - Existing view of the proposed location of the IID L line 166 kV Transmission Line crossing of State Route 86

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: Data Response Set 3

**VISUAL RESOURCES - FIGURE 5B**

Salton Sea Power Project - Simulated view of the proposed IID L Line 161 kV Transmission Line crossing of State Route 86

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: Data Response Set 3

**VISUAL RESOURCES - FIGURE 6A**

Salton Sea Power Project - Existing view of the proposed IID M Line 161 kV Transmission Line crossing of State Route 111

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: Data Response Set 3

**VISUAL RESOURCES - FIGURE 6B**

Salton Sea Power Project - Simulated view of the proposed IID M Line 161 kV Transmission Line crossing of State Route 111

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, AUGUST 2003**

SOURCE: Data Response Set 3

**VISUAL RESOURCES - FIGURE 7**

Salton Sea Power Project - Looking at proposed Bannister Switchyard just west of SR 86, looking northwest

**CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION,** AUGUST 2003

SOURCE: Photo simulation generated by applicant and provided to Commission staff on June 9th, 2003

# WASTE MANAGEMENT

Testimony of Ellen Townsend-Hough

## INTRODUCTION

This Final Staff Assessment presents an analysis of issues associated with managing wastes generated from constructing and operating the proposed Salton Sea Unit 6 Project (SSU6). Staff evaluated the proposed waste management plans and mitigation measures designed to reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and nonhazardous wastes. The technical scope of this analysis encompasses wastes generated during facility construction and operation. Wastewater is more fully discussed in the **Soil and Water Resources** section of this document.

Energy Commission staff's objectives in its waste management analysis are to ensure that:

- The management of the wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner; and
- The disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

### FEDERAL

#### Resource Conservation and Recovery Act (42 U.S.C. § 6922)

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

- record keeping practices which identify quantities of hazardous wastes generated and their disposition,
- labeling practices and use of appropriate containers,
- use of a manifest system for transportation, and
- submission of periodic reports to the U.S. Environmental Protection Agency (U.S. EPA) or authorized state.

#### Title 40, Code of Federal Regulations, part 260

These sections contain regulations promulgated by the EPA to implement the requirements of RCRA as described above. Characteristics of hazardous waste are

described in terms of ignitability, corrosivity, reactivity, and toxicity; and specific types of wastes are listed.

## STATE

### California Health and Safety Code §25100 et seq. (Hazardous Waste Control Act of 1972, as amended).

This act creates the framework under which hazardous wastes must be managed in California. It mandates the State Department of Toxic Substances Control (DTSC), Health Services (formerly the Department of Health Services, under the California Environmental Protection Agency ,) to develop and publish a list of hazardous and extremely hazardous wastes, and to develop and adopt criteria and guidelines for the identification of such wastes. It also requires hazardous waste generators to file notification statements with Cal EPA and creates a manifest system to be used when transporting such wastes.

### Title 14, California Code of Regulations, §17200 et seq. (Minimum Standards for Solid Waste Handling and Disposal)

These regulations set forth-minimum standards for solid waste handling and disposal; guidelines to ensure conformance of solid waste facilities with county solid waste management plans, as well as enforcement and administration provisions.

### Title 22, California Code of Regulations, §66262.10 et seq. (Generator Standards)

These sections establish requirements for generators of hazardous waste. Under these sections, waste generators must determine if their wastes are hazardous according to either specified characteristics or lists of wastes. As in the federal program, hazardous waste generators must obtain U.S. EPA identification numbers, prepare manifests before transporting the waste off-site, and use only permitted treatment, storage, and disposal facilities. Additionally, hazardous waste must only be handled by registered hazardous waste transporters. Generator requirements for record keeping, reporting, packaging, and labeling are also established.

### Title 22, California Code of Regulations, §67100.1 et seq. (Hazardous Waste Source Reduction and Management Review)

These sections establish reporting requirements for generators of certain hazardous and extremely hazardous wastes in excess of specified limits. The required reports must indicate the generator's waste management plans and performance over the reporting period.

## LOCAL

The Imperial County Department of Public Health, Environmental Services Division has the responsibility for administration and enforcement of the California Integrated Waste Management Act for non-hazardous solid waste at the proposed SSU6. Local agencies are responsible for the administration and enforcement of the hazardous material laws. The Imperial County Department of Public Health, Environmental Health Services

Division and the Imperial county Fire Protection Department would regulate hazardous waste at SSU6.

The Imperial County Fire Prevention Department is responsible for enforcement of the Uniform Fire Code, Article 80, which requires that a Hazardous Materials Inventory Statement and a Hazardous Materials Management Plan be prepared. This is discussed in greater detail in the **Hazardous Materials Management** section.

## SETTING

## PROJECT AND SITE DESCRIPTION

The proposed project is located on 80 acres of a 160-acre parcel in Imperial County. The plant is located north of McKendry Road, west of Severe Road, south of Peterson Road and east of Boyle Road. The area is primarily surrounded by agriculture. The proposed SSU6 would be located on the project site owned by CE Obsidian Energy (CEOE 2002a, Section 1.2).

The proposed SSU6 would be a 185-megawatt geothermal power plant. The components of this power plant would consist of a geothermal Resource Production Facility, a merchant class geothermal-powered Power Generation Facility and associated facilities (CEOE 2002a, p. 3-1).

The applicant completed and submitted a Phase I Environmental Site Assessment (ESA) conducted according to American Society for Testing and Materials (ASTM) standards. URS completed the ESA on January 29, 2002. Historical aerial photography shows the project site has been used for agriculture since 1953. The Phase I ESA performed for the power plant identified potential areas of concern, including various concrete slabs, existing geothermal wells, and potential pesticide and herbicide contamination, and recommended that an additional evaluation may need to be performed (CEOE 2002a, Appendix O). The applicant has noted that given the proposed industrial development on the site, neither a Phase II ESA nor remediation would be required (CEOE 2002a, p. 5.13-2). The applicant's consultant reviewed over twenty national and state databases through the Vista Site Assessment Plus Report for the evaluation of the proposed project site. The proposed project site is not listed in the Vista Site Assessment Plus Report (CEOE 2002a, Appendix O).

California Unions for Reliable Energy (CURE 2003) asserted that in the past, levies in the area had been constructed in part with filter cake (residual solids that have been removed from the geothermal brine fluid). Staff spoke with Michele Ochs of the Colorado River Basin Regional Water Quality Control Board, who verified that past owners of geothermal projects in the Salton Sea area may have used filter cake encased in cement blocks for such construction (Ochs 2003). She said that there is very little documentation of the levies and there are no maps that indicate exactly where these particular levies are located, although she is sure that SSU6 is located at least a mile away from any levies that are suspected of containing filter cake encased in cement.

## PROJECT SPECIFIC IMPACTS

## CONSTRUCTION

Site preparation and construction of the proposed SSU6 and associated facilities would generate both nonhazardous and hazardous wastes in solid and liquid forms.

### Nonhazardous Solid Wastes

Anticipated nonhazardous solid wastes generated during construction are detailed in Section 5.13.2.1.1 of the AFC (CEOE 2002a). Approximately 25 to 40 cubic yards per week of scrap wood, paper, glass and plastics, scrap metal and insulation could be generated during project construction (CEOE 2002a, Table 5.13-1). Wherever possible and practical, these wastes would be recycled. Nonrecyclable wastes would be collected and disposed of in a Class III landfill.

**WASTE MANAGEMENT TABLE 1**
**Anticipated Nonhazardous Construction Waste**

| Waste | Anticipated Waste Stream Classification | Estimated Quantity | Estimated Frequency of Generation |
|---|---|---|---|
| Scrap wood, steel, glass, plastic, paper, calcium silicate insulation, mineral wood insulation | Non-hazardous | 25-40 cu yd | Weekly |
| Oil absorbent materials | Nonhazardous | Small Quantities | As Needed |
| Oily rags generated during normal construction activities, lube oil flushes | Nonhazardous | 3-4 55 gallon drums | Monthly |
| Drilling Waste | Nonhazardous | 300,00 –700,000 cubic feet | During Construction |

During the construction of production and injection wells, drilling waste would be removed from the ground. The drilling wastes consist of soils, brine effluent and other materials. This waste would dry out in Regional Water Quality Control Board permitted, clay-lined mud sumps. Before disposal, the remaining solid waste would be tested to determine if the waste is hazardous. Waste that is determined to be non-hazardous would be disposed of in Desert Valley Company's Monofill Facility, a Class II landfill. Any waste that is deemed hazardous would be disposed of in a Class I landfill (CEOE 2002a, Table 5.13-1).

### Nonhazardous Liquid Wastes

Nonhazardous liquid wastes would be generated during construction, including sanitary wastes, equipment washwater, pipeline hydrotesting. Sanitary waste would be collected in portable toilet facilities and serviced by an outside contractor. Equipment wash-water and hydrotest water would be contained in storage containers at the designated wash sites and disposed of offsite. If the equipment wastewater contains

free-phase hydrocarbons, it would be run through an oily water separator. Oil removed from the separator would be disposed offsite. Water that is suitable for discharge will be disposed of in the Imperial Irrigation District drain canal.

## Hazardous Wastes

Hazardous wastes anticipated to be generated during construction are discussed in Section 5.13.2.1.1 of the AFC (CEOE 2002a). Solid hazardous wastes may include empty hazardous material containers, used and waste lube oil during steam turbine lube oil flushes, spent lead acid batteries and spent alkaline batteries (CEOE 2002a, Table 5.13-1). Wherever possible, the treatment method of choice for these wastes would be recycling at a permitted facility. The cleaning and flushing liquids would be sampled and characterized, and disposed of accordingly. Any non-recyclable hazardous wastes would be properly disposed of in one of three permitted Class I landfills discussed in Section 5.13.2.2 of the AFC.

The construction contractor would be considered the generator of hazardous wastes at the SSU6, and therefore responsible for compliance with all applicable LORS regarding these wastes, including employee training, accumulation limits, record keeping, and reporting. The accumulated wastes would be removed from the site and transported by a certified collection company to a permitted transfer, storage and disposal (TSD) facility prior to the expiration of the 90-day limit (CEOE 2002a, p. 5.13-6).

# OPERATION

The proposed SSU6 would generate both nonhazardous and hazardous wastes in solid and liquid forms under normal operating conditions. Filter-cake consisting of brine solids from the dewatering process would be the primary waste generated.

## Nonhazardous Solid Wastes

The proposed project would generate 120 tons per day of filter-cake wastes. The filter-cakes are composed of solids extracted from the geothermal brine fluid. Also, 2.5 tons per day of solid waste, the majority of which would be elemental sulfur, would come from the $H_2S$ abatement system. Both the filter-cake and the $H_2S$ abatement waste would be tested for hazardous substances and, if found to be hazardous, disposed of in a Class I landfill (CEOE 2002a, p. 5.13-6).

Other nonhazardous solid wastes generated during plant operation are expected to include rags, turbine air filters, machine parts, electrical materials, empty containers, and typical worker and small office wastes. Approximately 20 cubic yards of these wastes are projected to be generated annually (CEOE 2002a, Table 5.13-3).

## Nonhazardous Liquid Wastes

The wastewater from the clarifier effluent and cooling water blowdown would be discharged to injection wells for disposal and replenishment of the geothermal resource. Storm water from chemical storage, feed areas, reverse osmosis (RO) reject water, and oxygenated brine effluent in the clarifier would go the brine pond before being discharged to a dedicated injection well (CEOE 2002a, p. 5.13-7). The remaining liquid wastes are cooling tower wash-down and blow-down, chemical feed area drainage, and

general plant drainage. Liquid wastes are discussed in more detail in the **Soil and Water Resources** section of this document.

## Hazardous Wastes

Hazardous wastes anticipated to be generated during routine project operation include waste lubricating oil, used oil filters, laboratory waste, oily rags and absorbents, and used acidic and alkaline chemical cleaning wastes (potentially containing high concentrations of heavy metals). Table 5.13-3 in the AFC lists the anticipated hazardous wastes along with their origin, composition, estimated quantity, hazard class, and disposal method. Most of the wastes would be generated in relatively small quantities and would be recycled by certified recyclers. Acidic and alkaline cleaning wastes would be disposed of offsite.

The brine pond solids would constitute the largest percentage of waste at approximately 16,700 tons per year (CEOE 2002a p. 5.13-8). Brine pond solids and scale found in pipes, clarifiers, and separators during maintenance shutdowns would be disposed of as hazardous waste in a Class I landfill. The drilling waste and H2S abatement waste would be tested and, if found hazardous, would be disposed of in a Class I landfill.

## IMPACT ON EXISTING WASTE DISPOSAL FACILITIES

Nonhazardous and hazardous waste disposal sites suitable for disposal of project-related construction and operation wastes are identified in Table 5.13-2 of the AFC (CEOE 2002a). Listed in **WASTE TABLE 2** are the largest waste streams anticipated to be disposed of by the proposed project.

**WASTE MANAGEMENT Table 2**
**Summary of the Largest Waste Streams**

| Waste Stream | Waste Stream Classification | Estimated Quantity | Estimated Frequency of Generation | Offsite Treatment |
|---|---|---|---|---|
| (1) Wood, steel, glass paper, plastic, insulation | Non-hazardous | 25-40 cu yards | Weekly during construction | Class III disposal facility |
| (2) Drilling Waste* | Non-hazardous | 300,00-700,000 cu feet | During construction | Class II Monofill Landfill |
| (3) Sulfur byproduct* | Non-hazardous | 2.5 tons | Daily during operation | Class II disposal facility |
| (4) Filter-cake* | Non-hazardous | 120 tons | Daily during operation | Class II disposal facility |
| (5) Brine Pond Solids | Hazardous | 16,700 tons | Yearly during operation | Class I disposal facility |

* Items (2), (3) and (4) would be tested to verify if the waste is hazardous before disposal.

The minimal amounts of nonhazardous waste generated from the proposed project, on the order of 25 - 40 cubic yards per week during construction, would be disposed of in a Class III waste disposal site. On page 5.13-15 of the AFC, the applicant lists four landfills that can be used for disposal of the proposed project's solid waste. The sites have permitted capacity from 5.1 tons per day to 22 tons per day. Thus, the total amount of nonhazardous waste generated from project construction and operation would use only a small fraction of the available Class III landfills' capacity. Staff concludes that this potential impact would be less than significant. The majority of

nonhazardous waste from the proposed SSU6 project would be disposed of in a Class II landfill.

The non-hazardous drilling wastes, sulfur byproducts, and filter-cake would be disposed of in the Class II Monofill Facility. In September 2003, a new cell would be permitted to begin operation. The cell is permitted to accept 510 tons per day of solid waste. The cell will operate until 2012; therefore there is no short-term capacity problem for disposal of the project-related wastes. SSU6 is expected to operate beyond 2012; therefore, sulfur byproducts and filter cake would continue to be generated. The Monofill Facility has already permitted 160 acres of land for landfill use and will continue to add landfill capacity as needed (CEOE 2002a, p. 5.13-7). If additional capacity is not constructed at the Monofill Facility beyond 2012, the waste could be disposed of in a Class I landfill (CEOE 2002a, p. 5.13-7).

The AFC lists three Class I landfills in California that are permitted to accept hazardous waste: at Chemical Waste Management in King's County, Buttonwillow in Kern County, and Westmoreland in Imperial County (CEOE 2002a, Table 5.13-2). In total, there is an excess of 21.9 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with remaining operating lifetimes up to the year 2078. The amount of hazardous waste transported to these landfills has decreased in recent years due to source reduction efforts by generators, and the transport of waste out of state that is hazardous under California law, but not federal law.

Empty hazardous material containers, used and waste lube oil, spent lead batteries, spent alkaline batteries and hydraulic fluids are some of the hazardous waste that would be recycled (CEOE 2002a, Table 5.13-1 and Table 5.13-3). The volume of hazardous waste from SSU6 requiring off-site disposal would be a very small fraction (less than 0.01 percent) of the existing combined capacity of the three Class I landfills, and would not significantly impact the capacity or remaining life of any of these facilities.

## CUMULATIVE IMPACTS

As proposed, the quantities of nonhazardous and hazardous waste generated during construction and operation of the SSU6 would add to the total quantities of waste generated in Imperial County and the State of California. However, because (a) the waste would be generated in small quantities, (b) recycling efforts would be prioritized wherever practical, and (c) capacity is available in a variety of disposal facilities, these added quantities would not result in significant waste management impacts to any hazardous or nonhazardous landfill.

One hundred and twenty-three tons per day of filter-cake and sulfur wastes would be produced at SSU6 until approximately 2035. The Monofill Facility is scheduled to be in operation until 2012. As mentioned above, the Monofill Facility has obtained 160 acres of land permitted for a landfill. If the class II facility is not available to accept the waste from SSU6, disposal at a Class I landfill would be a feasible option.

## ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed SSU6 (please refer to **Socioeconomics Figure 1** in this Staff Assessment), and Census 2000 information that shows the low-income population is less than fifty percent within the same radius. Based on the **Waste Management** analysis, which included consideration of information supplied by participants at staff workshops, staff has not identified significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no **Waste Management** environmental justice issues related to this project.

## FACILITY CLOSURE

The AFC (CEOE 2002a §§ 3.6, 5.13.2.4, and 5.13.2.4). discusses SSU6's responsibilities for waste management in the event of a temporary facility closure due to damage to the facility from a natural disaster or permanent closure due to a cessation of operations. The applicant indicates that a contingency plan for temporary closure would be prepared prior to facility startup. In addition, a Risk Management Plan (CEOE 2002a, § 5.14.2.2) would be established containing additional procedures to be followed in the event of temporary closure due to plant damage or the possible release of a hazardous waste or material into the environment.

During any type of facility closure (see staff's **General Conditions** section which discusses planned, unexpected temporary, and unexpected permanent closure), the primary waste management related concern is that project wastes not pose any potentially significant problem to the public, workers, or the environment. Staff believes that conditions of certification in the General Conditions section would adequately address waste management issues related to closure.

In the case of unexpected temporary closure, waste management practices normally required by LORS and already in-place (such as limiting hazardous waste accumulation time to 90 days and requiring proper containment) would be adequate to avoid significant problems. In addition, staff's General Conditions for Facility Closure require preparation of an on-site contingency plan, which shall provide for removal of hazardous wastes and draining of all chemicals from storage tanks and other equipment for temporary closures exceeding 90 days.

An approved on-site contingency plan is also required to protect public health and safety in the case of unexpected permanent closure. As 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, SSU6 would develop a facility General Closure Plan at least twelve months prior to commencement of closure and is committed to complying with LORS that are applicable at the time of closure. The applicant indicates (CEOE

2002a, § 5.13.2.5) that such a closure plan would emphasize the maximum recycling of facility components and 24-hour site security.

## MITIGATION

AFC section 5.13.2.1 states that the handling and management of wastes at the proposed SSU6 facility would follow the hierarchical approach described in the following order of preference from greatest to least:

1. source reduction through pollution prevention measures;
2. recycling or reusing waste materials;
3. treatment to render the waste nonhazardous such as through neutralization; and
4. disposal of only those wastes that cannot be reduced treated or recycled.

Section 5.13.2 of the AFC discusses waste management measures, such as SSU6 would employ during the construction and operation phases, to manage and mitigate the impacts of the generation of liquid and solid non-hazardous and hazardous wastes.

Staff has proposed Conditions of Certification **WASTE-1, 2, 3, 4, and 5** which require that: 1) the project owner have an experienced Registered Professional Engineer or Geologist available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered; 2) if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling, file a written report, and seek guidance from the CPM and the appropriate regulatory agencies; 3) the project owner obtain a unique hazardous waste generator identification number from the DTSC in accordance with DTSC regulatory authority; 4) the project owner notify the CEC Compliance Project Manager whenever the owner becomes aware of any impending waste management-related enforcement action; and 5) the project owner prepare and submit waste management plans for all wastes generated during construction and operation of the facility and submit them to the CPM and the local agency.

## COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Energy commission staff concludes that the proposed Salton Sea Unit 6 Project would be able to comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during facility construction and operation. The applicant is required to dispose of hazardous and non-hazardous wastes at facilities approved by DTSC. Because hazardous wastes would be produced during project construction and operation, both the SSU6 and its construction contractor would be required to obtain hazardous waste generator identification numbers from the DTSC. Accordingly, both SSU6 and its construction contractor would be required to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records and appropriately train their employees. Pursuant to California Code of Regulations, Title 22, section 67100.1 et seq., a hazardous waste Source Reduction

and Evaluation Review and Plan must be prepared by the SSU6 if certain threshold quantities of hazardous wastes are generated on an annual basis (please see Hazardous Materials for further information).

## RESPONSE TO PUBLIC AND AGENCY COMMENTS

### AGENCY COMMENTS

The Department of Toxic Substances Control (DTSC) commented that "Additional evaluation of the site may be warranted if any spills of geothermal brine, diesel fuel, oil and hydrochloric acid on existing geothermal plants northwest and southwest of the site has adversely impacted soil or groundwater at the subject site (DTSC 2003)."
After DTSC's review of the applicant's Phase I ESA, the agency representative indicated, in phone conversations with staff, that there were additional concerns with a few areas on the project site. The areas that required additional information were the concrete pad as a possible area where pesticides may have been mixed, a burned area, and the potential for impact from existing geothermal power plants and possible impacts from geothermal well explorations.

CEOE responded to DTSC's comments by providing additional information to staff on June 4, 2003 (CEOE 2000q). The concrete pad was placed by Magma Power Company (Magma) in the early 1990's and was not associated with pesticide use or mixing. Magma let Brookhaven National Laboratory conduct experiments testing metallics for anti-corrosion and scaling tendencies for use in construction of heat-exchangers using geothermal resources. The burned area on the project site resulted from controlled burning of agricultural wastes, including plastic sheeting material. As indicated in the Phase I ESA, Appendix O page 4-1 (CEOE 2002a) it is unlikely that hazardous material releases from existing geothermal power plants would adversely affect soil and groundwater conditions at the SSU6 project site due to their distance (three-quarters of a mile away) and that they are hydraulically cross-gradient from the site.

## CONCLUSIONS AND RECOMMENDATIONS

Management of the wastes generated during construction and operation of the SSU6 project will not result in any significant adverse impacts if CEOE implements the mitigation measures proposed in the Application for Certification, and the proposed conditions of certification.

## CONDITIONS OF CERTIFICATION

**WASTE-1** The project owner shall provide the resume of a Registered Professional Engineer or Geologist, who shall be available for consultation during soil excavation and grading activities, to the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The Registered Professional Engineer or Geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil.

**Verification**: At least 30 days prior to the start of site mobilization the project owner shall submit the resume to the CPM for approval.

**WASTE-2** If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and file a written report to the project owner and CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the Registered Professional Engineer or Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the Registered Professional Engineer or Geologist, significant remediation may be required, the project owner shall contact (as appropriate) representatives of the Regional Water Quality Control Board, the Imperial County Fire Prevention Department, and the California Department of Toxic Substances Control for guidance and possible oversight.

**Verification**: The project owner shall submit any final reports filed by the Registered Professional Engineer or Geologist to the CPM within 5 days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

**WASTE-3** The project owner shall obtain a hazardous waste generator identification number from the Department of Toxic Substances Control prior to generating any hazardous waste.

**Verification**: The project owner shall keep its copy of the identification number on file at the project site and notify the CPM via the Monthly Compliance Report of its receipt.

**WASTE-4** Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

**Verification**: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that would be required in the manner in which project-related wastes are managed.

**WASTE-5** The project owner shall prepare a Construction Waste Management Plan and an Operation Waste Management Plan for all wastes generated during construction and operation of the facility, respectively, and shall submit both plans to the CPM for review and approval. The plans shall contain, at a minimum, the following:

- A description of all waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Methods of managing each waste, including treatment methods and companies contracted with for treatment services, waste testing methods to

assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

**Verification**: No less than 30 days prior to the start of site mobilization, the project owner shall submit the Construction Waste Management Plan to the CPM.

The Operation Waste Management Plan shall be submitted to the CPM no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions within 20 days of notification by the CPM.

In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year compared to the planned management methods.

## REFERENCES


CEOE 2002a. CE Obsidian Energy, LLC. Application for Certification for Salton Sea Unit 6, Geothermal Power Plant Project Volume I & 2. July 26, 2002.

CEOE (CE Obsidian Energy, LLC, Calipatria, California), 2003q. Responses To Issues Raised During Preliminary Staff Assessment Workshop. June 4, 2003.

CURE 2003. California Unions for Reliable Energy. Data request number 177. January 3, 2003.

DTSC 2003. Department of Toxic Substances Control. Letter submitted to Ellie Townsend-Hough on March 19, 2003.

Ochs, M., Associate Engineering Geologist, 2003. California Regional Water Quality Control Board, Colorado River Basin Region. Telephone conversation with Ellie Townsend-Hough, (California Energy Commission), June 3.

# WORKER SAFETY AND FIRE PROTECTION

Testimony of Geoff Lesh and Rick Tyler

## INTRODUCTION

This section of the staff assessment provides staff's evaluation of the Salton Sea Unit 6 project's compliance with laws, ordinances, regulations, and standards (LORS) relating to worker safety and fire protection. A framework for worker safety and fire protection is provided by LORS, and enforced through regulations codified at the Federal, State, and local levels. Worker safety is of utmost priority at the project location and is documented through worker safety practices and training. Industrial workers at the facility operate process equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to either eliminate these hazards or minimize the risk through special training, protective equipment or procedural controls. The purpose of this analysis is to assess whether the worker safety and fire protection measures proposed by CE Obsidian Energy LLC (CEOE or applicant) for the Salton Sea Unit 6 Project (SSU6) are adequate to:

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

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

### FEDERAL

In December 1970 Congress enacted Public Law 91-596, the Federal Occupational Safety and Health Act of 1970 (OSH Act). This Act mandates safety requirements in the workplace and is found in Title 29 of the United States Code, section 651 through 678 (29 U.S.C. §§ 651-678). Implementing regulations are codified at Title 29 of the Code of Federal Regulations, under General Industry Standards sections 1910.1 through 1910.1500. These clearly define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector. Most of the general industry safety and health standards now in force under this OSH Act represent a compilation of materials from existing federal standards and national consensus standards. These include standards from voluntary membership organizations of the American National Standards Institute (ANSI) and the National Fire Protection Association (NFPA) which publishes the National Fire Codes.

The purpose of the Occupational Safety and Health Act is to "assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources," (29 U.S.C. § 651). The Federal Department of Labor promulgates and enforces safety and health standards that are applicable to all businesses affecting interstate commerce. The Department of Labor established the

Occupational Safety and Health Administration (OSHA) in 1971 to discharge the responsibilities assigned by the OSH Act.

Applicable Federal requirements include:

- Occupational Safety and Health Act of 1970 29 U.S.C. § 651 et seq.;
- Occupational Safety and Health Administration Safety and Health Regulations 29 C.F.R. §1910.1 - 1910.1500;
- Federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the Federal requirements found in 29 C.F.R. §§1910.1 – 1910.1500 and §§ 1952.170 – 1952.175.

## STATE

California passed the Occupational Safety and Health Act of 1973 ("Cal/OSHA"), codified in California Labor Code § 6300 et seq. Regulations promulgated as a result of the Act are codified at Title 8 of the California Code of Regulations, beginning with sections 337-560 and continuing with sections1514 through 8568. The California Labor Code requires that the Cal/OSHA Standards Board adopt standards at least as effective as the federal standards (Labor Code § 142.3(a)). Thus all Cal/OSHA health and safety standards meet or exceed the Federal requirements. California obtained federal approval of its State health and safety regulations, in lieu of the federal requirements which are codified at 29 CFR §1910.1 - 1910.1500. The Federal Secretary of Labor, however, continually oversees California's program and will enforce any federal standard for which the State has not adopted a Cal/OSHA counterpart.

Employers are responsible for informing their employees about workplace hazards, potential exposure and the work environment (Labor Code § 6408). Cal/OSHA's principal tool in ensuring that workers and the public are informed is the Hazard Communication standard first adopted in 1981. Cal. Code Regs., tit. 8, §5194. This regulation was promulgated in response to California's Hazardous Substances Information and Training Act of 1980. It was later revised to mirror the Federal Hazard Communication Standard (29 C.F.R. §1910.1200) which established on the federal level an employee's "right to know" about chemical hazards in the workplace, but added the provision of applicability to public sector employers. A major component of this regulation is the required provision of Material Safety Data Sheets (MSDS's) to workers. MSDS's provide information on the identity, toxicity, and precautions to take when using or handling hazardous materials in the workplace.

Finally, California Code of Regulations, Title 8 section 3203 requires that employers establish and maintain a written Injury and Illness Prevent Program to identify workplace hazards and communicate them to their employees through a formal employee-training program.

Applicable State requirements include:

- Cal. Code Regs., tit. 8, §339 - List of hazardous chemicals relating to the Hazardous Substance Information and Training Act;
- Cal. Code Regs., tit. 8, §337, et seq. Cal/OSHA regulations;

- Cal. Code Regs., tit. 24, § 3 et seq. - incorporates the current addition of the Uniform Building Code;
- Health and Safety Code § 25500 et seq. - Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at the facility;
- Health and Safety Code §§ 25500 - 25541 - Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at the facility.

## LOCAL

The California Building Standards Code published at Title 24 of the California Code of Regulations section 3 et seq. is comprised of eleven parts containing the building design and construction requirements relating to fire and life safety and structural safety. The Building Standards Code includes the electrical, mechanical, energy, and fire codes applicable to the project. Local planning/building and safety departments enforce the California Uniform Building Code.

National Fire Protection Association (NFPA) standards are published in the California Fire Code. The fire code contains general provisions for fire safety, including but not restricted to: 1) required road and building access; 2) water supplies; 3) installation of fire protection and life safety systems; 4) fire-resistive construction; 5) general fire safety precautions; 6) storage of combustible materials; 7) exits and emergency escapes; and 8) fire alarm systems. The California Fire Code reflects the body of regulations published at Cal. Code Regs., 24 (Health and Safety Code §18901 et seq.). Similarly, the Uniform Fire Code (UFC) Standards, a companion publication to the California Fire Code, contains standards of the American Society for Testing and Materials and the NFPA. It is the United State's premier model fire code. It is updated annually as a supplement and published every third year by the International Fire Code Institute to include all approved code changes in a new edition.

Applicable local (or locally enforced) requirements include:

- 1998 Edition of California Fire Code and all applicable NFPA standards (Title 24, California Code of Regulations, sections 901-907);
- California Building Code Title 24, California Code of Regulations, section 3 et seq.
- Uniform Fire Code, 1997

## SETTING

The SSU6 site is in the Imperial Valley, southeast of the Salton Sea. The Imperial Valley is the southwest part of the Colorado Desert that merges northwestward into the Coachella Valley near the northern shore of the Salton Sea. The site is in a region of the Imperial Valley characterized mostly by agriculture and geothermal power production. The surrounding area is dominated by agriculture.

The project is composed of a geothermal Resource Production Facility (RPF), a Power Generation Facility (PGF), and ancillary facilities. The RPF includes all the brine and steam handling facilities from the production wellheads, through the crystallizer/clarifier

system, to the injection wellheads. It also includes a solids handling system for brine solids processing, a brine pond, and appropriate steam-venting vessels to support operations during startup/shutdown and emergency conditions. The PGF includes a condensing turbine/generator set, the gas removal and abatement systems, and the heat rejection system. The PGF also includes several power-distribution centers. Common facilities include a control building, a service water pond, and other ancillary facilities.

Worker exposure to safety issues related to this project is limited to onsite activities related to construction and operations.

Fire support services to the site will be supported by the Calipatria City Fire Department (the Calipatria City Fire Department is contracted by the Imperial County Fire Department, which has jurisdiction over the site). The City of Calipatria Fire Station is located at 125 North Park Ave, Calipatria, CA approximately 7 miles from SSU6. Staff contacted the City of Calipatria Fire Department and determined that the response time to the project site is estimated to be 10-12 minutes. The Hazmat first responder (hazardous material event response team) is also the Calipatria Fire Department. The Calipatria Fire Chief stated that at current staffing levels, he feels their ability to respond to emergency situations at the plant is adequate (see also **SOCIOECONOMICS** and **TRAFFIC AND TRANSPORTATION** sections of this staff assessment for discussion of emergency responses to the SSU6 location).

## IMPACTS

## PROJECT SPECIFIC IMPACTS

Industrial environments are potentially dangerous, during both construction and operation of facilities. Workers at the proposed project will be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the SSU6 to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

During construction and operation of the proposed SSU6 there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, flammable gas or liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires may develop from uncontrolled fires or be caused by large explosions of flammable gasses or liquids. Compliance with all LORS will be adequate to assure protection from all fire hazards.

## CUMULATIVE IMPACTS

Staff reviewed the potential for the construction and operation of the SSU6, combined with existing industrial facilities, to result in impacts on the fire and emergency service capabilities of the Calipatria City Fire Department and found that cumulative impacts

were insignificant. No request for additional equipment, staffing, or funding has been made by local authorities

## APPLICANT'S PROPOSED MITIGATION

A Safety and Health Program will be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

## CONSTRUCTION SAFETY AND HEALTH PROGRAM

The SSU6 workers will be exposed to hazards typical of construction and operation of a gas-fired simple cycle facility, except that there will be no combustion turbine with its associated fuel supply system at SSU6.

Construction Safety Orders are published at California Code of Regulations, title 8, section 1502 et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The Construction Safety and Health Program will include the following:

- Construction Injury and Illness Prevention Program (Cal Code Regs., tit. 8, § 1509);
- Construction Fire Protection and Prevention Plan ( Cal Code Regs., tit. 8, § 1920); and
- Personal Protective Equipment Program ( Cal Code Regs., tit. 8, §§ 1514 - 1522).

Additional programs under General Industry Safety Orders ( Cal Code Regs., tit. 8, §§ 3200 - 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§2299 - 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 450 - 544) will include:

- Electrical Safety Program;
- Unfired Pressure Vessel Safety Orders;
- Equipment Safety Program;
- Forklift Operation Program;
- Excavation/Trenching Program;
- Fall Prevention Program;
- Scaffolding/Ladder Safety Program;
- Articulating Boom Platforms Program;
- Crane and Material Handling Program;
- Housekeeping and Material Handling and Storage Program;
- Hot Work Safety Program;
- Respiratory Protection Program;

- Employee Exposure Monitoring Program;
- Confined Space Entry Program;
- Hand and Portable Power Tool Safety Program;
- Hearing Conservation Program;
- Back Injury Prevention Program;
- Hazard Communication Program;
- Air Monitoring Program;
- Heat and Cold Stress Monitoring and Control Program; and
- Pressure Vessel and Pipeline Safety Program.

The AFC includes adequate outlines of each of the above programs. Prior to construction of the SSU6, detailed programs and plans will be provided pursuant to condition of certification **WORKER SAFETY-1**.

## OPERATIONS AND MAINTENANCE SAFETY AND HEALTH PROGRAM

Upon completion of construction and prior to start of operation at the SSU6, the Operations and Maintenance Safety and Health Program will be prepared. This operational safety program will include the following programs and plans:

- Injury and Illness Prevention Program (Cal Code Regs., tit. 8,§ 3203);
- Emergency Action Plan (Cal Code Regs., tit. 8,§ 3220);
- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (Cal Code Regs., tit. 8, § 3221); and
- Personal Protective Equipment Program (Cal Code Regs., tit. 8, §§ 3401-3411).

In addition, the requirements under General Industry Safety Orders (Cal Code Regs., tit. 8, §§ 3200 - 6184), Electrical Safety Orders (Cal Code Regs., tit. 8, §§2299 - 2974) and Unfired Pressure Vessel Safety Orders (Cal Code Regs., tit. 8, §§ 450 - 544) will be applicable to the project. Written safety programs, which the applicant will develop for the SSU6, will ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Construction and Operation Health and Safety Programs as well as the Emergency Action Program/Plan, the Construction and Operation Injury and Illness Prevention Programs and the Fire Protection and Prevention Programs (CEOE 2003a, Sections 8.16.2.1 and 8.16.2.2). Prior to operation of the Salton Sea Unit 6 Project, all detailed programs and plans will be provided pursuant to condition of certification **WORKER SAFETY-2**.

## SAFETY AND HEALTH PROGRAM ELEMENTS

The Applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operation Safety and Health Program. The measures in these plans

are derived from applicable sections of state and federal law. The major items required in both Safety and Health Programs are as follows:

**Injury and Illness Prevention Program (IIPP)**

The Applicant will submit an expanded Construction and IIPP to Cal/OSHA for review and comment 30 days prior to both construction and operation of the project.

The IIPP will include the following components as presented in the AFC:

- Identity of person(s) with authority and responsibility for implementing the program;
- System ensuring employees comply with safe and healthy work practices;
- System facilitating employer-employee communications;
- Procedures identifying and evaluating workplace hazards, including inspections to
  - identify hazards and unsafe conditions;
  - Methods for correcting unhealthy/unsafe conditions in a timely manner;
  - Methods of documenting inspections and training and for maintaining records; and
- A training program for:
  - introducing the program;
  - new, transferred, or promoted employees;
  - new processes and equipment;
  - supervisors; and
  - contractors.

**Emergency Action Plan**

California regulations require an Emergency Action Plan (Cal Code Regs., tit. 8, § 3220). The AFC contains a satisfactory outline for an emergency action plan (CEOE 2002a, Sections 8.7.3.1 and 8.7.3.2).

The outline lists the following features:

- Purpose and Scope of Emergency Action Plan;
- Personnel Responsibilities during Emergencies;
- Specific Response Procedures;
- Evacuation Plan;
- Emergency Equipment Locations;
- Fire Extinguisher Locations;
- Site Security;
- Accident Reporting and Investigation;
- Lockout/Tagout;
- Hazard Communication;
- Spill Containment and Reporting;

- First Aid and Medical Response;
- Respiratory Protection;
- Personal Protective Equipment;
- Sanitation; and
- Work Site Inspections.

**Fire Prevention Plan**

- California Code of Regulations requires an Operations Fire Prevention Plan (Cal Code Regs., tit. 8, § 3221). The AFC describes a proposed fire prevention plan which is acceptable to staff. The plan will include the following topics:
- Responsibilities of employees and management;
- Procedures for fire control;
- Fixed and portable fire-fighting equipment;
- Housekeeping;
- Employee alarm/communication practices;
- Servicing and refueling areas;
- Training; and
- Flammable and combustible liquid storage.

Staff proposes that the applicant submit a final Fire Protection and Prevention Plan to the California Energy Commission Compliance Project Manager (CPM) and the Imperial County Fire Department for review and approval to satisfy proposed condition of certification **WORKER SAFETY-1 and 2**.

**Personal Protective Equipment Program**

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are encountered which, due to process, environment, chemicals or mechanical irritants can cause injury or impair bodily function as a result of absorption, inhalation or physical contact (Cal Code Regs., tit. 8, § 3380-3400). The SSU6 project operational environment will require the availability of PPE.

Information provided in the AFC indicates that all employees required to use PPE will be checked for proper fit and to see if they are medically capable of wearing the equipment. All safety equipment will meet NIOSH or ANSI standards and will carry markings, numbers, or certificates of approval. Respirators will meet NIOSH and California Department of Health and Human Services Standards. Each employee will be provided with the following information pertaining to the protective clothing and equipment:

- Proper use, maintenance, and storage;
- When the protective clothing and equipment are to be used;
- Benefits and limitations; and

- When and how the protective clothing and equipment are to be replaced. The PPE Program ensures that employers comply with the applicable requirements for PPE and provide employees with the information and training necessary to implement the program.

**Operations and Maintenance Written Safety Program**

In addition to the specific plans listed above, there are additional LORS applicable to the project, which are called "safe work practices". Both the Construction and the Operations Safety Programs will address safe work practices under a variety of programs. The components of these programs include the following:

- Fall Protection Program;
- Hot Work Safety Program;
- Confined Space Entry;
- Hearing Conservation Program;
- Hazard Communication Program;
- Process Safety Management (PSM) Program; and
- Contractor Safety Program.

Operations and Maintenance Safety Training Programs

Employees will be trained in the safe work practices described in the above-referenced safety programs.

## FIRE PROTECTION

Staff reviewed the information regarding available fire protection services and equipment (CEOE 2002a, Sections 2.3.2 Fire Protection Systems and 8.16 Worker Health and Safety) to determine if the project would adequately protect workers and if it would affect the fire protection services in the area. Staff agrees with the applicant that the project should rely on both onsite fire protection systems and local fire protection services. The onsite fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services including trained firefighters and equipment for a sustained response would be required by the Calipatria City Fire Department. The applicant intends to meet the minimum fire protection and suppression requirements as mandated by the Imperial County Fire Code, NFPA Standards, and the UFC. Elements include both fixed and portable fire extinguishing systems. Water will be used as the primary extinguishing agent.

The primary supply of water to the fire suppression systems will be from the Imperial Irrigation District (IID) canal water system, with a firewater tank reserve capacity of 300,000-gallons. Chemical and gas extinguishing agents (permanently installed or in portable extinguishers) will be provided in special hazard areas where water would be ineffective or harmful to the equipment being protected.

An automatic sprinkler fire protection system will be provided for the turbine generator and auxiliary equipment areas; an automatic spray system will provide protection for the

main step-up transformer; and automatic sprinkers will protect other administration areas. Fire detection sensors will also be installed.

A deluge spray system will provide fire suppression for the generator transformers and auxiliary power transformers. Fire hydrants and hose stations will be used to supplement the plant fire protection system.

In addition to the fixed fire protection system, fire extinguishers will be located throughout the plant Administrative/Maintenance Building, water treatment facility, and other structures as required by the local fire department.

The applicant will be required to provide the final Fire Protection and Prevention Program to staff and to the Imperial Valley Fire Department, prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

## FACILITY CLOSURE

The project owner/operator is responsible for maintaining an operational fire protection system during closure activities. The project must also stay in compliance with all applicable health and safety LORS during that time. A facility closure plan will be developed prior to closure to incorporate these requirements.

## CONCLUSION AND RECOMMENDATIONS

If the applicant for the proposed Salton Sea Unit 6 project provides a Project Construction Injury and Illness Prevention Program and a Project Operations Safety and Health Program as required by conditions of certification **WORKER SAFETY-1 and 2**, staff believes that the project will incorporate sufficient measures to ensure adequate levels of industrial safety, and comply with applicable LORS. Staff also concludes that the proposed plant will not have significant impacts on local fire protection services. The proposed facility is located within an area that is currently served by the local fire department. The fire risks of the proposed facility do not pose significant added demands on local fire protection services.

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

## PROPOSED CONDITIONS OF CERTIFICATION

**WORKER SAFETY-1** The project owner shall submit to the CPM a copy of the Project Construction Injury and Illness Prevention Program, containing the following:

- A Construction Safety Program;

- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Emergency Action Plan; and
- A Construction Fire Protection and Prevention Plan.

The Safety Program, the Personal Protective Equipment Program, and the Exposure Monitoring Program shall be submitted to the CPM for review and comment concerning compliance of the program with all applicable Safety Orders. The Construction Fire Protection and Prevention Plan and Emergency Action Plan shall be submitted to the Imperial County Fire Department for review and comment prior to submittal to the CPM.

**Verification:** At least 30 days prior to site mobilization, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Injury and Illness Prevention Program. The project owner shall provide a letter from the Imperial County Fire Department stating that they have reviewed and commented on the Construction Fire Protection and Prevention Plan Emergency Action Plan.

**WORKER SAFETY-2** The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- An Operation Injury and Illness Prevention Plan;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (Cal Code Regs., tit. 8,§ 3221); and;
- Personal Protective Equipment Program (Cal Code Regs., tit. 8,§§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted by the project owner to the Cal/OSHA Consultation Service, for review and comment concerning compliance of the program with all applicable Safety Orders. The Operation Fire Protection Plan and the Emergency Action Plan shall also be submitted by the project owner to the City of Calipatria Fire Department for review and acceptance.

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

## REFERENCES

CEOE, LLC, (CE Obsidian Energy, Calipatria, California ) 2002a. Application for Certification, Salton Sea Unit 6, Volumes I and II. July 29. 2002.

City of Calipatria Fire Department (CCFD). 2003. Personal communication with Fire Chief Chris Hall, January 30, 2003

1998 California Fire Code. Published by the International Fire Code Institute comprised of the International Conference of Building Officials, the Western Fire Chiefs Association, and the California Building Standards Commission. Whittier, Ca.

1997 Uniform Fire Code, Vol. 1. Published by the International Fire Code Institute comprised of the International Conference of Building Officials and the Western Fire Chiefs Association, Whittier, Ca.

# ENGINEERING ASSESSMENT

# FACILITY DESIGN

Testimony of Kevin Robinson, Al McCuen and Steve Baker

## INTRODUCTION

Facility Design encompasses the civil, structural, mechanical and electrical engineering design of the project. The purpose of the Facility Design analysis is to:

- verify that the laws, ordinances, regulations and standards (LORS) applicable to the engineering design and construction of the project have been identified;
- verify that the project and ancillary facilities have been described in sufficient detail, including proposed design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable engineering LORS, and in a manner that assures public health and safety;
- determine whether special design features should be considered during final design to deal with conditions unique to the site which could affect public health and safety; and
- describe the design review and construction inspection process and establish Conditions of Certification that will be used to monitor and ensure compliance with the engineering LORS and any special design requirements.

Subjects discussed in this analysis include:

- identification of the engineering LORS applicable to facility design;
- evaluation of the applicant's proposed design criteria, including the identification of those criteria that are essential to ensuring public health and safety;
- proposed modifications and additions to the Application for Certification (AFC) that are necessary to comply with applicable engineering LORS; and
- conditions of Certification proposed by staff to ensure that the project will be designed and constructed to assure public health and safety and comply with all applicable engineering LORS.

## SETTING

CE Obsidian Energy (CEOE) proposes to construct and operate a nominally rated 185-megawatt geothermal power plant known as the Salton Sea Unit 6 (SSU6) Project. The project will be located in the Imperial Valley, Imperial County. The site will occupy approximately 80 acres of a 160-acre parcel within the unincorporated area of Imperial County and will lie in seismic zone 4. For more information on the site and related project description, please see the **Project Description** section of this document. References to "the County" designate Imperial County. Additional engineering design details are contained in the Application for Certification (AFC), in Appendices A through E (CEOE 2002a).

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical and electrical) are described in the AFC (CEOE 2002a, Appendices A through E). Some of these LORS include the California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), and guidelines promulgated by the American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM) and American Welding Society (AWS).

## ANALYSIS

The basis of this analysis is the applicant's proposed analysis and construction methods and list of engineering LORS and design criteria set forth in the AFC.

### SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage and site access. Staff has assessed the criteria for designing and constructing linear support facilities such as the geothermal brine production/injection well lines and electric transmission line. The applicant proposes to use accepted industry standards (see AFC Appendices A through E for a representative list of applicable industry standards), design practices and construction methods in preparing and developing the site. Staff concludes that the project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes Conditions of Certification (see below and the **Geology and Paleontology** section of this document) to ensure compliance.

### MAJOR STRUCTURES, SYSTEMS AND EQUIPMENT

Major structures, systems and equipment are defined as those structures and associated components or equipment that are necessary for power production and are costly to repair or replace, that require a long lead time to repair or replace, or that are used for the storage, containment, or handling of hazardous or toxic materials. Major structures and equipment will be identified through compliance with proposed Condition of Certification **GEN-2** (below).

The AFC contains lists of the civil, structural, mechanical and electrical design criteria that demonstrate the likelihood of compliance with applicable engineering LORS, and that staff believes are essential to ensuring that the project is designed in a manner that protects public health and safety.

The project shall be designed and constructed to the 2001 edition of the California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect at the time design and construction of the project actually commences. In the event the initial designs are submitted to the

Chief Building Official (CBO) for review and approval when the successor to the 2001 CBSC is in effect, the 2001 CBSC provisions, identified herein, shall be replaced with the applicable successor provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed using the appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1** (below), which in part, requires review and approval by the CBO of the project owner's proposed lateral force procedures prior to the start of construction.

## PROJECT QUALITY PROCEDURES

The AFC (CEOE 2002a, § 4.2.7) describes a project Quality Program that will be used on the project to maximize confidence that systems and components will be designed, fabricated, stored, transported, installed and tested in accordance with the technical codes and standards appropriate for a power plant. Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this quality assurance/quality control (QA/QC) program would ensure that the project is actually designed, procured, fabricated, and installed as contemplated in this analysis.

## COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the building official is authorized and directed to enforce all the provisions of the CBC. For all energy facilities certified by the Energy Commission, the Energy Commission is the building official and has the responsibility to enforce the code. In addition, the Energy Commission has the power to render interpretations of the CBC and to adopt and enforce rules and supplemental regulations to clarify the application of the CBC's provisions.

The Energy Commission's design review and construction inspection process is developed to conform to CBC requirements and to ensure that all facility design Conditions of Certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to carry out the design review and construction inspections and act as delegate CBO on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to cover technical expertise not provided by the local official. The applicant, through permit fees as provided by CBC Sections 107.2 and 107.3, pays the costs of the reviews and inspections. While building permits in addition to the Energy Commission certification are not required for this project, in lieu permit fees are paid by the applicant consistent with CBC Section 107, to cover the costs of reviews and inspections.

Engineering and compliance staff will invite either the local building authority, the County, or a third party engineering consultant, to act as CBO for the project. When an entity has been identified to perform the duties of CBO, Energy Commission staff will complete a Memorandum of Understanding (MOU) with that entity that outlines its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed Conditions of Certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities and qualifications of the applicant's engineers responsible for the design and construction of the project (proposed Conditions of Certification **GEN-1** through **GEN-8**). Engineers responsible for the design of the civil, structural, mechanical and electrical portions of the project are required to be registered in California, and to sign and stamp each submittal of design plans, calculations and specifications submitted to the CBO. These conditions require that no element of construction subject to CBO review and approval shall proceed without prior approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written to require that no element of construction of permanent facilities subject to CBO review and approval, which would be difficult to reverse or correct, may proceed without prior approval of plans by the CBO. Those elements of construction that are not difficult to reverse are allowed to proceed without approval of the plans. The applicant shall bear the responsibility to fully modify those elements of construction to comply with all design changes that result from the CBO's subsequent plan review and approval process.

## FACILITY CLOSURE

The removal of a facility from service, or decommissioning, as a result of the project reaching the end of its useful life, may range from "mothballing" to removal of all equipment and appurtenant facilities and restoration of the site. Future conditions that may affect the decommissioning decision are largely unknown at this time.

In order to assure that decommissioning of the facility will be completed in a manner that is environmentally sound, safe and will protect public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of:

- proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
- all applicable LORS, local/regional plans and the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;
- the activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- decommissioning alternatives, other than complete site restoration.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure plan.

## CONCLUSIONS AND RECOMMENDATIONS

## CONCLUSIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents are those applicable to the project.
2. Staff has evaluated the proposed engineering LORS, design criteria and design methods in the record, and concludes that the design, construction and eventual closure of the project are likely to comply with applicable engineering LORS.
3. The Conditions of Certification proposed will ensure that the proposed facilities are designed and constructed in accordance with applicable engineering LORS. This will occur through the use of design review, plan checking and field inspections, which are to be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.
4. Although future conditions that may affect decommissioning are largely unknown at this time, it can reasonably be concluded that if the project owner submits a decommissioning plan as required in the **General Conditions** portion of this document prior to the commencement of decommissioning, the decommissioning procedure is likely to occur in compliance with all applicable engineering LORS.

## RECOMMENDATIONS

Energy Commission staff recommends that:

1. The Conditions of Certification proposed herein be adopted to ensure that the project is designed and constructed to assure public health and safety, and to ensure compliance with all applicable engineering LORS;
2. The project be designed and built to the 2001 CBSC (or successor standard, if such is in effect when the initial project engineering designs are submitted for review); and
3. The CBO shall review the final designs, conduct plan checking and perform field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

## CONDITIONS OF CERTIFICATION

**GEN-1** The project owner shall design, construct and inspect the project in accordance with the 2001 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval. (The CBSC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously.) All transmission facilities (lines, switchyards,

switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

In the event that the initial engineering designs are submitted to the CBO when a successor to the 2001 CBSC is in effect, the 2001 CBSC provisions identified herein shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

**Verification:** Within 30 days 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 in the area of facility design. The project owner shall provide the CPM a copy of the Certificate of Occupancy within 30 days of receipt from the CBO [2001 CBC, Section 109 – Certificate of Occupancy].

**GEN-2** Prior to submittal of the initial engineering designs for CBO review, the project owner shall furnish to the CPM and to the CBO a schedule of facility design submittals, a Master Drawing List and a Master Specifications List. The schedule shall contain a list of proposed submittal packages of designs, calculations and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM when requested.

**Verification:** At least 60 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the Master Drawing List and the Master Specifications List of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 1** below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

**Table 1: Major Structures and Equipment List**

| Equipment/System | Quantity (Plant) |
|---|---|
| Steam Turbine (ST) Foundation and Connections | 1 |
| Steam Turbine Generator Foundation and Connections | 1 |
| Steam Condenser and Auxiliaries Foundation and Connections | 1 |
| Condensate (HP) Hotwell Pumps Foundation and Connections | 2 |
| Condensate (SP/LP) Hotwell Pumps Foundation and Connections | 2 |
| Condensate Storage Tank Foundation and Connections | 1 |
| Filter Press System Structure, Foundation and Connections | 1 |
| Thickener Foundation and Connections | 2 |

| Equipment/System | Quantity (Plant) |
|---|---|
| Brine Production Wellpads | 5 |
| Brine Injection Wellpads | 3 |
| Purge Water Pumps (HP/SP/LP) Foundation and Connections | 6 |
| Main Transformer Foundation and Connections | 1 |
| Counterflow Cooling Tower Foundation and Connections – 10 cells each | 2 |
| Vertical Circulating Water Pumps Foundation and Connections | 6 |
| Blowdown Pumps Foundation and Connections | 2 |
| Cooling Tower Wetdown Pumps Foundation and Connections | 2 |
| Auxiliary Cooling Water Pumps Foundation and Connections | 2 |
| Benzene Abatement Structure, Foundation and Connections | 1 |
| H2S Abatement Structure, Foundation and Connections | 1 |
| NCG Removal System Structure, Foundation and Connections | 1 |
| Steam Vent Tank Foundation and Connections | 4 |
| Waste Water Collection System Foundation and Connections | 1 |
| Main Injection Pumps Foundation and Connections | 4 |
| Fire Protection System | 1 |
| Injection Booster Pump Foundation and Connections | 4 |
| Brine Pond Pumps Foundation and Connections | 2 |
| Generator Breakers Foundation and Connections | 3 |
| Transformer Breakers Foundation and Connections | 3 |
| Wellhead Separators Foundation and Connections | 4 |
| SP Crystallizers Foundation and Connections | 4 |
| LP Crystallizers Foundation and Connections | 4 |
| Atmospheric Flash Tanks Foundation and Connections | 4 |
| Dilution Water Heater/Pumps Foundation and Connections | 2 |
| Scrubbers Foundation and Connections | 6 |
| Demisters Foundation and Connections | 6 |
| Primary Clarifiers Foundation and Connections | 2 |
| Secondary Clarifiers Foundation and Connections | 2 |
| Vacuum System Foundation and Connections | 4 |
| Electric Motor Driven Fire Pump Foundation and Connections | 1 |
| Diesel Engine Fire Pump Foundation and Connections | 1 |
| Firewater Storage Tank Foundation and Connections | 1 |
| Compressed Air System Foundation and Connections | 2 |
| HCL Tank Foundation and Connections | 1 |
| Emergency Relief Tanks Structure, Foundation and Connections | 4 |
| Seed Pumps Foundation and Connections | 4 |
| Control Room Structure, Foundation and Connections | 1 |
| RO/Potable Water Systems | 2 |

| Equipment/System | Quantity (Plant) |
|---|---|
| Drainage Systems (including sanitary drain and waste) | 1 Lot |
| High Pressure and Large Diameter Piping and Pipe Racks | 1 Lot |
| HVAC and Refrigeration Systems | 1 Lot |
| Temperature Control and Ventilation Systems (including water and sewer connections) | 1 Lot |
| Building Energy Conservation Systems | 1 Lot |
| Substation/Switchyard, Buses and Towers | 1 Lot |
| Electrical Duct Banks | 1 Lot |

**GEN-3** The project owner shall make payments to the CBO for design review, plan check and construction inspection based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 2001 CBC [Chapter 1, Section 107 and Table 1-A, Building Permit Fees; Appendix Chapter 33, Section 3310 and Table A-33-A, Grading Plan Review Fees; and Table A-33-B, Grading Permit Fees], adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be as otherwise agreed by the project owner and the CBO.

**Verification:** The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next Monthly Compliance Report indicating that the applicable fees have been paid.

**GEN-4** Prior to the start of rough grading, the project owner shall assign a California registered architect, structural engineer or civil engineer, as a resident engineer (RE), to be in general responsible charge of the project [Building Standards Administrative Code (Cal. Code Regs., tit. 24, § 4-209, Designation of Responsibilities)]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project respectively. A project may be divided into parts, provided each part is clearly defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part.

The RE shall:

1. Monitor construction progress of work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all the facilities subject to CBO design review and inspection conforms in every material respect to the applicable LORS, these Conditions of Certification, approved plans, and specifications;

3. Prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;
4. Be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) of stamped drawings, plans, specifications and any other required documents;
5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and
6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests as not conforming to the approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work, if the work does not conform to applicable requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

**Verification:** At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) are subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**GEN-5** Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: A) a civil engineer; B) a soils engineer, or a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; and C) an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: D) a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; E) a mechanical engineer; and F) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 requires state registration to practice as a civil engineer or structural engineer in California.] All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of

Certification in the **Transmission System Engineering** section of this document.

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all responsible engineers assigned to the project [2001 CBC, Section 104.2, Powers and Duties of Building Official].

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

   1. Review the Foundation Investigations Report, Geotechnical Report or Soils Report prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;
   2. Design, or be responsible for design, stamp, and sign all plans, calculations and specifications for proposed site work, civil works and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and
   3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes in the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

   1. Review all the engineering geology reports;
   2. Prepare the Foundation Investigations Report, Geotechnical Report or Soils Report containing field exploration reports, laboratory tests and engineering analysis detailing the nature and extent of the soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load [2001 CBC, Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations];

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2001 CBC, Appendix Chapter 33; Section 3317, Grading Inspections; (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both); and
4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations [2001 CBC, section 104.2.4, Stop orders].

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare final soils grading report; and
2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2001 CBC, Appendix Chapter 33; Section 3317, Grading Inspections; (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both).

D. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;
2. Provide consultation to the RE during design and construction of the project;
3. Monitor construction progress to ensure compliance with engineering LORS;
4. Evaluate and recommend necessary changes in design; and
5. Prepare and sign all major building plans, specifications and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform with all of the mechanical engineering design requirements set forth in the Energy Commission's Decision.

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

**Verification:** At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**GEN-6** Prior to the start of an activity requiring special inspection, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2001 CBC, Chapter 17 [Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection)]; and Section 106.3.5, Inspection and observation program. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;
2. Observe the work assigned for conformance with the approved design drawings and specifications;
3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action [2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]; and
4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable provisions of the applicable edition of the CBC.

A certified weld inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall

inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

**Verification:** At least 15 days (or project owner and CBO approved alternative timeframe) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next Monthly Compliance Report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

**GEN-7** If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend the corrective action required [2001 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this Condition of Certification and, if appropriate, the applicable sections of the CBC and/or other LORS.

**Verification:** The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next Monthly Compliance Report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

**GEN-8** The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. 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 [2001 CBC, Section 108, Inspections]. The project owner shall retain one set of approved engineering plans, specifications and calculations at the project site or at another accessible location during the operating life of the project [2001 CBC, Section 106.4.2, Retention of Plans].

**Verification:** Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next Monthly Compliance Report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing final approved engineering plans, specifications and calculations as described above, the

project owner shall submit to the CPM a letter stating that the above documents have been stored and indicate the storage location of such documents.

**CIVIL-1** The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils Report, Geotechnical Report or Foundation Investigations Report required by the 2001 CBC [Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations].

**Verification:** At least 15 days (or project owner and CBO approved alternative timeframe) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next Monthly Compliance Report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

**CIVIL-2** The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area [2001 CBC, Section 104.2.4, Stop orders].

**Verification:** The project owner shall notify the CPM within 24 hours when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

**CIVIL-3** The project owner shall perform inspections in accordance with the 2001 CBC, Chapter 1, Section 108, Inspections; Chapter 17, Section 1701.6, Continuous and Periodic Special Inspection; and Appendix Chapter 33, Section 3317, Grading Inspection. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO and the CPM [2001 CBC, Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

**Verification:** Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a Non-Conformance Report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following Monthly Compliance Report.

**CIVIL-4** After completion of finished grading and erosion and sedimentation control and drainage 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 [2001 CBC, Section 109, Certificate of Occupancy].

**Verification:** Within 30 days of the completion of the erosion and sediment control mitigation and drainage facilities, the project owner shall submit to the CBO the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes. The project owner shall submit a copy of this report to the CPM in the next Monthly Compliance Report.

**STRUC-1** Prior to the start of any increment of construction of any major structure or component listed in **Facility Design Table 1** of Condition of Certification **GEN-2**, above, the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **Table 1**, above):

1. Major project structures;
2. Major foundations, equipment supports and anchorage;
3. Large field fabricated tanks;
4. Turbine/generator pedestal; and
5. Switchyard structures.

Construction of any structure or component shall not commence until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;
2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (i.e., highest loads, or lowest allowable stresses shall govern). All plans, calculations and specifications for foundations that support structures shall be filed

concurrently with the structure plans, calculations and specifications [2001 CBC, Section 108.4, Approval Required];

3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations and other required documents of the designated major structures at least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation [2001 CBC, Section 106.4.2, Retention of plans; and Section 106.3.2, Submittal documents]; and
4. Ensure that the final plans, calculations and specifications clearly reflect the inclusion of approved criteria, assumptions and methods used to develop the design. The final designs, plans, calculations and specifications shall be signed and stamped by the responsible design engineer [2001 CBC, Section 106.3.4, Architect or Engineer of Record].

**Verification:** At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 1** of Condition of Certification **GEN-2** above, the project owner shall submit to the CBO, with a copy to the CPM, the responsible design engineer's signed statement that the final design plans, specifications and calculations conform with all of the requirements set forth in the Energy Commission's Decision.

If the CBO discovers non-conformance with the stated requirements, the project owner shall resubmit the corrected plans to the CBO within 20 days of receipt of the non-conforming submittal with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM a copy of a statement from the CBO that the proposed structural plans, specifications and calculations have been approved and are in conformance with the requirements set forth in the applicable engineering LORS.

**STRUC-2** The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);
2. Concrete pour sign-off sheets;
3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);
4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2001 CBC, Chapter 17, Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection); Section 1702, Structural Observation and Section 1703, Nondestructive Testing.

**Verification:** If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM [2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]. The NCR shall reference the Condition(s) of Certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

**STRUC-3** The project owner shall submit to the CBO design changes to the final plans required by the 2001 CBC, Chapter 1, Section 106.3.2, Submittal documents and Section 106.3.3, Information on plans and specifications, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

**Verification:** On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the Monthly Compliance Report, when the CBO has approved the revised plans.

**STRUC-4** Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in Chapter 3, Table 3-E of the 2001 CBC shall, at a minimum, be designed to comply with the requirements of that Chapter.

**Verification:** At least 30 days (or project owner and CBO approved alternate timeframe) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following Monthly Compliance Report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

**MECH-1** The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major

piping and plumbing system listed in **Facility Design Table 1**, Condition of Certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of said construction [2001 CBC, Section 106.3.2, Submittal Documents; Section 108.3, Inspection Requests; Section 108.4, Approval Required; 2001 California Plumbing Code, Section 103.5.4, Inspection Request; Section 301.1.1, Approval].

The responsible mechanical engineer shall stamp and sign all plans, drawings and calculations for the major piping and plumbing systems subject to the CBO design review and approval, and submit a signed statement to the CBO when the said proposed piping and plumbing systems have been designed, fabricated and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards [Section 106.3.4, Architect or Engineer of Record], which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Specific City/County code.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [2001 CBC, Section 104.2.2, Deputies].

**Verification:** At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 1**, Condition of Certification **GEN-2** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

**MECH-2** For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-

OSHA), prior to operation, the code certification papers and other documents required by the applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of said installation [2001 CBC, Section 108.3, Inspection Requests].

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and
2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

**Verification:** At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

**MECH-3** The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of said construction. The final plans, specifications and calculations shall include approved criteria, assumptions and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS [2001 CBC, Section 108.7, Other Inspections; Section 106.3.4, Architect or Engineer of Record].

**Verification:** At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations,

plans and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

**ELEC-1** Prior to the start of any increment of electrical construction for electrical equipment and systems 480 volts and higher, listed below, with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations [CBC 2001, Section 106.3.2, Submittal documents]. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS [2001 CBC, Section 108.4, Approval Required, and Section 108.3, Inspection Requests]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

A. Final plant design plans to include:

1. one-line diagrams for the 480 volt and higher systems; and
2. system grounding drawings.

B. Final plant calculations to establish:

1. short-circuit ratings of plant equipment;
2. ampacity of feeder cables;
3. voltage drop in feeder cables;
4. system grounding requirements;
5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 480 volt and higher systems;
6. system grounding requirements; and
7. lighting energy calculations.

C. The following activities shall be reported to the CPM in the Monthly Compliance Report:

1. Receipt or delay of major electrical equipment;
2. Testing or energization of major electrical equipment; and
3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission Decision.

**Verification:** At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and

stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

## REFERENCES

CEOE (CE Obsidian Energy, LLC, Calipatria, California), 2002a. Application for Certification for Salton Sea Unit 6, Geothermal Power Plant Project Volume I & II. July 26, 2002.

# GEOLOGY, MINERAL RESOURCES, AND PALEONTOLOGY

Testimony of Dal Hunter, Ph.D., C.E.G.

## INTRODUCTION

In the geology, mineral resources, and paleontology section, staff discusses potential impacts of the proposed Salton Sea Unit 6 (SSU6) project regarding geologic hazards, geologic (including mineralogic), and paleontologic resources. Energy Commission staff's objective is to ensure that there will be no significant adverse impacts to significant geological and paleontological resources during project construction, operation and closure. A brief geological and paleontological overview of the project is provided. The section concludes with staff's proposed monitoring and mitigation measures with respect to geologic hazards and geologic, mineralogic, and paleontologic resources, with the inclusion of Conditions of Certification.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The applicable LORS are listed in the Application for Certification (AFC), in Section 5.2.5 of the AFC (CE Obsidian Energy, LLC (CEOE) 2000a). The following is a brief description of the LORS for geologic hazards and resources, and paleontologic resources.

### FEDERAL

The proposed SSU6 power plant is not located on federal land; however, a 2.8 mile portion of the L-line interconnection electrical transmission linear is located on federal property administered by the Bureau of Land Management (BLM). As such, federal LORS for the protection and recovery of geologic, mineralogic, or paleontologic resources include the Antiquities Act of 1906 and the National Environmental Policy Act (NEPA) apply to a portion of the L-line interconnection.

### 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 project investigation, design (Chapters 16 and 18), and construction (including grading and erosion control as found in Appendix Chapter 33). The *CBC* supplements the *UBC*'s grading and construction ordinances and regulations. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 1998 CBSC is in effect, the 1998 CBC provisions, identified herein, shall be replaced with the applicable successor provisions.

The California Environmental Quality Act Guidelines Appendix G provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts.

- Section (V) (c) asks if the project will directly or indirectly destroy a unique paleontological resource or site or unique geological feature.

- Sections (VI) (a), (b), (c), (d), and (e) pose questions that are focused on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) pose questions about the project's effect on mineral resources.

The "Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources: Standard Procedures" (Society of Vertebrate Paleontology [SVP], 1995) is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. They were adopted in October 1995 by the Society of Vertebrate Paleontology (SVP), a national organization.

Conditional Use Permits (CUP) are issued by Imperial County for geothermal exploration and development projects under its jurisdiction and contain specific conditions and performance standards that must be adhered to during the life of the project. These are described in the Imperial County General Plan, Geothermal and Transmission Element and Appendix B of that document. Conditions and performance standards related to geology and mineral resources include setbacks from the surface traces of active faults, requirement that a geotechnical investigation be performed, and the requirement that the project shall participate in the County seismic monitoring program and County subsidence monitoring and detection program.

## ENVIRONMENTAL SETTING

The proposed SSU6 is located within the Colorado Desert geomorphic province at the southern end of the Salton Sea in Imperial County, California. This area within the Colorado Desert is characterized by a structural depression known as the Salton Trough, the San Anderas Fault system, and other major faults. The Salton Trough is characterized by flat topography, generally below mean sea level (MSL) adjacent to the Salton Sea, with the Chocolate Mountains to the east and the Superstition Hills to the west. Major geologic units in the vicinity of the site include the Pleistocene Brawley Formation and Holocene Lake Cahuilla Beds. The Pleistocene Brawley Formation consists of tectonically deformed cemented lacustrine sediments, including silts and clays. The Holocene Lake Cahuilla Beds consist of flat-lying lacustrine sediments including sandy deltaic and beach deposits, silt, and clay associated with ancient Lake Cahuilla. During the Pleistocene and Holocene, the Salton Trough area was periodically inundated by floodwaters from the Colorado River flowing in from the south.

Geotechnical exploration at the site by the applicant generally encountered variable lean clay, silt, silty sand, and clayey sand lacustrine (lake) deposits. Portions of these soil units were interbedded. The fine-grained soils, including lean clay and silt, were generally classified as brown, soft to firm, and as exhibiting low to medium plasticity. The coarse-grained soils, including silty sand and clayey sand, were generally classified as brown, medium dense, and as exhibiting low plasticity. The lacustrine deposits were encountered to 77-1/2 feet, the maximum depth of exploration (Geotechnics, 2002).

The site lies within Salton Sea Known Geothermal Resource Area (KGRA), an area in which the U. S. Department of the Interior has recognized significant geothermal resource potential. The site also lies in an area zoned A-3-G, agriculture with a

geothermal overlay, as designated by Imperial County (Imperial County, 1993). In 1981, a Master Environmental Impact Report was approved by Imperial County to expand the geothermal zoning overlay that is required for the construction of geothermal operations. (WESTEC Services, 1981).

## ANALYSIS AND IMPACTS

There are two types of impacts considered in this section. The first are geologic hazards, which could impact proper functioning of the proposed facility and include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, and tsunamis and seiches. The second considers potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

## STAFF'S CRITERIA FOR DETERMINING IMPACT SIGNIFICANCE

There are no federal LORS with respect to geologic hazards and geologic and mineralogic resources; however, the California Building Code (*CBC*) provides geotechnical and geological investigation and design guidelines, which engineers must adhere to when designing a proposed facility. As a result, the criteria used to assess geologic hazard impact significance includes evaluating each potential hazard in relation to being able to adequately design and construct the proposed facility.

With respect to impacts the proposed facility may have on existing geologic and mineralogic resources, geologic and mineral resource maps for the surrounding area were reviewed, in addition to site-specific information provided by the applicant, to determine if geologic and mineralogic resources are present in the area. Operating procedures of the proposed facility, such as ground water extraction and mass grading operations were reviewed, to the extent known, to determine if such operations could adversely impact such resources.

Staff reviewed existing paleontologic information for the surrounding area, as well as site-specific information provided by the applicant, in accordance with accepted assessment protocol (SVP, 1995) to determine if there are any known paleontologic resources in the general area. If present or likely to exist, Conditions of Certification are applied to project approval, which outline procedures required during construction to mitigate impacts to potential resources.

## GEOLOGIC HAZARDS

The AFC (CE Obsidian Energy, LLC (CEOE) 2000a) provides good documentation of potential geologic hazards at the SSU6 plant site. Review of the AFC, coupled with our independent research, indicates that potential geologic hazards at the site are high. These risks are inherent in development of geothermal energy since the geothermal resource is the direct result of faulting and magmatic activity.

Our independent research included review of available geologic maps, reports, and related data of the SSU6 plant site and associated linear facility areas. Geological information was available from the California Geological Survey (CGS), U. S. Geological Survey (USGS), and other governmental organizations.

Detailed geological discussion and information about the project's linear facilities was not included in the AFC (CE Obsidian Energy, LLC (CEOE) 2000a). However, given the geology and borings present at the site and our independent literature review, the potential for these geologic hazards along the linear facilities is also high. In order to accurately assess the potential for liquefaction, dynamic compaction, hydrocompaction, subsidence, and expansive soils along the linear facilities, subsurface exploration and associated laboratory testing and analyses should be performed during the design-level geotechnical investigation, after the final alignments have been selected. Physical exploration along preliminary alignments may result in unnecessary disturbance of paleontologic, cultural or biological resources.

## Faulting and Seismicity

Energy Commission staff reviewed the California Geological Survey (CGS) publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions*, dated 1994 (CGS, 1994), *Geologic Map of California – Salton Sea Sheet* (Jennings, 1967), *Alquist-Priolo Zones* (CGS, 2000), *Preliminary Geologic Map of the California – Baja California Border Region* (CGS, 1984), and *Maps of Known Active Fault Near-source Zones in California and Adjacent Parts of Nevada* (International Conference of Building Officials [ICBO], 1998). The project is located within Seismic Zone 4 as delineated on Figure 16-2 of the *CBC*.

The closest known active fault is the Brawley Fault, located approximately 1/2 mile east of the site. The plant site, well pads, and portions of the associated linear facilities are within the Brawley Seismic Zone (ICBO, 1998). CEC staff has calculated an estimated deterministic peak horizontal ground acceleration for the plant site in the range of 0.41g. This estimate is based upon a moment magnitude 6.4 earthquake on the Brawley Fault. A second active fault, the Elmore Ranch Fault, is located approximately 4 miles to the northwest. Staff has calculated an estimated deterministic peak ground acceleration for the Elmore Ranch Fault in the range of 0.33g. This estimate is based on a moment magnitude 6.6 earthquake on the Elmore Ranch Fault. Other active faults within the vicinity of the site, include the San Andreas Fault (Southern and Coachella segments), the San Jacinto Fault (Superstition Hills, Superstition Mountain, and Coyote Creek segments), and the Imperial Fault. The *CBC* designates a minimum design ground acceleration of 0.4g for the entire project. The closest known pre-Holocene fault is located approximately 15-1/2 miles northeast of the site (Morton, 1966).

The projected surface trace of the closest known deep blind fault within the geothermal reservoir is located approximately 3,000 feet southeast of the plant site and is crossed by the injection well line and L-line and Midway Interconnection electrical transmission lines. Since the plant site is not located within 50 feet of an active fault as defined by the Alquist-Priolo Act, fault trenching is not required.

There are no current standards that require linear facilities to be designed to resist fault rupture or liquefaction, even when these facilities cross an active fault (Anderson, 2001). However, Imperial County does require utilities to submit an operation plan "*describing the effects of failures at the fault and the various emergency facilities and procedures which exist to assure that failure does not threaten public safety*" (Imperial County, 1993).

Seismicity accompanying fluid injection is known to have occurred at Rangely, Colorado and the Rocky Mountain Arsenal, near Boulder, Colorado. The magnitudes of earthquakes generated in this manner are typically quite low. Seismicity at these locations was most likely due to high pressure waste fluid injection. In the SSU6 injection field, significant pressure increases due to fluid injection are unlikely (WESTEC Services, 1981). Since low pressures are used in re-injecting geothermal fluids, the potential for seismicity related to fluid injection is low.

## Liquefaction

Liquefaction is a nearly complete loss of soil shear strength that can occur during a seismic event. During the seismic event, cyclic shear stresses cause the development of excessive pore water pressure between the soil grains, effectively reducing the internal strength of the soil. This phenomenon is generally limited to unconsolidated, clean to silty sand (up to 35 percent non-plastic fines) and very soft silts lying below the ground water table. The higher the ground acceleration caused by a seismic event, the more likely liquefaction is to occur. Severe liquefaction can result in catastrophic settlements of overlying structural improvements and lateral spreading of the liquefied layer when confined vertically but not horizontally. Since the site is underlain by interbedded, saturated silty sands, and the depth to ground water is approximately 4 feet; the potential for liquefaction is high; however, the potential for catastrophic liquefaction is probably much lower.

## Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density). The decrease in volume can result in settlement of overlying structural improvements. Since the site is in Seismic Zone 4 and is generally underlain by interbedded medium dense silty sand soils, the potential for dynamic compaction is high.

## Hydrocompaction

Partially saturated soils can possess bonds that are a result of chemical precipitates that accumulate under semi-arid conditions. Such soluble compound bonds provide the soils with cohesion and rigidity; however, these bonds can be destroyed upon wetting. When destroyed, a substantial decrease in the material's void ratio is experienced even though the vertical pressure does not change. Materials that exhibit this decrease in void ratio and corresponding decrease in volume with the addition of water are defined as collapsible soils. Collapsible soils are typically limited to true loess, fine flash flood deposits, clayey loose sands, loose sands cemented by soluble salts, and windblown silts. Since the site is underlain by medium dense soils that were deposited in a lacustrine environment and are generally saturated (below the ground water table), the potential for hydrocompaction is negligible.

## Subsidence

Ground subsidence can occur when ground water is drawn down by irrigation activities such that the effective unit weight of the soil mass is increased, which in turn increases

the effective stress on underlying soils, resulting in consolidation/settlement of the underlying soils. Subsidence may also be caused by regional tectonic processes, withdrawal of geothermal fluids, and injection of fluids at a lower temperature than the field temperature. Typically, these forms of subsidence affect a large area.

Regional tectonic subsidence may result in approximately 1.6 inches of subsidence annually (Lofgren, 1987) over the Salton Trough area with a maximum of 2 inches occurring near the Salton Sea and decreasing to near zero near the U.S. / Mexico border (Imperial County, 1993). Localized subsidence data collected by the applicant from their survey network shows up to 2.4 inches of subsidence across the plant site from 1989 to 1999. This equates to about 0.25 inch annually, well below the regional figures. The subsidence across the plant site is the combined result of tectonic and geothermal production related subsidence. Thermal reservoir compaction of 1.8 feet to 4.5 feet was estimated for a proposed 49 MW geothermal power plant in 1981 located approximately 1 mile east of the proposed SSU6 plant site; however, the report also stated, "it is difficult to predict what fraction, if any, of the reservoir compaction will translate into surface vertical movement" (WESTEC Services, 1981). Subsidence has not caused any perceived damage to the irrigation systems in the Imperial Valley over the 60-year history of irrigation (LLNL, 1980). Possible reasons for no impact to the irrigation system in the Imperial Valley are the low rate of movement and very small changes in slope (LLNL, 1980).

Since the SSU6 will reinject spent geothermal fluids with injection wells, subsidence due to tectonic processes affects a large area, and production wells are located distant from the plant, total subsidence is expected to result in a low potential for settlement that would significantly impact the plant and surrounding areas. If the project were under Imperial County's jurisdiction, a conditional use permit to operate the SSU6 would be required that includes the annual monitoring of subsidence to determine the baseline and subsidence elevations at the project site in the context of the Imperial Valley monitoring data that is coordinated by the Imperial County Public Works Department. Should the natural subsidence and any project-induced subsidence be identified as severe enough to result in off-site impacts, the County would then require that further actions be considered to mitigate subsidence impacts to an appropriate level. Such measures include, but are not limited to, increasing the injection volume into the geothermal resource and grading of irrigated areas affected by the subsidence by the applicant. Therefore, Condition of Certification GEO-1 is recommended as a mitigation measure to continue the collection of data in this area of the Imperial Valley, which will assure that any subsidence in the future at the site will not result in a significant impact to surrounding areas.

## Expansive Soils

Soil expansion occurs when clay-rich soils, with an affinity for water, exist in-place at a moisture content below their plastic limit. The addition of moisture from irrigation, capillary tension, water line breaks, etc. causes the clay soils to collect water molecules in their structure, which, in turn, causes an increase in the overall volume of the soil. This increase in volume can correspond to movement of overlying structural improvements. As reported in the boring logs, the site generally is underlain by silty sand, clayey sand, silt, and lean clay soils (Geotechnics, 2002). A low to medium

potential for expansion may be present in the clayey sand and lean clay soils given the limited geotechnical testing data available.

## Landslides

Landslides typically involve rotational slump failures within surficial soils/colluvium and/or weakened bedrock that are usually implemented by an increase of the material's moisture content above a layer, which exhibits a relatively low strength. Debris-flows are shallow landslides that travel downslope very rapidly as muddy slurry. Since the site, transmission lines, and geothermal pipeline areas are generally topographically flat, the potential for landslides is negligible.

## Tsunamis and Seiches

Tsunamis and seiches are earthquake-induced waves, which can inundate low-lying areas adjacent to large bodies of water. The proposed site is situated approximately 227 feet to 232 feet below mean sea level and approximately 1,000 feet southeast of the Salton Sea with an approximate surface elevation of 227 feet below mean sea level. The Gulf of California is located approximately 120 miles to the southeast of the site with higher ground elevations present in-between. As a result, the potential for tsunamis from the Gulf of California to affect the site is considered low, but the potential for seiches from the Salton Sea to affect the site is considered high. No other large bodies of water are present near the plant site or associated linear facilities.

## Geothermal Reservoir

Exploration and modeling of the geothermal reservoir has been performed by the applicant using the computer program TETRAD. Numerous test, production, and injection wells have been drilled since 1972 to characterize and utilize the geothermal resource. Geothermal reservoir modeling by the applicant was based upon available data and was used to minimize the impact from SSU6 operations on the geothermal reservoir and existing Salton Sea geothermal facilities. Locations and depths of both production and injection wells were reportedly optimized using the TETRAD model.

## Volcanic Activity

Volcanic activity typically involves eruptions of lava, pyroclastics, or tephra that may be non-explosive or explosive depending upon the geologic setting. Structures and populations adjacent to centers of volcanic activity may be severely impacted by the sudden onset of volcanic activity. The U. S. Geological Survey has mapped the plant site area and portions of the linear facilities as a combined flowage hazard zone (Miller, 1989), or an area adjacent to explosive volcanoes or vents. Since the SSU6 plant site is adjacent to Obsidian Butte, a volcanic vent active in the late Pleistocene and a part of the Salton Buttes, the potential for impact to the SSU6 plant site is high from volcanic activity.

# GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff have reviewed applicable geologic maps and reports for this area (Kohler, 2002; Larose et al., 1999; DOGGR, 1982; Tooker and Beeby, 1990; and Morton, 1966). Based on this information and the information contained in the AFC (CE Obsidian Energy, LLC (CEOE) 2000a and b), there are no known mineralogic resources

located at or immediately adjacent to the proposed SSU6 site. However, Obsidian Butte represents a significant geologic resource. Obsidian Butte is a small volcanic glass dome that is part of the Salton Buttes and is a popular stop during geologic field trips. Minor pumice and aggregates were mined in the past within the Salton Buttes, but mining has since been abandoned. The production well pad on Obsidian Butte will not result in closure or access restrictions to the area. Large quantities of $CO_2$ gas were produced from shallow wells northeast of the plant site from 1933 to 1954 for the production of dry ice. The plant site is also located within a known geothermal resource area as designated by the U. S. Geological Survey. Based upon a review of available information, staff concludes that the proposed SSU6 has a low potential to impact geologic or mineralogic resources.

The applicant's consultant conducted a paleontologic resources field survey and a sensitivity analysis for the proposed SSU6 and the proposed linear facility improvements to support the SSU6. No significant fossil localities were identified at the SSU6 site or directly under the associated linear facilities. However, fossils were found in similar geologic units (Lake Cahuilla Beds) adjacent to the proposed linear facilities and within 1 mile of the plant site. Surficial geologic units were assigned a "high" sensitivity rating, with respect to potentially containing paleontological resources. The underlying Brawley Formation, which may be excavated for foundations and utilities at the plant site and electrical transmission towers, was also assigned a "high" sensitivity rating with respect to potentially containing paleontological resources.

Staff asked the San Bernardino County Museum (SBCM) for a literature review and a check of the Regional Paleontologic Locality Inventory (RPLI). In a letter dated November 12, 2002, SBCM verified that there are no known paleontological resources at the plant site, but determined the Lake Cahuilla Beds and the Brawley Formation have a "high" sensitivity rating with respect to potentially containing paleontological resources, and that a mitigation plan would be necessary. Based on review of available information, staff concludes that the proposed SSU6 project has high potential to contain significant paleontologic resources.

## PROJECT SPECIFIC IMPACTS

Seismicity, liquefaction, and seiches potential represent the main geologic hazards at this site. No geologic or mineralogic resources are known to exist in the area with the exception of Obsidian Butte. The (confidential) Paleontologic Resources Report (CE Obsidian Energy, LLC (CEOE) 2000a) assigns a sensitivity rating of high for all geologic units which underlie the proposed facility and associated linears. The Conditions of Certification obligate the developer to follow the requirements of the California Building Code with respect to project design and construction. The paleontological conditions mandate procedures for worker training, site monitoring, and resource preservation for sites with a potential to encounter vertebrate fossils. Conditions of Certification **GEO-1, GEN-1**, **GEN-5**, **CIVIL-1** (**Facility Design**), and **PAL-1** to **PAL-7** will mitigate any potential hazards and resource impacts discussed above to a less than significant level.

## CUMULATIVE IMPACTS

The SSU6 site lies in an area, which exhibits moderate to high geologic hazards and no known geologic or mineralogic resources, other than Obsidian Butte, a popular geologic

field trip stop. Based on this information and the proposed Conditions of Certification to mitigate potential project specific impacts, it is staff's opinion that the potential for significant adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources, from the proposed project, is low. There is some potential for new geothermal production wells to impact existing geothermal power plants by depleting the resource. However, the applicant has used state of the art geothermal resource modeling to locate its wells and to minimize this potential cumulative impact. Since the resource is the result of a plate boundary spreading center and, therefore, enormous and because the nearby power plants are owned by affiliates of the applicant, the potential for cumulative impact due to resource depletion is probably negligible. In addition, there may be some potential for subsidence due to geothermal production to occur. Subsidence network monitoring should continue in the future to further refine total subsidence and that subsidence due to geothermal fluid withdrawal. Therefore, **GEO-1** is required to assure that any subsidence impacts are less than significant.

## FACILITY CLOSURE

A definition and general approach to closure is presented in the **General Conditions** section of this assessment. Facility closure activities are not anticipated to impact geologic, mineralogic, or paleontologic resources. This is due to the fact that no such resources are known to exist at the proposed project site. In addition, decommissioning and closure of the power plant should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed in plant decommissioning and closure will have been disturbed during construction and operation of the facility.

## RESPONSE TO PUBLIC AND AGENCY COMMENT

Staff has not received comments regarding geology, paleontology, or surface water from the public or local agencies, other than the Imperial County Public Works Department and the Intervener, California Unions for Reliable Energy (CURE).

A final project geotechnical report is required by the *CBC* and the Conditions of Certification (**GEN- 1, GEN-5,** and **CIVIL-1**) of this document.

Concerns raised by the Imperial County Public Works Department and CURE have been addressed in this document.

## MITIGATION

The Energy Commission only has jurisdiction over the power plant facility and the transmission lines. Permitting authority for the production and injection wells is performed by the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR), while responsibility for permitting the geothermal brine pipelines and the well pads is retained by Imperial County.

The preceding analysis and the suggested conditions of certification are based upon a review of the entire SSU6 project. Conditions of certification, all of which are

recommended for adoption by the Energy Commission, are suggested for inclusion by responsible agencies in permits for their exclusive jurisdictional areas. The conditions of certification in this section are written in a manner to be applicable to all elements of the project, though the Energy Commission can only impose them on the energy facility and the transmission lines.

Staff recommends that the DOGGR and Imperial County review and incorporate the conditions of certification below into their respective permits for the Salton Sea Unit 6 project.

**Conditions of Certification Recommendations To Agencies**

| Condition of Certification | Imperial County | DOGGR |
|---|---|---|
| GEO-1 | X | X |
| PAL-1 | X | X |
| PAL-2 | X | |
| PAL-3 | X | |
| PAL-4 | X | |
| PAL-5 | X | |
| PAL-6 | X | |
| PAL-7 | X | |

## CONCLUSIONS AND RECOMMENDATIONS

The applicant will likely be able to comply with all applicable LORS. Design, construction, and operation of the project should have no significant impacts on paleontologic, geologic, or mineralogic resources. Staff proposes to ensure compliance with applicable LORS and protection of potential geologic and paleontologic resources with the adoption of the proposed Conditions of Certification listed below.

## PROPOSED CONDITIONS OF CERTIFICATION

General Conditions of Certification with respect to Geology are covered under Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section. In addition, staff recommends **GEO-1** below. The Conditions of Certification for Paleontology follow:

**GEO-1** The applicant shall comply with the seismic and subsidence monitoring standards set forth in the Imperial County General Plan, Geothermal and Transmission Element.

**Verification:** At least 30 days prior to the start of construction, the Project Owner shall submit a seismic and subsidence monitoring plan to the Imperial County Public Works Department for review and approval. The Project Owner shall submit a letter to the CPM showing evidence of review by the Imperial County Public Works Department that the plan meets the above referenced requirements. In addition, after start of commercial operation the Project Owner shall submit to the County an annual report outlining the seismic and subsidence monitoring performed during the previous year as

required by the above referenced requirements. Evidence that the report has been accepted as adequate by the County shall be provided to the CPM annually.

**PAL-1** The project owner shall submit to the CPM for review and approval, the resumé and qualifications of its Paleontological Resource Specialist (PRS). If the approved PRS is replaced prior to completion of project mitigation and report, the project owner shall obtain CPM approval of the replacement. The project owner shall submit to the CPM to keep on file, resumés of the qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resumé shall also be provided to the CPM.

The PRS resumé shall include the names and phone numbers of references. The resumé shall also demonstrate to the satisfaction of the CPM, the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995.

The experience of the PRS shall include the following:

1. institutional affiliations or appropriate credentials and college degree;
2. ability to recognize and collect fossils in the field;
3. local geological and biostratigraphic expertise;
4. proficiency in identifying vertebrate and invertebrate fossils and;
5. at least three years of paleontological resource mitigation and field experience in California, and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified PRMs to monitor the project as he or she deems necessary. PRMs shall have the equivalent of the following qualifications:

1. BS or BA degree in geology or paleontology and one year experience monitoring in California;
2. AS or AA in geology, paleontology or biology and four years experience monitoring in California; or
3. Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

**Verification:** At least 60 days prior to the start of ground disturbance, the project owner shall submit a resumé for review and approval as well as a statement of availability of its designated PRS for on-site work.

At least 20 days prior to ground disturbance, the project owner shall provide a letter with resumés naming anticipated PRMs for the project and stating that the identified PRMs

meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional PRMs are obtained during the project, the PRS shall provide additional letters and resumés to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor beginning on-site duties.

At least 10 working days prior to the termination or release of the PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent PRS is proposed to the CPM for consideration.

**PAL-2** The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction laydown areas and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and the plan and profile drawings for the utility lines would normally be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and can be of such as scale that 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the power plant or linear facility changes, the project owner shall provide maps and drawings reflecting these changes to the PRS and CPM.

If construction of the project will proceed in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Prior to work commencing on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

**Verification:** At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start or restart of ground disturbance.

If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within five days of identifying the changes.

**PAL-3** The project owner shall ensure that the PRS prepares, and the project owner shall submit to the CPM for review and approval, a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring,

collecting, and sampling activities and may be modified with CPM approval. This document shall be used as a basis for discussion in the event that on-site decisions or changes are proposed. The project owner shall ensure that copies of the CPM-approved PRMMP are distributed to the PRS, all PRMs, the project owner's on-site construction manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of the Vertebrate Paleontology (SVP, 1995) and shall include, but not be limited to, the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking; construction monitoring; mapping and data recovery; fossil preparation and collection; identification and inventory; preparation of final reports; and transmittal of materials for curation will be performed according to the PRMMP procedures;
2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the Conditions of Certification;
3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;
4. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed schedule for the monitoring and sampling;
5. A discussion of the procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;
6. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;
7. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources;
8. Identification of the institution that has agreed to receive any data and fossil materials collected, requirements or specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution; and,
9. A copy of the paleontological Conditions of Certification.

**Verification:** At least 30 days prior to ground disturbance, the project owner shall provide a copy of the CPM-approved PRMMP to the CPM. The PRMMP shall include an affidavit of authorship of the PRMMP by the PRS, and acceptance of the project owner evidenced by a signature.

**PAL-4** Prior to ground disturbance and for the duration of construction, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for all project managers, construction supervisors and workers who are involved with or operate ground disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of an initial in-person PRS training prior to ground disturbance. Following the initial in person training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern.

The Worker Environmental Awareness Program (WEAP) shall address the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Good quality photographs or physical examples of vertebrate fossils that may be expected in the area shall be provided;
3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;
4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. A Certification of Completion of WEAP form signed by each worker indicating that they have received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

**Verification:** At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP including the brochure with the set of reporting procedures the workers are to follow.

At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning on using a video for interim training.

If an alternate paleontological trainer is requested by the owner, the resumé and qualifications of the trainer shall be submitted to the CPM for review and approval. Alternate trainers shall not conduct training prior to CPM authorization.

In the Monthly Compliance Report (MCR) the project owner shall provide copies of the WEAP Certification of Completion forms with the names of those trained and the trainer

or type of training offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

**PAL-5** The project owner shall ensure that the PRS and PRM(s) monitor, (consistent with the PRMMP), all construction-related grading, excavation, trenching, and augering in areas where potentially fossil-bearing materials have been identified. In the event that the PRS determines full time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring different from the accepted schedule presented in the PRMMP shall be proposed in a letter or e-mail from the PRS and the project owner to the CPM prior to the change in monitoring. The letter or e-mail shall be submitted to the CPM for review and approval and shall include the justification for the change in monitoring.
2. The project owner shall ensure that the PRM(s) keeps a daily log of monitoring of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.
3. The project owner shall ensure that the PRS notifies the project owner and the CPM within 24-hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the Conditions of Certification.
4. Either the project owner or the PRS shall notify the CPM within 24-hours (or Monday morning in the case of a weekend) of a significant find of fossil materials or a halt of construction activities due to the discovery of fossil materials.

   The project owner shall ensure that the PRS prepares a summary of the monitoring and other paleontological activities that will be included in the MCR. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities and general locations of excavations, grading, etc. A section of the report will include the geologic units or subunits encountered; descriptions of sampling within each unit; and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring including any incidents of non-compliance and any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the project owner shall include an explanation in the summary as to why monitoring was not conducted.

**Verification:** The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is an unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

**PAL-6** The project owner, through the PRS, shall ensure that all components of the PRMMP are adequately performed throughout project construction.

**Verification:** The project owner shall maintain in their compliance file, copies of signed contracts or agreements with the PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after completion and approval of the CPM-approved Paleontological Resources Report (PRR) (See PAL-7). The project owner shall be responsible for payment of any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be submitted to the CPM.

**PAL-7** The project owner shall ensure preparation of a PRR by the designated PRS. The PRR shall be prepared following completion of the ground disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information and submitted to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

**Verification:** Within 90 days of completion of ground disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the CPM.

**Certification of Completion of Worker Environmental Awareness Program SALTON SEA UNIT 6 (02-AFC-2)**

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on Cultural, Paleontology and Biological Resources for all personnel (i.e. construction supervisors, crews and plant operators) working on-site or at related facilities. By signing below, the participant indicates that they understand and shall abide by the guidelines set forth in the Program materials. Include this completed form in the Monthly Compliance Report.

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Cul Trainer: _____ Signature:_____ Date: ___/___/____

Paleo Trainer: _____ Signature:_____ Date: ___/___/____

Bio Trainer: _____ Signature:_____ Date: ___/___/____

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# POWER PLANT EFFICIENCY

Testimony of Shahab Khoshmashrab

## INTRODUCTION

The Energy Commission makes findings as to whether energy used by the Salton Sea Unit 6 Project (SSU6) would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the SSU6'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.

In order to support the Energy Commission's findings, this analysis will:

- determine whether the facility would 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 (LORS)

### FEDERAL

No federal LORS apply to the efficiency of this project.

### STATE

No State LORS apply to the efficiency of this project.

### LOCAL

No local ordinances apply to power plant efficiency.

## SETTING

CE Obsidian Energy, LLC (CEOE, applicant) proposes to construct and operate the 185 MW (nominal net output) SSU6, a merchant class geothermal-powered generating facility, selling power to the Imperial Irrigation District (IID) and the power market (CEOE 2002a, AFC §§ 1.2, 1.2.3, 2.2, 2.3). (Note that this rating is an approximate value based upon preliminary design information and generating equipment manufacturers' projected performance with the plant operating at full load.)

The SSU6 Power Generating Facility would consist of one geothermal power block, including a condensing steam turbine/generator set, the gas removal and abatement systems, and the heat rejection system (CEOE 2002a, AFC §§ 1.3.2.1, 3.1, 3.3.1). The steam turbine would be a multi-casing, triple-pressure, exhaust flow condensing turbine. The Resource Production Facility would provide geothermal fluid from production wells

through above ground pipelines to the steam handling system, where the steam would be separated from the liquid phase (flashed).

## ANALYSIS

CEQA Guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Cal. Code Regs., tit. 14, § 15126.4(a)(1)). Appendix F of the Guidelines suggests consideration of such factors as decreasing reliance on natural gas and oil; and increasing reliance on renewable energy sources (Cal. Code regs., tit. 14, § 15000 et seq., Appendix F).

The SSU6 would use geothermal resources in the form of steam, consuming substantial amounts of energy. However, according to the State Department of Commerce, Division of Oil, Gas and Geothermal Resources (DOGGR 2002), CEC staff (CEC 2002e) and the Committee, sufficient resources exist to supply the SSU6 for its designed 30-year life.

Geothermal power plants produce electric power by expanding steam in the steam turbine. This steam comes from heated, pressurized brine in the ground. Geothermal resources are considered renewable if the quantities of water and heat used are being replaced continuously. Water recharge can occur from rainfall, subterranean drainage, or human efforts. Heat recharge occurs when there is sufficient heat, near enough to the surface, to replace that used in power generation. The geothermal resource available at the Salton Sea Known Geothermal Resource Area (the Salton Sea KGRA) can be considered renewable because a magma intrusion near the surface provides heat recharge, and subterranean and surface drainage from an area of 8,360 square miles provides water recharge.

The applicant proposes to use a high efficiency, triple-pressure steam turbine. The geothermal fluid would be conveyed to the steam handling system where steam would be separated from the brine in three flashes, producing high-pressure, standard-pressure and low-pressure steam for use in the turbine. Chemically stabilized brine flows from the steam handling system to the solids handling system where solids are removed, after which the brine is injected back into the ground. The turbine uses the steam produced at all three pressures to generate power, the most efficient steam turbine configuration possible. In the older, less efficient geothermal power plants currently operating at the Salton Sea, steam is produced in two pressures, high and low. Before entering the steam turbine, the high-pressure steam is throttled down to the pressure of the low-pressure steam, where it is mixed with the rest of the low-pressure steam. Only this low-pressure (low energy content) steam is expanded in the turbine to generate power, and much of the energy in the higher pressure (higher energy content) steam is wasted. The proposed steam turbine uses steam far more efficiently than the older machines.

### Alternative Generating Technologies

Alternative generating technologies for the SSU6 are considered in the AFC (CEOE 2002a, AFC § 6.2.3). Conventional boiler and steam turbine, combined cycle

combustion turbine, simple cycle combustion turbine, natural gas, coal, oil, solar, wind, hydroelectric, biomass, nuclear and municipal solid waste technologies are all considered. Given the facts that geothermal generating technology decreases reliance on natural gas and oil, and increases reliance on renewable energy sources, combined with the project objectives and location, staff agrees with the applicant that only geothermal generating technology is feasible.

### Alternative Heat Rejection System

The applicant proposes to employ an evaporative cooling system (mechanical draft, counter flow cooling towers) as the means for rejecting power cycle heat (mainly condensate heat) (CEOE 2002a, AFC §§ 3.3.3.2, 3.3.5.1, 6.2.3.14). An alternative heat rejection system would utilize an air-cooled condenser.

The local climate in the Salton Sea area is characterized by high temperatures and low relative humidity (low wet-bulb temperature). In low temperatures and high relative humidity (low dry-bulb temperature), the air-cooled condenser performs relatively efficiently compared to the evaporative tower. However, at the SSU6 project area (low wet-bulb temperature and high dry-bulb temperature) the air-cooled condenser performance is relatively poor compared to that of an evaporative cooling tower. Furthermore, the performance of the heat rejection system affects the performance of the steam turbine, impacting turbine efficiency. At the SSU6 project site, evaporative cooling would be considerably more effective than the air-cooled condenser, resulting in higher steam turbine efficiency.

In conclusion, due to the renewable energy source available, the generating equipment (triple-pressure steam turbine) and evaporative cooling, energy consumed by the project would not create significant adverse effects on energy supplies or resources, nor would it require additional sources of energy supply or consume energy in a wasteful or inefficient manner.

## FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, will not influence, nor will it be influenced by, project efficiency. Any efficiency impacts due to closure of the project would be on the electric system as a whole. Yet the vast size of the electric system serving California, the number of generating plants offering to sell power into it, and the existence of the California Independent System Operator to ensure the efficient management of the system, all lend assurance that closure of this facility will not produce significant adverse impacts on efficiency.

## CONCLUSIONS AND RECOMMENDATIONS

The project, if constructed and operated as proposed, would generate 185 MW (nominal net output) of electric power using the most efficient generating technology currently available for geothermal power projects. In addition, employment of the proposed evaporative heat rejection system instead of an air-cooled system proves to be most suitable due to the enhanced turbine efficiency and the availability of condensed geothermal steam.

The project would decrease reliance on natural gas and oil, and would increase reliance on renewable energy resources. As proposed, the SSU6 would consume substantial amounts of energy. However, since it would consume a renewable resource and would employ the most efficient generating technology and heat rejection system available, it would not create significant adverse effects on energy supplies or resources, nor would it require additional sources of energy supply or consume energy in a wasteful or inefficient manner. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

No energy standards apply to the project. Facility closure would not likely present significant impacts on electric system efficiency.

From the standpoint of efficiency, staff believes the SSU6 can be certified. No Conditions of Certification are proposed.

## REFERENCES


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# POWER PLANT RELIABILITY

Testimony of Shahab Khoshmashrab

## INTRODUCTION

In this analysis, Energy Commission staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric system it serves (see **Setting** below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliability of power generation. While CE Obsidian Energy, LLC (applicant) has predicted a 95 percent or higher availability for the Salton Sea Unit 6 Project (SSU6) (see below), staff uses the benchmark identified above, rather than the applicant's projection, to evaluate the project's reliability.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Presently, there are no laws, ordinances, regulations or standards (LORS) that establish either power plant reliability criteria or procedures for attaining reliable operation. However, the commission must make findings as to the manner in which the project is to be designed, sited and operated to ensure safe and reliable operation (Cal. Code Regs., tit. 20, § 1752(c)). Staff takes the approach that a project's reliability is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if the project exhibits reliability at least equal to that of other power plants on that system (see **Setting** below).

## SETTING

In the regulated monopoly electric industry of past decades, the utility companies assured overall system reliability, in part, by maintaining a "reserve margin." This amounted to having on call, at all times, sufficient generating capacity, in the form of standby power plants, to quickly handle unexpected outages of generating or transmission facilities. The utilities generally maintained a 7- to 10-percent reserve margin, meaning that sufficient capacity was on call to quickly replace from 7 to 10 percent of total system resources. This margin proved adequate, in part because of the reliability of the power plants that constituted the system.

Now, in the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the California Independent System Operator (CaISO), an entity that purchases, dispatches and sells electric power throughout the state. How CaISO will ensure system reliability is still being determined; protocols are being developed and put in place that will, it is anticipated, allow sufficient reliability to be maintained under the competitive market system. "Must-run" power purchase agreements and "participating generator" agreements are two mechanisms being employed to ensure an adequate supply of reliable power.

The CaISO also requires those power plants selling ancillary services, as well as those holding reliability must-run contracts, to fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes (CaISO 2002);
- describing all remedial actions taken during any outages (CaISO 2002); and
- scheduling all planned maintenance outages with the CaISO.

The CaISO's mechanisms to ensure adequate power plant reliability apparently were devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there is cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants exhibit individual reliability sufficiently lower than this historical level, the assumptions used by CaISO to ensure system reliability will prove invalid, with potentially disappointing results. On November 29, 2001, the CaISO Board of Directors determined to pursue a program to establish and enforce power plant maintenance standards (McCorkle 2001).

Until the restructured competitive electric power system has undergone a shakeout period, and the effects of varying power plant reliability are thoroughly understood and compensated for, staff deems it wise to encourage power plant owners to continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

The applicant proposes to operate the 185 MW (nominal net output) SSU6, selling energy and capacity to the Imperial Irrigation District (IID) and to the power market (CEOE 2002a, AFC § 1.2). The project is expected to operate at an overall availability of 95 percent or higher (CEOE 2002a, AFC §§ 4.1, 6.2.3.1).

## ANALYSIS

The availability factor for a power plant is the percentage of the time that it is available to generate power; both planned and unplanned outages subtract from its availability. Measures of power plant reliability are based on its actual ability to generate power when it is considered available, and are based on starting failures and unplanned, or forced, outages. For practical purposes, reliability can be considered a combination of

these two industry measures, making a reliable power plant one that is available when called upon to operate. Throughout its intended 30-year life (CEOE 2002a, AFC §§ 3.5.1, 4.1.1), the SSU6 will be expected to perform reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that the SSU6 will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

## EQUIPMENT AVAILABILITY

Equipment availability will be ensured by use of appropriate quality assurance/ quality control (QA/QC) programs during design, procurement, construction and operation of the plant and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

### Quality Control Program

The applicant describes a QA/QC program (CEOE 2002a, AFC § 4.2.7) typical of the power industry. Equipment would be purchased from qualified suppliers, based on technical and commercial evaluations. The project would maintain a record of documents for review and reference including vendor instruction manuals; design calculations and drawings; quality assurance reports; inspection and equipment testing records; conformed construction drawings and records; procurement specifications; and purchase orders and correspondence. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

## PLANT MAINTAINABILITY

### Equipment Redundancy

A generating facility called on to operate in baseload service for long periods of time must be capable of being maintained while operating. A typical approach for achieving this is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide appropriate redundancy of function for the project (CEOE 2002a, AFC § 4.2; Appendix F). The standard and low-pressure crystallizer trains will be redundant, allowing full plant output to be maintained when one of the trains is taken out of service (CEOE 2002a, AFC § 4.2.1). Redundancy will be provided in the steam turbine subsystems where practical (CEOE 2002a, AFC § 4.2.2). Further, the plant's distributed control system (DCS) will be fully redundant with automatic tracking and switchover capability in case of primary microprocessor failure. Four 33 percent parallel ejector trains featured in the gas removal system will be available, allowing one train to be isolated for maintenance while maintaining plant operation at full capacity with the other three trains. Enough wells will be drilled to provide production and injection

capacity so that full plant output can be maintained while wells are being individually worked over (CEOE 2002a, AFC § 4.2.1). The plant instrument air system will be equipped with redundant systems. Other balance of plant equipment will be provided with redundancy (CEOE 2002a, AFC § 4.2; Appendix F), including:

- two 100-percent air compressors;
- two 100-percent condensate pumps;
- three 50-percent vertical circulating water pumps per cooling tower; and
- two 100-percent blow down pumps;

With this opportunity for continued operation in the face of equipment failure, staff believes that equipment redundancy would be sufficient for a project such as this.

### Maintenance Program

The applicant proposes to establish a plant maintenance program typical of the industry (CEOE 2002a, AFC § 4.2.8). Equipment manufacturers provide maintenance recommendations with their products; the applicant will base its maintenance program on these recommendations. The program would encompass both preventive and predictive maintenance techniques. Maintenance outages would be planned for periods of low electricity demand. In light of these plans, staff expects that the project would be adequately maintained to ensure acceptable reliability.

## FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

### Fuel Availability

According to the State Department of Commerce, Division of Oil, Gas and Geothermal Resources (DOGGR), the Salton Sea Geothermal Field is believed to supply sufficient resources in commercial quantities for the life of the SSU6 (DOGGR 2002).

### Water Supply Reliability

The SSU6 would be designed to be self-sufficient with regard to water supply to the greatest extent practical (CEOE 2002a, AFC §§ 5.4.1.1, 3.3.4.2). Water produced from the condensate steam in the power cycle would supply the needed makeup water for the plant's heat rejection system. Additionally, this condensate would supply much of the water necessary to decrease the concentration of brine for ease of re-injection. This water would constitute over 95 percent of the facility's water need. Fresh water from the IID canal system would provide the balance. For further discussion of water supply, see **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 and tsunamis (tidal waves) will not likely represent a hazard for this project, but flooding, seismic shaking (earthquake) and seiches (waves in inland bodies of water) present credible threats to reliable operation.

### Flooding

Site elevation ranges from 232 feet below mean sea level to 227 feet below mean sea level. The site is within the 100-year flood plain. To mitigate the flood hazard, the applicant plans to construct a berm around the entire facility with a top of berm elevation of –220 feet. The applicant also proposes to design the drainage plan for the project site to prevent flooding of the facilities by a 100-year, 24 hour storm event, in accordance with the Imperial County Flood Control requirements (CEOE 2002a, AFC §§ 4.3.1.2, 5.2.1, 5.4.4.1). In light of compliance with the flood control requirements and the mitigation measures proposed by the applicant, staff believes that concerns with the power plant functional reliability due to flooding events will be mitigated to less than significant. For further discussion, see **Soil and Water Resources**.

### Seismic Shaking

The site lies within Seismic Zone 4 (CEOE 2002a, AFC § 4.3.1.1); see **Geology and Paleontology**. The project would be designed and constructed to the latest appropriate LORS (CEOE 2002a, AFC § 5.2.4; Appendix B). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking compared to older facilities, because these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project would likely perform at least as well as, and perhaps better than, older existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no real concern that power plant reliability will affect the electric system's reliability due to seismic events.

### Seiches

A wave created by earthquake shaking in an enclosed body of water is called a seiche. The possibility may exist for a seiche to occur in the Salton Sea; see **Geology and Paleontology**. The proposed site is situated nearly at the Salton Sea level and approximately 1,000 feet southeast of the Salton Sea. Therefore, it is possible for flooding from a seiche to affect the site. However, there are no records of seiches occurring during recent earthquakes in the Imperial Valley. Because of the applicant's proposal to mitigate the possible impact of a seiche, such as raising the embankment height along the western side of the site and/or ground improvement (CEOE 2002a, AFC §§ 5.2.1.4.5, 5.2.4.4), staff believes that concerns with the power plant functional reliability due to seiches events will be mitigated to less than significant.

## COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as many other related reliability data) are kept by the North American Electric Reliability Council (NERC). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System (GADS), and periodically summarizes and publishes the statistics on the Internet (http://www.nerc.com). NERC reports the following summary generating unit statistics for the years 1996 through 2000 (NERC 2001):

**For Geothermal units (All MW sizes)**
Availability Factor = 91.00 percent

The triple-pressure, condensing steam turbine technology that is planned for the project has been on the market for many years now, and can be expected to exhibit typically high availability. The brine handling and treatment technology to be employed in the SSU6 has been under development by CEOE and its predecessors for several decades, and has proven reliable. In light of this, the applicant's prediction of an annual availability factor of 95 percent or higher (CEOE 2002a, AFC §§ 4.1, 6.2.3.1) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). In fact, these new machines can well be expected to outperform the fleet of various (mostly older) steam turbines that make up the NERC statistics. Technological advancements, as well as redundancy as illustrated above, have led to extremely high reliability for the steam turbine considered for this project. Much maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures. The applicant's estimate of plant availability therefore appears realistic. The stated procedures for assuring design, procurement and construction of a reliable power plant are in keeping with industry norms, and staff believes they are likely to yield an adequately reliable plant.

## FACILITY CLOSURE

Closure of the facility, whether planned or unplanned, cannot impact power plant reliability. Reliability impacts on the electric system from facility closure, should there be any, are discussed in **Transmission System Engineering**.

## CONCLUSIONS AND RECOMMENDATION

The applicant predicts an equivalent availability factor of 95 percent or higher, which staff believes is achievable in light of the industry norm of 91 percent for this type of plant.

The geothermal technology chosen for the project would provide a reliable power source for Imperial County and California.

Based on a review of this proposal, staff concludes that the plant will be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No Conditions of Certification are proposed.

## REFERENCES


CaISO (California Independent System Operator) 2002. "Forced Outage Reporting Requirements," CaISO web site, posted on August 14, 2002.

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# TRANSMISSION SYSTEM ENGINEERING

Testimony of Sudath Arachchige, Demy Bucaneg P.E.and Al McCuen

## SUMMARY OF CONCLUSIONS

Staff concludes that the proposed Salton Sea Unit 6 (SSU6) switchyard, outlet lines, and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards (LORS). The Interconnection of the project may result in the need to upgrade the breaker capacity of the Coachella Valley substation, to install a remedial action scheme (RAS) and to upgrade transformers within the Imperial Irrigation District (IID) power system due to increase of power flow. No additional new transmission facilities, other than those proposed by the applicant, are required for the interconnection of the 185MW Salton Sea Unit 6 Project.

## INTRODUCTION

This Transmission System Engineering (TSE) analysis in the Staff Assessment (SA) provides the basis for the findings in the Energy Commission's Decision. The SA 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 SA also assesses whether or not the applicant has accurately identified all interconnection facilities required for addition of the project to the electric grid.

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

Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). Therefore, the Energy Commission must identify and evaluate the environmental effect of construction and operation of any new or modified transmission facilities required for the project's interconnection to the electric grid and also beyond the project's interconnection with the existing transmission system that are required or are a reasonably foreseeable consequence of the power plant addition to the California transmission system.

CE Obsidian Energy (owner, applicant) filed an Application for Certification (AFC) with the California Energy Commission to construct a nominal 200 megawatt (MW) geothermal electric power plant in Imperial County, California. The owner proposes to connect their project, Salton Sea Unit 6 (SSU6) into the Imperial Irrigation District (IID) transmission system via two new 161kV lines. IID would design, construct and own the interconnection facilities including towers, lines, and the Bannister switch yard. One interconnection would connect to the new IID Bannister Switching Station. The existing 161kV "L" line would loop in and out through the IID Bannister Switching Station. The other 161kV circuit would connect to the IID Midway Substation. In case both segments

of the “L” line are out of service, the 15-mile 161kV line that terminates at the Midway substation would serve as an additional interconnection. The project was originally projected to be on line by the first quarter of 2005. (SSU6 2002-Volume 1, AFC section 1.2) Delays in the review process make winter of 2005-2006 a more realistic on line date.

## 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.
- California Public Utilities Commission (CPUC) General Order 128 (GO-128), “Rules for Construction of Underground Electric Supply and Communications Systems,” formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons engaged in the construction, maintenance and operation or use of underground electric lines and to the public in general.
- The National Electric Safety Code, 1999 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- North American Reliability Council (NERC)/Western Electricity Coordinating Council (WECC) Planning Standards merge the WECC Planning Standards into the NERC Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards. These standards allow planning of electric systems to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage and stability limits. These standards include the reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of the standards, “NERC/WECC Planning Standards with Table I and WECC Disturbance-Performance Table” and on Section I.D, “NERC/WECC Standards for Voltage Support and Reactive Power”. These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal loading, voltage and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) and to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines in a right of way and/or multiple generators). While controlled loss of generation or load or system separation is

permitted in certain circumstances, their uncontrolled loss is not permitted (WECC August 9, 2002).

- Cal-ISO Grid Planning Standards also provide standards, and guidelines to assure the adequacy, security and reliability in the planning of the Cal-ISO transmission grid facilities. The Cal-ISO Grid Planning Standards incorporate the WSCC and NERC Planning Standards. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC and the NERC Planning Standards for Transmission System Contingency Performance. However, the Cal-ISO Standards also provide some additional requirements that are not found in the WSCC or NERC Planning Standards. The Cal-ISO Standards apply to all participating transmission owners interconnecting to the Cal-ISO controlled grid. They also apply when there are any impacts to the Cal-ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the Cal-ISO (Cal-ISO 2002a).

## EXISTING FACILITIES AND RELATED SYSTEMS

The SSU6 facility is bounded by five existing substation facilities, El Centro Switching Station (ECSS), Midway, Avenue 58 (Ave 58), Niland, and Coachella Valley Substations (Coachella). Existing transmission line facilities include:

- ECSS-Ave 58 161kV “L” Line
- ECSS-Midway 161kV “M” Line
- Ave 58-Coachella 161kV Line
- Midway-Niland 161kV Line
- Niland-Coachella 161kV “N” Line
- Midway-Coachella 230kV “KN” and “KS” Lines

The above substation and transmission line facilities are owned by IID. The ECSS connects to San Diego Gas & Electric (SDG&E) system at the Imperial Valley Substation through the 230kV “S” Line. The Southern California Edison (SCE) system ties with the IID System at two points:

- SCE’s Devers Substation via Coachella-Devers 230kV “KN” Line; and,
- SCE’s Mirage Substation via Coachella-Ramon 230kV Line and Ramon-Mirage 230kV Line.

The Arizona Power Service (APS) and IID intertie at the Yucca Substation. Western Area Power Authority (WAPA) interconnects with IID at Blythe Station and Knob Substation respectively (Pre-SSU6 Project, 2005 IID System Configuration Map).

The applicant has proposed two points of interconnection for the SSU6, one at the new Bannister substation utilizing three-breaker ring bus configuration and the second point of interconnection at Midway substation.

## PROJECT DESCRIPTION

### SWITCHYARD AND INTERCONNECTION FACILITIES

The SSU6 is a geothermal power generating facility to be located in the area of the existing Salton Sea geothermal power units near Niland, California. The SSU6 will consist of one steam turbine generator (STG) with a nominal output of approximately 200 MW (SSU6 2002-volume 1, AFC, Section 3-1). The expected net output of the plant, after station service usage will be approximately 185MW.The generating unit will be connected to a dedicated 260MVA step-up transformer and the high voltage terminals of the transformer will be connected to the 161kV bus.

### SSU6 TRANSMISSION INTERCONNECTION FACILITIES

The SSU6 will be interconnected to IID grid via two 161kV single circuits. One interconnection will be a 16-mile single circuit connected to the L-line at Bannister switching station. The other interconnection will be a 15-mile single circuit connected at Midway substation. The interconnection at Midway substation would be a direct inter-tie between the SSU6 and IID's existing M -line.

## ANALYSIS AND IMPACTS

### SYSTEM RELIABILITY

A System Impact Study (SIS) for connecting a new power plant to the existing power system grid is performed to determine the alternate and preferred interconnection facilities to the grid, downstream transmission system impacts and their mitigation measures in conformance with system performance levels as required in Utility reliability criteria, NERC/WECC planning standards and Cal-ISO reliability criteria. The study determines both positive and negative impacts, and for the reliability criteria violation cases (for the negative impacts) determines the alternate and preferred additional transmission facilities or other mitigation measures. The study is conducted with and without the new generation project and its interconnection facilities by using the computer model base case for the year the generator project will come on-line. The study normally includes a Load Flow study, Transient Stability study, Post-transient Load Flow study and Short Circuit study. The study is focused on thermal overloads, voltage deviations, system stability (excessive oscillations in the generators and transmission system, voltage collapse, loss of loads or cascading outages) and short circuit duties. The study must be conducted under the normal condition (N-0) of the system and also for all credible contingency/emergency conditions, which includes the loss of a single system element (N-1) such as a transmission line, transformer or a generator and the simultaneous loss of two system elements (N-2), such as two transmission lines or a transmission line and a generator. The study may also be conducted for credible simultaneous loss of multiple (more than two) system elements. In addition to the above analysis, the studies may be performed to verify whether sufficient active or reactive power margins are available in the area system or area sub-system to which the new generator project will be interconnected.

## Scope of System Impact Study (SIS)

The study was performed by IID at the request of the CE Obsidian Energy to identify the transmission system impacts caused by the SSU6 project on the IID's 161kV system and the systems of the SCE, WAPA, APS and SDG&E. The SIS included a Power Flow Study, Short Circuit Study, and Dynamic Stability Analysis (SSU6 2002, System Impact Study). The study modeled the proposed SSU6 for a net output of 185MW. The base cases included all approved IID, SCE, WAPA, APS and SDG&E projects, modeled major transmission system path flows, and the proposed queue generation projects before the on-line date of the SSU6. The detailed study assumptions have been described in the SIS. The Power Flow studies were conducted with and without the SSU6 connected to the IID grid at the Bannister switching station and Midway substation using a 2005 Heavy Summer base case under normal (N-0), Cal-ISO Category B (N-1) and Category C (N-2) contingency conditions. The Power Flow study assessed the project's impact on thermal loading of the transmission lines and equipment. Dynamic stability studies were conducted with the SSU6 using the 2005 Heavy Summer base case to determine whether the SSU6 would create instability in the system following certain selected outages. Short circuit studies were conducted with and without the SSU6 to determine if the SSU6 would result in overstressing existing substation facilities.

## Power Flow Study Results

SIS showed pre-existing overloads in the power systems. The overloading problems affect transformer and transmission line facilities under N-1 and N-2 conditions. The proposed mitigation measures for the pre-existing conditions involve the installation of RAS to trip generation from the IID System and the reduction of generation from the Blythe I Energy Project. Assuming that the pre-existing conditions are corrected, the transmission system impact study identified three minor transmission conditions that require mitigation for the connection of and power delivery from SSU6 to IID's transmission system. Based on the SIS results, there are no adverse impacts under normal conditions of the network due to interconnection of the SSU6 as proposed. Below are the study results and mitigation measures based on conducted contingency analysis.

## Normal (N-0) Conditions

- The SIS results indicated that no overloads would occur under N-0 conditions in any of the seven base cases studied. The addition of the SSU6 project does not have negative thermal impact on the system under N-0 condition.

## Contingency N-1/Cal-Iso Category B Conditions

- At the Midway Substation, the outage of the 230/92kV Transformer #1 overloads Transformer #2 by approximately 41% and vice versa.
- The outage of the 161/92kV Transformer in Avenue 58 Substation overloads the 161/92kV Transformer #3 at the Coachella Valley Substation by approximately 9%.

## Contingency N-2/Cal-Iso Category C Conditions

- The outage of both ECSS-Bannister and ECSS-Midway 161kV Lines overloads the 161/92kV Transformer #1 in Niland Substation by approximately 45% at the worst case scenario.
- The outage of both ECSS-Bannister and Midway-SSU6 161kV Lines overloads the 161/92kV Transformer #1 in Avenue 58 Substation by approximately 24% at the worst case scenario. Same outage creates overload problems in the Bannister-Ave 58 161kV Line by approximately 10%.
- The tripping of both Coachella-Devers and Ramon-Mirage 230kV Transmission Lines overloads the Blythe-Blythe SC 161kV Line by approximately 2%.
- The tripping of both Coachella-Devers and Devers-Mirage 230kV Transmission Lines overloads the 230/115kV Transformer #1 in Mirage Substation by approximately 7%.
- Outage of the Ave 58-Bannister and Midway-SSU6 161kV Lines overloads the ECSS-Bannister 161kV Line by approximately 8%.
- Outage of the Coachella-Midway 230kV Lines 1 and 2 overloads the Earthe2-Reg1ex 92kV Line by approximately 57%.
- Outage of the Coachella-Devers and Coachella-Ramon 230kV Transmission Lines overloads the 230/92kV Transformer #1 at Ramon Substation by approximately 4%.

## Mitigation

The following mitigation measures were identified for the impacts described herein.

- At the Avenue 58 Substation: replace the 161/92kV, 125 MVA transformer with a 225MVA transformer.
- At the Niland Substation: replace the 161/92kV, 75MVA transformer with the Avenue 58 125 MVA transformer.
- At the Coachella Valley Substation: install a parallel 161/92kV, 125 MVA transformer with the existing 161/92kV transformer, 125 MVA transformer.
- For the Bannister-Ave 58 and ECSS-Bannister 161kV Lines: implement operating procedures to reduce SSU6 generation to approximately 170MW.
- At the Ramon Substation: install RAS to trip generation at the IID collector system.
- For the Earthe2-Reg1ex 92kV Line: install RAS to trip generation at the IID collector system.
- In addition to the above mitigation plan, the possibility of the requirement of an operating procedure was identified under the unlikely contingency of loosing both the 161kV line from the project to IID's Midway substation, and either the 161kV line from the project to the El Centro Switching Station or to the Avenue 58 substation at the time of extreme hot weather conditions.

The IID and the applicant will coordinate with the adjacent utilities to identify mitigation measures involving the overloads in the Blythe-Blythe SC 161kV Line and in the

230/115kV Transformer #1 at Mirage Substation. These overloads are enumerated in the "Contingency N-2/Cal-ISO Category C Conditions" above.

Adding the SSU6 project does not have a negative thermal impact on the system under category B and C contingency conditions. The SSU6 will deliver power to the IID system through contractual agreements thus minimizing any significant impact on external system. The identified transformers above are within the fence lines of the respective substations and would not create significant environmental impacts.

## Transient Stability Study Results

Dynamic Stability studies for SSU6 were conducted using 2005 Heavy Summer base case to determine if the SSU6 would create any adverse impact on the stable operation of the transmission grid following selected Cal-ISO category B (N-1) & C (N-2) outages (SSU6-2002, SIS). The results indicate there are no identified transient stability concerns on the transmission system following the selected disturbances, as outlined in the SIS for integration of the SSU6.

## Post-Transient Power Flow Study Results

The power flow studies did not indicate that voltage deviations of 5% or greater would occur, therefore no post-transient studies were undertaken.

## Short Circuit Study Results

Short circuit studies were performed to determine the degree to which the addition of the SSU6 project increases fault duties at the IID's substations, adjacent utility substations, and the other 161-kV and 230-kV busses within the study area. The busses at which faults were simulated, the maximum three phase and single line-to-ground fault currents at these busses both without and with the SSU6 project, and information on the breaker duties at each location are summarized in table below (Section-5.2, SSU6-AFC-2002).

1. The short circuit fault duty analysis at Coachella Valley Substation identified three 92kV breakers at 92.8% of their maximum interrupting rating in the pre-project base case and 93.6% of their maximum interrupting rating in the post-project base case. The calculated maximum short circuit current is below the short circuit interrupting rating of the cited circuit breakers. However, the owner has recommended replacement of three circuit breakers at Coachella Valley Substation as identified in the tabulation.

| Substation | Breaker | kV | Short Circuit Interrupting Rating (Amps) | Pre-project Short Circuit (Amps) | Post project Short Circuit (Amps) |
|---|---|---|---|---|---|
| Coachella Valley | X10 | 92 | 20000 | 18563 | 18715 |
| | CLNO | 92 | 20000 | 18563 | 18715 |
| | CXSO | 92 | 20000 | 18563 | 18715 |

## COMPLIANCE WITH LORS

The SIS would comply with the NERC/WECC planning standards and Cal-ISO reliability criteria. The proposed SSU6 Bannister switchyard will be located within the corridor of the proposed transmission lines. The IID will design, build and operate the proposed switchyard. The 161kV overhead lines will be designed and built by the IID. The proposed modifications to the Midway substation will be done by IID within the substation fenced yard.

Staff concludes that assuming the Conditions of Certification are met; the project will meet the requirements and standards of all applicable LORS.

## FACILITY CLOSURE

Planned closure occurs in a planned and orderly manner such as at the end of its useful economic or mechanical life or due to gradual obsolescence. Under such circumstances, the owner is required to provide a closure plan 12 months prior to closure, which in conjunction with applicable LORS, is considered sufficient to provide adequately for safety and reliability. For instance, a planned closure provides time for the owner (CEOE) to coordinate with the Transmission Owner (TO), in this case the IID, to assure that the TO's system will not be closed into the outlet thus energizing the project substation. Alternatively, the owner may coordinate with the TO to maintain some power service via the outlet line to supply critical station service equipment or other loads.

An unplanned closure occurs when the facility is closed suddenly and/or unexpectedly for a short term due to unforeseen circumstances such as a natural or other disaster or emergency. During such a closure the facility cannot insert power into the utility system. Closures of this sort can be accommodated by establishing an on-site contingency plan (TSE-5, g) ii (Executed Facility Interconnection Agreement).

An unplanned permanent closure occurs when the project owner abandons the facility. This is considered to be a permanent closure. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. An on-site contingency plan, that is in place and approved by the Energy Commission's Compliance Project Manager (CPM) prior to the beginning of commercial operation of the facilities, will be developed to assure safety and reliability (TSE-5, g) ii (Executed Facility Interconnection Agreement).

## RESPONSE TO AGENCY AND PUBLIC COMMENTS

### IMPERIAL COUNTY PUBLIC WORKS DEPARTMENT (ICPWD) – Letter dated December 5, 2002

**ICPWD (12-05-03) 1:** Item 6 -Section 3.3.6.1.2 – Transmission Line Specifications – The proposed transmission line will be designed and constructed to G.O. 95 and other applicable State and local codes. Around 1990, the 230kV transmission line that will be

connected to failed due to high winds. It's our understanding the line was designed to G.O. 95 and not UBC. Although no reference or comments were made specifically, the transmission line should be designed for microbursts with UBC maximum exposure and 1.5 for essential facilities.

**Response:** Details and evaluation about the line failure were not available for analysis. UBC does not address design and construction standards for power utility overhead transmission lines. These requirements are specifically reinforced in the CPUC G.O. 95 rules and engineering standards. In our coordination with the Imperial Irrigation District (IID), the construction of the 161kV transmission line will be in accordance with CPUC G.O. 95. The proposed L Line loop, SB Line and MD Line will be constructed for a 108 mph wind speed (E. Lutz email dated May 29, 2003).

**ICPWD (12-05-03) 2:** General Note – Lastly, the project will need to pay a fair share for the maintenance of the first order level circuit backbone lines.

Response: This specific maintenance agreement should be drawn between the Owner and IID. Provisions may be stipulated in the facility interconnection agreement under COC TSE-5g) ii. The Energy Commission does not regulate cost responsibility for transmission line facilities.

## CONCLUSIONS AND RECOMMENDATIONS

1. The load flow analysis identifies some overload violations. The stability studies indicated that the SSU6 project has no adverse impact on system stability. Mitigation measures have been identified.
2. Post transient analysis identified no post transient voltage deviation criteria violation.
3. The three-phase short circuit duty analysis indicated that the 185 MW SSU6 generation project marginally increases the pre-project short circuit duty but is still under the breaker interrupting capacity.
4. The addition of SSU6 and related transmission lines will increase operator flexibility for maintaining the transmission system during steady state and contingency conditions.

## RECOMMENDATIONS

If the Commission approves the project, staff recommends the following Conditions of Certification to insure system reliability and conformance with LORS.

## CONDITIONS OF CERTIFICATION FOR TSE

**TSE-1** The project owner shall furnish to the CPM and to the CBO a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To

facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

**Verification:** At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

| **Table 1: Major Equipment List** |
|---|
| Breakers |
| Step-up Transformer |
| Switchyard |
| Busses |
| Surge Arrestors |
| Disconnects |
| Take off facilities |
| Electrical Control Building |
| Switchyard Control Building |
| Transmission Pole/Tower |
| Grounding System |

**TSE-2** Prior to the start of construction the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or D) a mechanical engineer. (Business and Professions Code Sections 6704 et seq., require state registration to practice as a civil engineer or structural engineer in California.)

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical or civil and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project.

If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes; if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**TSE-3** If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action. (1998 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

**Verification:** The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action required to obtain the CBO's approval.

**TSE-4** For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the

installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

a) receipt or delay of major electrical equipment;

b) testing or energization of major electrical equipment; and

c) the number of electrical drawings approved, submitted for approval, and still to be submitted.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

**TSE-5** The project owner shall ensure that the design, construction and operation of the proposed transmission facilities will conform to all applicable LORS, including the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations as determined by the CBO.

a) The SSU6 will be interconnected to IID grid via two 161kV single circuits. One of the proposed interconnection would be a 16-mile single circuit connected to the L-line at Bannister switching station. The new Bannister switching station shall be a three-breaker ring bus configuration. The other interconnection would be a 15-mile single circuit 161kV Line connected at the Midway substation.

b) The power plant switchyard and outlet line shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36 and 37 of the “High Voltage Electric Safety Orders”, Cal-ISO standards, National Electric Code (NEC) and related industry standards.

c) Breakers and busses in the power plan switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

d) Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner’s standards.

e) The project conductors shall be sized to accommodate the full output from the project.

f) Termination facilities shall comply with applicable SGD&E interconnection standards.

g) The project owner shall provide to the CPM:

i) The final Detailed Facility Study (DFS) including a description of facility upgrades, operational mitigation measures, and/or Special Protection System (SPS) sequencing and timing if applicable,

ii) Executed project owner and IID Facility Interconnection Agreement.

**Verification:** At least 60 days prior to the start of construction of transmission facilities (or a lesser number of days mutually agree to by the project owner and CBO, the project owner shall submit to the CBO for approval:

a) Design drawings, specifications and calculations conforming with CPUC General Order 95 or NESC, Title 8, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", NEC, applicable interconnection standards and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems and major switchyard equipment.

b) For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst case conditions"[1] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", NEC, applicable interconnection standards, and related industry standards.

c) Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5** a) through f) above.

d) The final DFS, including a description of facility upgrades, operational mitigation measures, and/or SPS sequencing and timing if applicable, shall be provided concurrently to the CPM.

**TSE-6** The project owner shall inform the CPM and CBO of any impending changes, which may not conform to the requirements **TSE-5** a) through f), and have not received CPM and CBO approval, and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

**Verification:** At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes which may not conform to requirements of **TSE-5** and request approval to implement such changes.

**TSE-7** The project owner shall provide the following Notice to the California Independent System Operator (Cal-ISO) prior to synchronizing the facility with the California Transmission system:

[1] Worst case conditions for the foundations would include for instance, a dead-end or angle pole.

1. At least one week prior to synchronizing the facility with the grid for testing, provide the Cal-ISO a letter stating the proposed date of synchronization; and
2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the ISO Outage Coordination Department.

**Verification:** The project owner shall provide copies of the Cal-ISO letter to the CPM when it is sent to the Cal-ISO one week prior to initial synchronization with the grid. The project owner shall contact the Cal-ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the Cal-ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

**TSE-8** The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8, CCR, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

**Verification:** Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

a) "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.

b) An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan".

c) A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

## REFERENCES

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.

Cal-ISO (California Independent System Operator). 2002a. Cal-ISO Grid Planning Standards, February 2002.

IID (Imperial Irrigation District) 2002a, Imperial Irrigation District System Impact Study submitted to the California Energy Commission. (Included with CEOE, 2003h, Data Response to 105 and 106)

NERC/WECC (North American Reliability Council / Western Electricity Coordinating Council), 2002. NERC/WECC Planning Standards, August 2002.

## DEFINITION OF TERMS

AAC — All Aluminum conductor.

ACSR — Aluminum Conductor Steel-Reinforced.

SSAC — Steel-Supported Aluminum Conductor.

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) that carries the current.

Congestion Management

Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports) will not violate criteria.

Emergency Overload

See Single Contingency. This is also called an L-1.

Kcmil or KCM

Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.

Kilovolt (kV)

A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.

Loop — An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.

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.

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.

Switchyard A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.

Thermal rating See ampacity.

TSE Transmission System Engineering.

Tap A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.

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.

# GENERAL CONDITIONS
# INCLUDING
# COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Connie Bruins

## INTRODUCTION

The project General Conditions Including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with air and water quality, public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission (Energy Commission) and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions;
- establish requirements for facility closure plans; and
- specify conditions of certification that follow 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 assuring that the condition has been satisfied.

## GENERAL CONDITIONS OF CERTIFICATION

### DEFINITIONS

To ensure consistency, continuity and efficiency, the following terms, as defined, apply to all technical areas, including Conditions of Certification:

### SITE MOBILIZATION

Moving trailers and related equipment onto the site, usually accompanied by minor ground disturbance, grading for the trailers and limited vehicle parking, trenching for construction utilities, installing utilities, grading for an access corridor, and other related activities. Ground disturbance, grading, etc. for site mobilization are limited to the portion of the site necessary for placing the trailers and providing access and parking for

the occupants. Site mobilization is for temporary facilities and is, therefore, not considered construction.

## GROUND DISTURBANCE

Onsite activity that results in the removal of soil or vegetation, boring, trenching or alteration of the site surface. This does not include driving or parking a passenger vehicle, pickup truck, or other light vehicle, or walking on the site.

## GRADING

Onsite activity conducted with earth-moving equipment that results in alteration of the topographical features of the site such as leveling, removal of hills or high spots, or moving of soil from one area to another.

## CONSTRUCTION

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. Construction does **not** include the following:

a. the installation of environmental monitoring equipment;

b. a soil or geological investigation;

c. a topographical survey;

d. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; or

e. any work to provide access to the site for any of the purposes specified in a., b., c., or d.

## START OF COMMERCIAL OPERATION[1]

For compliance monitoring purposes, "commercial operation" is that phase of project development which begins after the completion of start-up and commissioning, where the power plant has reached steady-state production of electricity with reliability at the rated capacity. For example, at the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

## COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

A Compliance Project Manager (CPM) will oversee the compliance monitoring and shall be responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;

2. resolving complaints;

3. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;

[1] A different definition of "Start of Commercial Operation," may be included in the Air Quality (AQ) section (per District Rules or Federal Regulations). In that event, the definition included in the AQ section would only apply to that section.

4. documenting and tracking compliance filings; and
5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval the approval will involve all appropriate staff and management.

The Energy Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

## Pre-Construction and Pre-Operation Compliance Meeting

The CPM may schedule pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings will be to assemble both the Energy Commission's and the project owner's technical staff to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification to confirm that they have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings shall ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

## Energy Commission Record

The Energy Commission shall maintain as a public record, in either the Compliance file or Docket file, for the life of the project (or other period as required):

- all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
- all monthly and annual compliance reports filed by the project owner;
- all complaints of noncompliance filed with the Energy Commission; and
- all petitions for project or condition changes and the resulting staff or Energy Commission action.

# PROJECT OWNER RESPONSIBILITIES

It is the responsibility of the project owner to ensure that the general compliance conditions and the conditions of certification are satisfied. The general compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, compliance conditions, or ownership. Failure to comply with any of the conditions of certification or the general compliance conditions may result in reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate. A

summary of the General Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section. The designation after each of the following summaries of the General Compliance Conditions (**COM-1, COM-2,** etc.) refers to the specific General Compliance Condition contained in **Compliance Table 1.**

## COM-1, Unrestricted Access

The CPM, responsible Energy Commission staff, and delegate agencies or consultants, shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the files and records maintained on site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

## COM-2, Compliance Record

The project owner shall maintain project files onsite, or at an alternative site approved by the CPM, for the life of the project unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all "as-built" drawings, all documents submitted as verification for conditions, and all other project-related documents.

## COM-3, Compliance Verification Submittals

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions.

Verification of compliance with the conditions of certification can be accomplished by:

1. reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;
2. providing appropriate letters from delegate agencies verifying compliance;
3. Energy Commission staff audits of project records; and/or
4. Energy Commission staff inspections of mitigation or other evidence of mitigation.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the involved condition(s) of certification by condition number and include a brief description of the subject of the submittal**. The project owner shall also identify those submittals **not** required by a condition of certification with a statement such as: "This submittal is for information only and is not required by a specific condition of certification." When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All submittals shall be addressed as follows:

**Compliance Project Manager**
**Docket Number**
**California Energy Commission**
**1516 Ninth Street (MS-2000)**
**Sacramento, CA 95814**

If the project owner desires Energy Commission staff action by a specific date, they shall so state in their submittal and include a detailed explanation of the effects on the project if this date is not met.

## COM-4, Pre-Construction Matrix and Tasks Prior to Start of Construction

Prior to commencing construction a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's **first** compliance submittal , and shall be submitted prior to the first pre-construction meeting, if one is held. It will be in the same format as the compliance matrix referenced below.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times (e.g., 30, 60, 90 days) for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project construction.

Verification lead times (e.g., 90, 60 and 30-days) associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.
It is important that the project owner understand that the submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change based upon the Final Decision

## COMPLIANCE REPORTING

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

## COM-5, Compliance Matrix

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all compliance conditions in a spreadsheet format. The compliance matrix must identify:

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;
7. the compliance status of each condition (e.g., “not started,” “in progress” or “completed” (include the date); and
8. the project’s preconstruction and construction milestones, including dates and status (if milestones are required).

Satisfied conditions do not need to be included in the compliance matrix after they have been identified as satisfied in at least one monthly or annual compliance report.

## COM-6, Monthly Compliance Report

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date on which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the **Key Events List. The Key Events List form is found at the end of this section.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and five copies (or amount specified by Compliance Project Manager) of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;
2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Monthly Compliance Report;
3. an initial, and thereafter updated, compliance matrix which shows the status of all conditions of certification;
4. a list of conditions that have been satisfied during the reporting period, and a description or reference to the actions which satisfied the condition;

5. a list of any submittal deadlines that were missed accompanied by an explanation and an estimate of when the information will be provided;
6. a cumulative listing of any approved changes to conditions of certification;
7. a listing of any filings with, or permits issued by, other governmental agencies during the month;
8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;
9. a listing of the month's additions to the on-site compliance file;
10. any requests, with justification, to dispose of items that are required to be maintained in the project owner's compliance file; and
11. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolutions of any resolved complaints, and the status of any unresolved complaints.

## COM-7, Annual Compliance Report

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall identify the reporting period and shall contain the following:

1. an updated compliance matrix 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;
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;
9. an evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see General Conditions for Facility Closure addressed later in this section]; and

10. a listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved complaints, and the status of any unresolved complaints.

## COM-8, Construction and Operation Security Plan

Thirty days prior to commencing construction, a site-specific Security Plan for the construction phase shall be developed and maintained at the project site. At least 60 days prior to the initial receipt of hazardous materials on-site, a site-specific Security Plan and Vulnerability Assessment for the operational phase shall be developed and maintained at the project site. The project owner shall notify the CPM in writing that the Plan is available for review and approval at the project site.

### Construction Security Plan

The Construction Security Plan must address:

1. site fencing enclosing the construction area;
2. use of security guards;
3. check-in procedure or tag system for construction personnel and visitors;
4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
5. evacuation procedures.

### Operation Security Plan

The Operations Security Plan must address:

1. permanent site fencing and security gate;
2. use of security guards;
3. security alarm for critical structures;
4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;
5. evacuation procedures;
6. perimeter breach detectors and on-site motion detectors;
7. video or still camera monitoring system;
8. fire alarm monitoring system;
9. site personnel background checks [Site personnel background checks are limited to ascertaining that the employee's claims of identity and employment history are accurate. All site personnel background checks must be consistent with state and federal law regarding security and privacy.]; and
10. site access for vendors and requirements for Hazardous Materials vendors to conduct personnel background security checks [Site access for vendors must be strictly controlled. Consistent with recent state and current federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleet and employ only drivers properly

licensed and trained. The project owner is required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous materials conduct personnel background checks on any employee involved in the transportation and delivery of hazardous materials to the power plant. All vendor related personnel background checks will be consistent with site personnel background checks, as per above, including state and federal law regarding security and privacy.].

In addition, in order to determine the level of security appropriate for this power plant, the project owner shall prepare a Vulnerability Assessment and implement site security measures addressing hazardous materials storage and transportation consistent with US EPA and US Department of Justice guidelines [Chemical Vulnerability Assessment Methodology (July 2002)]. The level of security to be implemented is a function of the likelihood of an adversary attack, the likelihood of adversary success in causing a catastrophic event, and the severity of consequences of that event. This Vulnerability Assessment will be based, in part, on the use and storage of certain quantities of acutely hazardous materials as described by the California Accidental Release Prevention Program (Cal-ARP, Health and Safety Code section 25531). Thus, the results of the off-site consequence analysis prepared as part of the Risk Management Plan (RMP) will be used to determine the severity of consequences of a catastrophic event and hence the level of security measures to be provided.

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

## COM-9, Confidential Information

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Docket with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information, that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

## COM-10, Department of Fish and Game Filing Fee

Pursuant to the provisions of Fish and Game Code Section 711.4, the project owner shall pay a filing fee in the amount of $850. The payment instrument shall be provided to the Energy Commission's Project Manager (PM), not the CPM, at the time of project certification and shall be made payable to the California Department of Fish and Game. The PM will submit the payment to the Office of Planning and Research at the time of filing of the notice of decision pursuant to Public Resources Code Section 21080.5.

## COM-11, Reporting of Complaints, Notices, and Citations

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded inquiries shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during

construction and operation. The telephone number shall be provided to the CPM who will post it on the Energy Commission's web page at:

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html

Any changes to the telephone number shall be submitted immediately to the CPM who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies of all complaint forms, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt, to the CPM. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

## FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

There are at least three circumstances in which a facility closure can take place, planned closure, unplanned temporary closure and unplanned permanent closure**.**

## CLOSURE DEFINITIONS

### Planned Closure

A planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

### Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

### Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner remains accountable for implementing the on-site contingency plan. It can also

include unplanned closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

## GENERAL CONDITIONS FOR FACILITY CLOSURE

### COM-12, Planned Closure

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 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.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;
2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;
3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and
4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

In the event that there are significant issues associated with the proposed facility closure plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or the Energy Commission may hold public hearings as part of its approval procedure.

In addition, prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

As necessary, prior to or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities, until Energy Commission approval of the facility closure plan is obtained.

### COM-13, Unplanned Temporary Closure/On-Site Contingency Plan

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all

necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less that 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. (Also see the analysis for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than twelve months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

## COM-14, Unplanned Permanent Closure/On-Site Contingency Plan

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the unlikely event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

## CBO DELEGATION AND AGENCY COOPERATION

In performing construction monitoring of the project, Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Commission staff retains CBO authority when selecting a delegate CBO including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental control when conducting project monitoring.

## ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider. Moreover, to ensure compliance with the terms and conditions of certification and applicable LORS, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

## NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1230 et seq., but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by current law or regulations.

### Informal Dispute Resolution Procedure

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project

owner, the Energy Commission, or any other party, including members of the public, may initiate this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents.

This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1230 et seq., but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The procedure encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be referred to the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

**Request for Informal Investigation**

Any individual, group, or agency may request that the Energy Commission conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter and, within seven working days of the CPM's request, provide a written report of the results of the investigation, including corrective measures proposed or undertaken, to the CPM. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to provide an initial report, within 48 hours, followed by a written report filed within seven days.

**Request for Informal Meeting**

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;
2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;

3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and
4. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum 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

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint or a request for an investigation with the Energy Commission's General Counsel. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1230 et seq.

The Chairman, upon receipt of a written request stating the basis of the dispute, may grant a hearing on the matter, consistent with the requirements of noticing provisions. The Energy Commission shall have the authority to consider all relevant facts involved and make any appropriate orders consistent with its jurisdiction (Cal. Code Regs., tit. 20, §§ 1232-1236).

## POST CERTIFICATION CHANGES TO THE ENERGY COMMISSION DECISION: AMENDMENTS, INSIGNIFICANT PROJECT CHANGES AND VERIFICATION CHANGES

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify project design, operation or performance requirements, and to transfer ownership or operational control of the facility.

A petition is required for **amendments** and for **insignificant project changes** as specified below. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the CPM, who will file it with the Energy Commission's Docket in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of approval process applies are explained below.

### AMENDMENT

A proposed modification will be processed as an amendment if it involves a change to, a deletion of, or a new condition, or if the modification will result in a potential for environmental impact. Changes to ownership or operational control also require an amendment.

## INSIGNIFICANT PROJECT CHANGE

The proposed modification will be processed as an insignificant project change if it does not require changing the language in a condition of certification, have a potential for significant environmental impact, or cause the project to violate laws, ordinances, regulations or standards.

## VERIFICATION CHANGE

As provided in Title 20, Section 1770 (d), California Code of Regulations, a verification may be modified by staff without requesting an amendment to the decision if the change does not conflict with the conditions of certification.

# COM-6, KEY EVENTS LIST

PROJECT: **Salton Sea Geothermal Unit #6 Power Project**

DOCKET #: **02-AFC-02**

COMPLIANCE PROJECT MANAGER: **Connie Bruins**

| EVENT DESCRIPTION | DATE |
|---|---|
| Certification Date/Obtain Site Control | |
| Online Date | |
| **POWER PLANT SITE ACTIVITIES** | |
| Start Site Mobilization | |
| Start Ground Disturbance | |
| Start Grading | |
| Start Construction | |
| Begin Pouring Major Foundation Concrete | |
| Begin Installation of Major Equipment | |
| Completion of Installation of Major Equipment | |
| First Combustion of Gas Turbine | |
| Start Commercial Operation | |
| Complete All Construction | |
| **TRANSMISSION LINE ACTIVITIES** | |
| Start T/L Construction | |
| SYNCHRONIZATION WITH GRID AND INTERCONNECTION | |
| COMPLETE T/L CONSTRUCTION | |
| **FUEL SUPPLY LINE ACTIVITIES** | |
| Start Gas Pipeline Construction and Interconnection | |
| COMPLETE GAS PIPELINE CONSTRUCTION | |
| **WATER SUPPLY LINE ACTIVITIES** | |
| START WATER SUPPLY LINE CONSTRUCTION | |
| COMPLETE WATER SUPPLY LINE CONSTRUCTION | |

**TABLE 1**
**COMPLIANCE SECTION**
**SUMMARY of GENERAL CONDITIONS OF CERTIFICATION**

| CONDITION NUMBER | PAGE # | SUBJECT | DESCRIPTION |
|---|---|---|---|
| COM-1 | 4 | Unrestricted Access | The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site. |
| COM-2 | 4 | Compliance Record | The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files. |
| COM-3 | 4 | Compliance Verification Submittals | The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether the condition was satisfied by work performed by the project owner or his agent. |
| COM-4 | 5 | Pre-construction Matrix and Tasks Prior to Start of Construction | Construction shall not commence until all of the following activities/submittals have been completed:<br>▪ property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns;<br>▪ a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction;<br>▪ all pre-construction conditions have been complied with; and<br>▪ the CPM has issued a letter to the project owner authorizing construction. |
| COM-5 | 6 | Compliance Matrix | The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification. |
| COM-6 | 6 | Monthly Compliance Report (including a Key Events List) | During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List. |

| CONDITION NUMBER | PAGE # | SUBJECT | DESCRIPTION |
|---|---|---|---|
| COM-7 | 7 | Annual Compliance Reports | After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. |
| COM-8 | 8 | Security Plans | Thirty days prior to commencing construction, the project owner shall submit a Security Plan for the construction phase. Sixty days prior to initial receipt of hazardous material on site, the project owner shall submit an Security Plan & Vulnerability Assessment for the operational phase. |
| COM-9 | 9 | Confidential Information | Any information the project owner deems confidential shall be submitted to the Dockets Unit with an application for confidentiality. |
| COM-10 | 9 | Dept of Fish and Game Filing Fee | The project owner shall pay a filing fee of $850 at the time of project certification. |
| COM-11 | 9 | Reporting of Complaints, Notices and Citations | Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations. |
| COM-12 | 10 | Planned Facility Closure | The project owner shall submit a closure plan to the CPM at least twelve months prior to commencement of a planned closure. |
| COM-13 | 11 | Unplanned Temporary Facility Closure | To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation. |
| COM-14 | 12 | Unplanned Permanent Facility Closure | To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation. |
| | | | |

**ATTACHMENT A**

COMPLAINT REPORT/RESOLUTION FORM

| |
|---|
| PROJECT NAME: **SALTON SEA GEOTHERMAL UNIT #6 POWER PROJECT**<br>AFC Number: **02-AFC-02** |
| **COMPLAINT LOG NUMBER** _____<br>Complainant's name and address:<br><br>Phone number: |
| Date and time complaint received:<br>Indicate if by telephone or in writing (attach copy if written):<br>Date of first occurrence: |
| Description of complaint (including dates, frequency, and duration): |
| Findings of investigation by plant personnel:<br><br>Indicate if complaint relates to violation of Energy Commission requirement:<br>Date complainant contacted to discuss findings: |
| Description of corrective measures taken or other complaint resolution:<br><br>Indicate if complainant agrees with proposed resolution:<br>If not, explain:<br><br>Other relevant information: |
| If corrective action necessary, date completed:<br>Date first letter sent to complainant: _____(copy attached)<br>Date final letter sent to complainant: _____(copy attached) |
| This information is certified to be correct.<br>Plant Manager's Signature: _____ Date: |

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

# PREPARATION TEAM

## SALTON SEA UNIT 6 PROJECT
## FSA PREPARATION TEAM

| | |
|---|---|
| Executive Summary | Robert Worl |
| Introduction | Robert Worl |
| Project Description | Robert Worl |
| Air Quality | William Walters, Lisa Blewitt, and Keith Golden |
| Biological Resources | Natasha Nelson |
| Cultural Resources | Roger Mason and Gary Reinoehl |
| Hazardous Materials | Geoff Lesh and Rick Tyler |
| Land Use | David Flores |
| Noise and Vibration | Steve Baker |
| Public Health | Ramesh Sundareswaran |
| Socioeconomics | Joseph Diamond, Ph.D. |
| Traffic and Transportation | Ken Peterson |
| Transmission Line Safety and Nuisance | Obed Odoemelam, Ph.D. |
| Visual Resources | James Adams, Dale Edwards, William Walters, and Lisa Blewitt |
| Waste Management | Ellie Townsend-Hough |
| Water & Soil Resources | Michael Krolak |
| Worker Safety and Fire Protection | Geoff Lesh and Rick Tyler |
| Facility Design | Kevin Robinson, Al McCuen and Steve Baker |
| Geology, Mineral Resources, and Paleontology | Dal Hunter, Ph.D. |
| Power Plant Efficiency | Shahab Khoshmashrab |
| Power Plant Reliability | Shahab Khoshmashrab |
| Transmission System Engineering | Demetrio Bucaneg, Sudath Arichchige, and Al McCuen |
| Alternatives | Robert Worl |
| General Conditions | Connie Bruins |
| Project Assistant | Angela Hockaday |
| Support Staff | Angela Hockaday |

# DECLARATION OF
## NATASHA NELSON

**I, NATASHA NELSON** declare as follows:

1. I am presently employed by the California Energy Commission in the **BIOLOGICAL RESOURCES UNIT** of the Systems Assessment and Facilities Siting Division as a **BIOLOGIST**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **BIOLOGICAL RESOURCES**, for the **SALTON SEA UNIT 6 PROJECT (02-AFC-2)** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 4/14/03 Signed: [signature]

At: Sacramento, California

# *NATASHA NELSON*
## *Planner II*

Experienced in biological resource assessment including endangered species surveys, endangered species mitigation and monitoring, coordination with state and federal agencies, and riparian restoration. Educational background emphasized biological resources, general ecology, geographic information systems, and small mammals.

## *PROFESSIONAL EXPERIENCE*

**2001 – to date BIOLOGIST, California Energy Commission.** I provide independent biological resource assessments of proposed energy plants and related facilities and review the implementation of biological resource conditions of certification required by the Warren-Alquist Act and the California Environmental Quality Act (CEQA). Once energy facilities are constructed and operating, I am responsible for making sure each facility operates in compliance with associated biological resources conditions of certification. These conditions of certification involve endangered species protection, habitat restoration and monitoring, off-site habitat compensation, and wildlife surveys. Agency permit coordination is an important component of my work.

**1997 - 2001 BIOLOGIST, Aspen Environmental Group.** I was the project manager or technical writer for many projects that involved National Environmental Policy Act (NEPA) and CEQA documentation. The majority of projects were for utility infrastructure (e.g., power plants, transmission lines, petroleum pipelines) and included aspects of Section 404 Clean Water Act permitting and state or federal Endangered Species Act compliance. I performed reconnaissance level wildlife and plant surveys, and researched issues of concern. I also created adaptive management plans for wildlife and habitat restoration in desert and riparian areas.

**1996 - 1997 BIOLOGIST, Bureau of Land Management.** As the wildlife biologist for the West Mojave Coordinated Planning effort I gathered and synthesized data regarding the state and federally-listed species in the Mojave desert. I updated and verified all mapping information used in the planning effort including species' range and occurrence data. Most mapping was done using ARC-INFO's AML language and the California Department of Fish and Game database programs (Rarefind and NDDB). During public meetings I gave overviews and presentations of my work to date.

## *EDUCATION*

- B. S. **BIOLOGY**, 1993, Willamette University, Salem, Oregon
- M. S. **WILDLIFE SCIENCE**, 1996, Oregon State University, Corvallis, Oregon

## *PROFESSIONAL AFFILIATIONS*

- Conservation Biology
- Society for Ecological Restoration

# DECLARATION OF
**Roger Mason**

I, **Roger Mason** declare as follows:

1. I am presently employed by Chambers Group, Inc. as a Cultural Resources Consultant working as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission's Energy Facilities Siting and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Cultural Resources for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief

Dated: August 4, 2003 Signed: Roger D. Mason

At: Irvine, California

**ROGER D. MASON, PH.D.**
**DIRECTOR OF CULTURAL RESOURCES**

Dr. Mason has been professionally involved with cultural resources management in southern California since 1983. Dr. Mason is the author of over 100 reports dealing with cultural resource surveys, evaluations, and mitigation programs in all southern California counties. Section 106 experience includes successful nomination of the San Antonio Terrace Archaeological District on Vandenberg AFB to the NRHP and preparing a Historic Preservation Plan for the District. Dr. Mason was also Principal Investigator for the data recovery and construction monitoring program for the San Joaquin Hills Transportation Corridor, a Section 106 project reviewed by Caltrans. Prior to joining Chambers Group, Dr. Mason was the Principal Investigator for the Newport Coast Archaeological Project in coastal Orange County. This project was the largest privately funded cultural resources mitigation program on the West Coast and involved data recovery excavations at 85 sites. Recently, Dr. Mason was named to the Year 2000 Edition of the Marquis Who's Who in America.

**EDUCATION**

Ph.D., Anthropology (Archaeology), University of Texas at Austin
B.A., Anthropology, University of Washington

**PROFESSIONAL AFFILIATIONS AND CERTIFICATIONS**

- Registered Professional Archaeologist (formerly SOPA)
- Orange County Certified Archaeologist
- Riverside County Qualified Archaeologist
- American Anthropological Association
- Society for American Archaeology
- Society for California Archaeology
- Pacific Coast Archaeological Society

**REPRESENTATIVE PROJECT EXPERIENCE**

- **Pacific Highlands Ranch Data Recovery and Indexing Program** – Pardee Construction Company
  Principal Archaeologist – Directed data recovery at four prehistoric sites and "indexing" at five sites that were to be preserved in open space, as required by the project EIR for the Pacific Highlands Ranch project north of Carmel Valley in the City of San Diego. The subsurface boundaries of concentrations of cultural material within each site also for data recovery were defined by excavating a total of 252 systematically spaced shovel test probes (STPs) in several phases of work. As required by the City, the data recovery program consisted of hand excavation of 78 1 by 1 meter units comprising a two percent sample of each cluster within each site. After completing Phase 1 of data recovery, statistical analysis showed that adequate samples of lithic waste flakes, shell, and animal bone had been recovered, but that additional units would likely yield new tool types at one of the sites. In addition, a fire-affected rock feature was encountered at one of the other sites. Accordingly, five additional units were excavated to recover more tools and two more units were excavated to expose and record the feature during Phase 2 of data recovery. A report will be completed that provides an interpretation of activities carried out at these sites which are part of the La Jolla Complex (8,500 and 3,000 BP).

- **NEPA Compliance Environmental Documentation for Installation and/or Modification of Digital Cellular Telephone Communication Facilities throughout Southern California - Confidential Client.** Directed cultural resources studies for this large-scale program. Records searches and field surveys were conducted, and reports prepared to document potential impacts on cultural resources for over 500 cellular communications facilities throughout southern and central California.

- **Environmental Services for California Segments of Nationwide Fiber Optic Cable Network - Confidential Client.** Managed cultural resources studies for this large scale project, which entailed a full range of environmental permitting services in support of a nationwide fiber optic network installation project. The new fiber optic network will cross 40 states and serve 50 U.S. cities, with a total of 75,000 miles of fiber optic network. Approximately 75 percent of the buried fiber optic cable system will be located within railroad right-of-ways, with the rest to be located within highway right-of-ways and limited private land. The project completion date goal is the end of 2001. Responsibilities include records searches, cultural resources surveys, subsurface testing, data recovery, and construction monitoring in central and southern California. Cultural resources surveys and checklists for CEQA Preliminary Environmental Assessments for construction of off right of way facilities throughout California are also being prepared.

- **San Joaquin Hills Transportation Corridor Archaeological Data Recovery Program - Sverdrup/ Transportation Corridor Agencies.** Project Archaeologist - Directing data recovery (major archaeological excavation) as mitigation of impacts for six archaeological sites determined eligible by the SHPO prior to construction and for six sites found during monitoring that met the eligibility requirements of the Treatment Plan. Coordinated Native American observer program during field work. Completed six data recovery reports that were reviewed and accepted by Caltrans with little or no revisions.

- **San Joaquin Hills Transportation Corridor Archaeological Monitoring Program - Sverdrup/ Transportation Corridor Agencies.** Project Archaeologist - Directed construction monitoring over a period of 42 months during construction of the 14 mile long toll road. Wrote a Treatment Plan accepted by Caltrans and SHPO that determined whether data recovery would be necessary for sites found during construction. This made it unnecessary to consult with SHPO each time a site was discovered during construction, thereby avoiding construction delays. Evaluated new sites in accord with the Treatment Plan to determine if data recovery was necessary.

- **Ford Road Archaeological Test Program - Sverdrup/Transportation Corridor Agencies.** Project Archaeologist - Directed Section 106 test program at five archaeological sites that could be impacted by construction of Ford Road. Wrote test report and Request for Determination of Eligibility reviewed and approved by the Corps of Engineers and SHPO for the five sites. Wrote Data Recovery Plan reviewed and approved by the Corps of Engineers and SHPO for the two sites that were determined eligible and that would be impacted by construction.

- **Ford Road Archaeological Data Recovery Plan - Sverdrup/Transportation Corridor Agencies.** Project Archaeologist - Directed data recovery (major archaeological excavation) as mitigation of impacts for two archaeological sites determined eligible by the SHPO prior to construction. Coordinated Native American observer program during field work. Completed data recovery report that was reviewed and accepted by the Corps of Engineers with no revisions.

- **Ford Road Archaeological Construction Monitoring Program - Sverdrup/Transportation Corridor Agencies.** Project Archaeologist - Directed construction monitoring over a period of 27 months during the construction of the road. Directed controlled grading of two archaeological sites after completion of data recovery.

- **Newport Coast Archaeological Project - The Irvine Company.** Principal Investigator - Wrote a research design and carried out data recovery for 32 archaeological sites in this four square mile tract. The project area included the ridges and canyons of the coastal slopes of the San Joaquin Hills and the marine terraces south of Corona Del Mar. This was the largest privately funded archaeological project in the western United States.

- **Historic Property Survey Reports - Various Cities/Caltrans.** Cultural Resources Manager - Was co-author for six Historic Property Survey Reports using Caltrans Section 106 guidelines. These were for Caltrans local assistance street widening projects in various sites in southern California.

- **Del Mar Highlands Estates Data Recovery Program - Pardee Construction.** Principal Investigator - Directed data recovery program at SDI-13,094, a Milling Stone Period site dating to about 5,000 years ago near the San Dieguito River in the City of San Diego. Both randomly placed and block excavation units were used to recover cultural material from the site in general and from three fire-affected rock features (hearths). Also directed indexing program at another site with both a prehistoric and a historic component.

- **Oak Park III Data Recovery Program - Pardee Construction.** Principal Investigator - Directed data recovery program at VEN 1020, a Late Period camp in Ventura County used for yucca roasting and hunting. The project included a magnetometer program to locate fire-affected rock features that included roasting pits and hearths. The results were presented in a report that provided information about activities carried out at a field camp probably used by people from a nearby village in the Ventureño Inland Chumash area.

- **Vandenberg Air Force Base Cultural Resources Services - National Park Service/Vandenberg Air Force Base.** Principal Investigator - Directed two year cultural resources survey of entire base (90,000 acres) during which over 600 new archaeological sites were recorded.

- **Third Party As-Needed Environmental Impact Report Review for CEQA Compliance - City of Carlsbad.** Task Leader for Cultural Resources - Provided review of draft Environmental Impact Reports (EIRs) for a variety of projects prior to the release of the documents to the public. Environmental documents and supporting technical reports are reviewed for methodology, adequacy of analysis, completeness, and compliance with CEQA, as well as local, state, and federal laws and policies.

**PROFESSIONAL EXPERIENCE**

1993- Director of Cultural Resources, Chambers Group, Inc., Irvine, CA. Principal Investigator, San Joaquin Hills Transportation Corridor Archaeological Mitigation Program. Data recovery at 12 sites, plus construction monitoring. Principal Investigator, Vandenberg Air Force Base Open-End Cultural Resources Services Contract. Survey of entire base (90,000 acres; over 600 sites).

1990-1993 Director of Archaeology, The Keith Companies, Costa Mesa, CA. Principal Investigator Newport Coast Archaeological Project, Orange County, CA. Data recovery at 32 sites plus construction monitoring.

1988-1990 Managing Archaeologist, The Keith Companies.

1987-1988 Senior Archaeologist, Tetra Tech, Inc., San Bernardino, CA. Principal Investigator and Project Manager of the San Antonio Terrace Archaeological District project, Vandenberg AFB, CA. Historic Preservation Plan for the district and survey, testing, and mitigation of sites to be affected by construction of ICBM test facilities.

1983-1987 Research Director, Project Director, Scientific Resource Surveys, Inc., Huntington Beach, CA. Responsible for research designs, planning of fieldwork, and author and/or editor of all reports produced by SRS during this four-year period. Projects in all southern California counties.

1981-1982 Visiting Assistant Professor, Central Michigan University. Courses: New World Archaeology, Archaeological Method and Theory.

1977-1981 Staff Historical Archaeologist, Cannon Reservoir Human Ecology Project, University of Nebraska (Funded by St. Louis District, U.S. Army Corps of Engineers). Archival research on frontier settlement systems in northeast Missouri.

1976-1978 Co-Principal Investigator, Proyecto Coatlan, Morelos-Guerrero Regional Center, Instituto Nacional de Antropologia de Historia (INAH), Morelos, Mexico. Surface collection at an Aztec period provincial center (dissertation research).

1973 Co-Director, Xoxocotlan Surface Collection Project, Monte Alban, Oaxaca, Mexico.

1972 Field Assistant, Valley of Oaxaca Settlement Pattern Project, Monte Alban, Oaxaca, Mexico.

## PUBLICATIONS, PAPERS, AND REPORTS

### Articles

In Press Complexity, Demography, and Change in Late Holocene Orange County. In *Cultural Complexity on the California Coast: Late Holocene Archaeological and Environmental Records*, edited by J. M. Erlandson and T. L. Jones. Perspectives in California Archaeology, Institute of Archaeology, University of California, Los Angeles. (Second author with H.C. Koerper and M. L. Peterson)

2000 Weighing and Counting Shell: A Response to Glassow and Glassow. *American Antiquity* 65:757-761. (Senior author with M. L. Peterson and J. A. Tiffany.)

1996 An Ochre Copped Stone from Orange County. *Pacific Coast Archaeological Society Quarterly*, 34(1): 59-72. (Junior author with H.C. Koerper.)

1996 Weighing Vs. Counting: Measurement Reliability and the California School of Mortar Analysis. *American Antiquity* 61:303-324. (Senior author with M. L. Peterson and J. A. Tiffany.)

1997 Middle Holocene Adaptations on the Newport Coast of Orange County. In *Archaeology of the California Coast During the Middle Holocene*, edited by J.M. Erlandson and M.A. Glassow, pp. 35-60. Perspectives in California Archaeology, Volume 4. Institute of Archaeology, University of California, Los Angeles. (Senior author with H.C. Koerper and P.F. Langenwalter.)

1998a Archaeological, Ethnohistoric, and Historic Notes Regarding CRA-53 and Other Sites Along the Lower Santa Ana River Drainage, Costa Mesa. *Pacific Coast Archaeological Society Quarterly* 37(1):1-36. (Junior author with H.C. Koerper, C.E. Carter, and P. Apodaca.)

1990b Two Barbed Stone Spear Points from Coastal Orange County. Pacific Coast *Archaeological Society Quarterly* 32(1):50-64. (Junior author with H.C. Koerper, C. Prior and R.E. Taylor.)

1990c Arrow Projectile Point Types as Temporal Types: Evidence from Orange County. *Journal of California and Great Basin Anthropology* 18:258-283. (Junior author with H.C. Koerper, A.B. Schroth, and M. Peterson.)

1991 Morphological Types and Temporal Projectile Point Types: Evidence from Orange County, California. *Journal of California and Great Basin Anthropology* 13:81-105. (Junior author with H.C. Koerper and A.B. Schroth.)

1988 Summary of Work Carried Out at CA-LAN-43, The Linares Village Site. *Pacific Coast Archaeological Society Quarterly* 22(3):9-17.

1982 Historic Settlement Patterns. In *The Cancion Reservoir Human Ecology Project: An Archaeological Study of Cultural Adaptations in the Southern Prairie Peninsula*, edited by Michael J. O'Brien, Dennis E. Lewarch, and Robert E. Warren, pp. 369-387. Academic Press, New York.

1982 A Regional Chronology of the Early Historic Period. In *The Cancion Reservoir Human Ecology Project, An Archaeological Study of Cultural Adaptations in the Southern Prairie Peninsula*, edited by Michael J. O'Brien, Dennis E. Lewarch, and Robert E. Warren, pp. 131-141. Academic Press, New York.

1982 The Structure of Historic Communities. In *The Cancion Reservoir Human Ecology Project: An Archaeological Study of Cultural Adaptations in the Southern Prairie Peninsula*, edited by Michael J. O'Brien, Dennis E. Lewarch, and Robert E. Warren, pp. 301-334. Academic Press, New York. (Co-author with M. O'Brien and J. Saunders.)

**Papers Presented**

1998 Demographic Dynamics in Late Holocene Orange County. Paper presented at the Annual Meeting of Society for California Archaeology, San Diego. (Second author with H.C. Koerper.)

1994 Results of the Newport Coast Archaeological Project. Paper presented at the Annual Meeting of the Society for California Archaeology, Ventura, California.

1993 The Middle Holocene Period on the Newport Coast, Orange County, California. Paper presented at the Annual Meeting of the Society for California Archaeology, Pacific Grove, California.

1991 Preliminary Results of the Newport Coast Archaeological Project. Presented at the Southern Data Sharing Meeting of the Society for California Archaeology, Los Angeles.

1990 Archaeometry and Archaeological Interpretation in the Newport Coast Archaeological Project. Presented at the 55th Annual Meeting of the Society for American Archaeology, Las Vegas, Nevada.

**Cultural Resource Management Reports - Principal Author**

2000 The Futuldom Project. Data Recovery at CA-ORA-855, San Juan Capistrano, California. Prepared for WSM Partnership, C/O the Archon Group, Irving, Texas. (co-author)

1999 Archaeological Survey Report For Level 3 Long Haul Fiber Optic Project, State Route 246 From Lompoc To Surf, State Route 1 From Las Cruces To Lompoc, And U.S. Highway 101 From Gaviota To Las Cruces, County Of Santa Barbara, California. Prepared for Parsons Brinckerhoff, Orange.

1999 Cultural Resources Survey Report for Level 3 Fiber Optics Project: WS-02 in Oakland. Prepared for Level 3 Project Office, Pleasanton, California.

1999 Cultural Resources Survey Report for Level 3 Fiber Optics Project: WS-07 in Oakland and Emeryville. Prepared for Level 3 Project Office, Pleasanton, California

1999 Cultural Resources Survey Report for Level 3 Long Haul Fiber Optics Project : County Road Workarounds Between Gaviota and Summerland, County of Santa Barbara, California. Prepared for Parsons Brinckerhoff, Orange.

1999 Results of Archaeological Test Programs at CA-RIV-1022, CA-RIV 3331, and CA-RIV-3332H Colonwood Hills Project Area, City of Lake Elsinore, Riverside County. Prepared for Pardee Construction Company, C/O Hewitt & McGuire, LLP, Irvine.

1998 Archaeological Evaluation Report for CA-ORA-855 on the 29.3-Acre Property South and East of the Intersection of Camino Capistrano and Junipero Serra Road, San Juan Capistrano, California. Prepared for Archon Group, Los Angeles.

1998 Cultural Resources Test Report : CA-ORA-1322H and CA-ORA-1323H, Olinda Heights Project, Brea, Orange County, California. Prepared for SunCal Companies, Anaheim (co-author)

1998 Cultural Resources Test And Data Recovery Report, CA-ORA-1321, Olinda Heights Project, Brea, Orange County, California. Prepared for SunCal Companies, Anaheim.

1998 Final Technical Report. Phase I, II, and III Archaeological Survey for Cultural Resources Inventory, Vandenberg Air Force Base, Santa Barbara County, California. Prepared for National Park Service, San Francisco, and Vandenberg Air Force Base

1998 Indexing Program at CA-SDI-5372/H Del Mar Highlands Estates Project, City of San Diego. Prepared for Pardee Construction, care of Hewitt & McGuire, LLP, Irvine.

1998 Oak Park III Data Recovery at CA-VEN-1020, Oak Park, Ventura County. Prepared for Pardee Construction, care of Hewitt & McGuire, LLP, Irvine

1998 Cultural Resources Element FIR for Cypress Canyon Residential Development Project, Anaheim, California. Prepared for ROX Consulting Group, Tustin, California

1998 Archaeological Constraints Analysis, El Morro Mobile Home Park Expansion and Improvement. Prepared for El Morro Community Association, Newport Beach, California

1998 Archaeological Investigations at the Simi Valley Drive-In Theater Property, Simi Valley, California. Prepared for Patriot Homes, Inc., Sherman Oaks, California.

1997 Review of "A Research Design for the Evaluation of Archaeological Sites Within the Hellman Ranch Specific Plan Area." Prepared for the City of Seal Beach.

1997 Review of "Landscape and People of Bolsa Bay, Volume 1: Compendium of Themes and Models, Research Design for Analysis: Bolsa Bay Project." Prepared for the Koll Company.

1997 Addendum to Historic Study Report for Three Sites in the San Joaquin Hills Transportation Corridor, Southern Orange County. Prepared for Caltrans District 12, Santa Ana and Federal Highways Administration, Sacramento.

1997 Draft Technical Report: Phase I, II, and III Archaeological Survey for Cultural Resources Inventory, Vandenberg Air Force Base, Santa Barbara County, California. Prepared for National Park Service, San Francisco, and Vandenberg Air Force Base.

1997 San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-225. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1997 San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-206. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1997 San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-689, CA-ORA-736, and CA-ORA-1029. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1997 San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-1370 and CA-ORA-1492. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1997 Cultural Resources Survey Report for the Fairmont Estates Project in the City of Yorba Linda, Orange County, California. Prepared for ROX Consulting Group, Inc., Irvine.

1997 Heritage Research Overview and Survey Report for the Motorola Electronic Circuit Installation Project, Cleveland National Forest, Trabuco Ranger District, Orange County, California. Prepared for Harding Lawson Associates, Irvine.

1996 Final Report of Findings: Biological and Cultural Surveys on IRP Sites at the National Training Center at Fort Irwin, San Bernardino County, California. Prepared for U.S. Army Corps of Engineers, Los Angeles District.

1996 Cultural Resources Survey Report for the San Juan Basin Groundwater Management Plan Project, Orange County, California. Prepared for San Juan Basin Authority, San Juan Capistrano.

1996 San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-1398, CA-ORA-1401, CA-ORA-1430, CA-ORA-1435, and CA-ORA-1436. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1990 San Joaquin Hills Transportation Corridor: Results of Data Recovery at CA-ORA-125 and CA-ORA-1295. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1989 Review of "A Research Design and Investigation Program for Test Level Evaluations of Archaeological Sites Located on the Hellman Ranch, City of Seal Beach, California." Prepared for City of Seal Beach.

1988 Archaeological Test Program Report for CA-LAN-2310 in the Monarch Hills Project Near the City of Santa Clarita, Los Angeles County, California. Prepared for Pardee Construction, Los Angeles.

1988 Results of Data Recovery at CA-ORA-482 and CA-ORA-1061, New Ford Road Project, Irvine, California. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Santa Ana.

1985 Research Design for Data Recovery at CA-VEN-1020. Prepared for Pardee Construction, Los Angeles.

1985 Archaeological Resources Protection Plan for the Background Study Sampling Areas at Naval Weapons Station, Seal Beach, Orange County, California. Prepared for International Technology Corporation, Irvine, and Naval Facilities Engineering Command, San Diego.

1985 Archaeological Resources Protection Plan for Installation Restoration Sites 5, 8, 12, 16, 21, 40, 44, and 46 at Naval Weapons Station, Seal Beach, Orange County, California. Prepared for International Technology Corporation, Irvine, and Naval Facilities Engineering Command, San Diego.

1984 Treatment Plan for Archaeological Sites Discovered During Construction of the San Joaquin Hills Transportation Corridor, Orange County, California. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Costa Mesa.

1984 Archaeological Resources Protection Plan for Installation Remediation Sites 4, 8, 9, and SWMU 56, Naval Weapons Station, Seal Beach. Prepared for Acutek Environmental Inc., Fountain Valley, and U.S. Navy, San Diego.

1984 Newport Coast Archaeological Project: Newport Coast Settlement Systems, Summary and Discussion. Prepared for Coastal Community Builders, Newport Beach. (Senior author with M. Peterson.)

1984 Newport Coast Archaeological Project: Results of Data Recovery from CA-ORA-274 and CA-ORA-670, Orange County, California. Prepared for Coastal Community Builders, Newport Beach.

1983 Data Recovery Plan: Prehistoric Archaeological Sites CA-ORA-1061 and CA-ORA-482 within the Area of Potential Effect of the Proposed New Ford Road. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Costa Mesa.

1983 Test Program Results and Request for Determination of Eligibility for Five Sites in the New Ford Road Alignment, Irvine, California. Prepared for Sverdrup Corporation, Irvine, and Transportation Corridor Agencies, Costa Mesa.

1993 Results of Historical Research and Recommendations for the Proposed Federal Building Site in Santa Ana, California. Prepared for National Park Service, Atlanta, and General Services Administration, San Francisco (with J.A. McKenna)

1993 Newport Coast Archaeological Project: Results of Data Recovery from the Pelican Hill Sites, CA-ORA-667 and CA-ORA-1203, Orange County, California. Prepared for Coastal Community Builders, Newport Beach

1992 Newport Coast Archaeological Project: Results of Data Recovery from the French Hat Complex Sites, CA-ORA-232, CA-ORA-233, CA-ORA-671, CA-ORA-672, and CA-ORA-1205, Orange County, California. Prepared for Coastal Community Builders, Newport Beach.

1992 Newport Coast Archaeological Project: Results of Data Recovery at CA-ORA-667, Orange County, California. Prepared for Coastal Community Builders, Newport Beach

1992 Newport Coast Archaeological Project: Data Recovery from Sites Impacted by Construction of Pacific Coast Highway (Inland Side) (CA-ORA-246 and CA-ORA-1208). Report prepared for Orange County EMA.

1992 Newport Coast Archaeological Project: Data Recovery at Area 13 of CA-ORA-662 (ICD 13) Impacted by Construction of Lower Loop Road. Report prepared for Orange County EMA.

1992 Newport Coast Archaeological Project: Data Recovery at Three Newport Coast Open Sites (ORA-673, 675, 684). Report prepared for Coastal Community Builders (The Irvine Company)

1992 Newport Coast Archaeological Project: Testing and Data Recovery at the Golf Course Sites (ORA-660, 664, 665, 666, 1229, 1230, 1231, 1232, 1233, and 1234). Report prepared for Coastal Community Builders (The Irvine Company)

1992 Cultural Resources Survey Report for the Lenwood Ranch Project, near Barstow, San Bernardino County, California

1992 Cultural Resources Survey Report for Shadow Ridge Project near Palm Desert, Riverside County, California.

1992 Cultural Resources Survey Report for the Olinda Project, Brea, Orange County, California

1991 Newport Coast Archaeological Project: Data Recovery at ORA-683. Report prepared for Coastal Community Builders (The Irvine Company)

1991 Newport Coast Archaeological Project: Data Recovery at the Washbowl Hill Sites (ORA-339, 340, 828, and 829). Report prepared for Coastal Community Builders (The Irvine Company)

1991 Newport Coast Archaeological Project: Data Recovery at the Lake Small Rockshelter Sites (ORA-674, 676, 677, 678, 679, 682, 1204, 1206, and 1210). Report prepared for Coastal Community Builders (The Irvine Company).

1991 Newport Coast Archaeological Project: Data Recovery at the Pelican Hill Road Segment B Sites (CRA-221, 1085, and 1290). Report prepared for Orange County CMA and Coastal Community Builders (The Irvine Company).

1991 Newport Coast Archaeological Project: Project Background and Research Design. Prepared for Coastal Community Builders (The Irvine Company).

1991 Prehistoric Cultural Resources Survey Report and Analysis of Impacts for the Ford Road Realignment EIR, Orange County, California.

1991 Cultural Resources Survey Report for the Golden Oasis Project, Lake Elsinore, Riverside County, California.

1991 Historic Property Survey Report for the Coachella Valley Water District Reservoir Sites EA/IS (Del Webb) and BLM Land Exchange, Riverside County, California

1991 Cultural Resources Survey Report, Pepperwood Estates, City of San Juan Capistrano, Orange County, California.

1990 Cultural Resources Survey Report: Sonrise Canyon Ranch, Chino Hills, San Bernardino County, California.

1990 Archaeological Test Program at Site SBR-5096 near State Route 71, San Bernardino County, California

1990 Cultural Resources Report for General Plan Amendment/Zone Change 89-048 in the City of Poway, San Diego County, California

1990 Cultural Resources Survey Report, Santiago Canyon Road Alignment Study, Orange County, California.

1990 Archaeological Resources Survey Report for a 55-Acre Parcel of Land, Tentative Tract No. 13801 in Hickey Canyon, Southeast Orange County, California.

1990 Cultural Resources Survey Report of a 7-Acre Parcel in Chatsworth, City of Los Angeles, Los Angeles County, California.

1989 Report on Archaeological Auger Testing on Tract No. 13269 (Centre Park No. 8) in the City of Huntington Beach, Orange County, California

1989 Cultural Resources Survey Report, Marcel's Terrace in the City of San Juan Capistrano, Orange County, California.

1989 Cultural Resources Survey Report for Tentative Tract No. 47850 in the City of Palmdale, Los Angeles County, California

1989 Cultural Resources Survey Report, Tentative Tract No. 34098, Agua Dulce, Los Angeles County, California

1989 Cultural Resources Survey Report for the Sierra Palmdale Project in Palmdale, Los Angeles County, California

1989 Cultural Resources Survey Report for the 10-Acre Vertlemont Site in San Bernardino County, California.

1989 Cultural Resources Survey Report for the State Route 67/Woodside Avenue Interchange, San Diego County, California.

1989 Cultural Resources Survey Report for the Laguna Heights Project, Riverside County, California.

1989 Cultural Resources Survey Report for the West Lake Elsinore Assessment District, Riverside County, California.

1989 Cultural Resources Survey for the McMillan Ranch Project near Corona, Riverside County, California.

1989 Cultural Resources Survey Report: Temecula Ranch, Aguanga Valley, Riverside County, California.

1989 Archaeological Data Recovery at Site ORA-1214, the Central Park #5 Project in the City of Huntington Beach, Orange County, California. Prepared for the Dahl Company.

1988 Archaeological Resources Survey Report for the Vulcan Property, Tentative Tract No. 45979 near Newhall, Los Angeles County, California.

1988 Historic Preservation Plan: San Antonio Terrace Archaeological District, Vandenberg Air Force Base, California. Prepared for the U.S. Air Force.

1987 Request for Determination of Eligibility: San Antonio Terrace Archaeological District, Vandenberg Air Force Base, California. Prepared for the U.S. Air Force.

1987 Cultural Resources Survey of Proposed Sites, Intercontinental Ballistic Missile and Peacekeeper Rail Garrison Test Areas, San Antonio Terrace, Vandenberg Air Force Base, California. Prepared for the U.S. Air Force.

1987 Test Plan for National Register Evaluation of Archaeological Sites on the Coyote Canyon Sanitary Landfill Property, Orange County, California. Prepared for the Orange County Waste Management Program.

1987 Research Design and Mitigation Plan for Archaeological Site CA-ORA-226 on the Coyote Canyon Sanitary Landfill Property, Orange County, California. Prepared for the Orange County Waste Management Program.

1987 Document of Eligibility for Archaeological Site CA-ORA-226 on the Coyote Canyon Sanitary Landfill Property, Orange County, California. Prepared for the Orange County Waste Management Program. (Senior author.)

1987 Research Design for Evaluation of Coastal Archaeological Sites in Northern Orange County, California.

1987 Historical Property Survey Report: Highway 74 (Fourth Street) Widening, City of Perris, California. Prepared for the City of Perris and Caltrans. (Co-author.)

1987 Archaeological Investigation of the Northwestern Part of CA-ORA-85, Bolsa Chica Mesa, Orange County, California.

1987 Cultural Resource Survey Reports and Overviews Associated with the Well Field and Weymouth Pipelines.

1987 Cultural Resource Survey Report for the Modification of the Lawanda Pipeline Alignment.

1986 Historic Property Survey Report: Euclid Avenue Improvement Project, City of Upland, California. Prepared for the City of Upland. (Co-author.)

1986 Archival Research and Remote Sensing Investigations Concerning Reported Cemeteries and Isolated Graves in the Santa Ana River Project Area. Prepared for the Los Angeles District, U.S. Army Corps of Engineers. (Senior author.)

1986 Research Design for Data Recovery: A Mitigation Program for CA-ORA-83: The Cogged Stone Site on Bolsa Chica Mesa, Orange County, California.

1986 Archaeological Evaluation of CA-ORA-83: The Cogged Stone Site on Bolsa Chica Mesa, Orange County, California. (Co-author.)

1986 Amendment to the Historic Property Survey Report: Evaluation of Archaeological Site CA-ORA-368 for National Register of Historic Places Eligibility for the Warner Avenue Widening and Reconstruction Project in the City of Huntington Beach, California. Prepared for the City of Huntington Beach.

1986 Historic Property Survey and Evaluation of the Temecula Bridge (56C-1661), Riverside County, California. Prepared for the County of Riverside. (Senior author.)

1986 Report on Prehistoric and Historic Investigations at Main Ranch, Riverside County, California.

1986 Phase I Results and Phase II Proposals for Archaeological Assessment of the Meadowlark Airport, Huntington Beach, California.

1985 Results of Test Excavations on Mescaltitan Island, Site III, CA-SBR-46. Prepared for Goleta Sanitary District and the State Water Resources Control Board. (Co-author.)

1985 Research Design for Test Excavations on Mescaltitan Island, Site III, SBA-46. Prepared for the Goleta Sanitary District and the State Water Resources Control Board.

1985 Final Archaeological Report, Rancho Paquito Interceptor, Sonora-Standard, California. Prepared for the Tuolumne Regional Water District and the State Water Resources Control Board.

1985 Archaeological Investigations on the Cherokee Property, Mount Laguna, San Diego County, California.

1984 A Historical Study of Stewart Ranch in Riverside County, California. (Senior author.)

1984 Eastern Corridor Alignment Study, Orange County, California. Prepared for the County of Orange. (Senior author.)

1984 Historic Property Survey Report for the Arbor Vitae Street Improvement Project, Inglewood, California. Prepared for the City of Inglewood.

1984 Cultural Resource Survey Report on Wolfskill Ranch, Riverside County, California. (Senior author.)

1984 Lema San Elo Archaeology, San Diego County, California. (Senior author.)

1983 Evaluation of Prehistoric and Historic Resources, Gamble Hills, San Diego County, California.

1983 Historic Property Survey Report: Warner Avenue Widening and Reconstruction Project, City of Huntington Beach, California. Prepared for the City of Huntington Beach. (Co-author.)

# DECLARATION OF
**Gary Reinoehl**

I, Gary Reinoehl declare as follows:

I am presently employed by the California Energy Commission in the Environmental Office of the Systems Assessments and Facilities Siting Division as a Planner II.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the staff testimony on Cultural Resources Section for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief

Dated: June 11, 2003 Signed:

At: Sacramento, California

**Gary L. Reinoehl**
9156 Linda Rio Drive
Sacramento, CA 95826
(916) 364-9136
email: garyreh@quikmail.com

**Education**

| School | Field | Degree | Year |
|---|---|---|---|
| Portland State University | Major: Mathematics<br>Minor: Anthropology | Bachelor of Arts | 1969 |
| Sonoma State University | Cultural Resources Management | Master of Arts | 1998 |

**Experience**

*State of California, California Energy Commission* — *2000 to present*
*Planner*

Duties: Review cultural resources studies submitted to the Commission by energy permit applicants. Write data request in accordance with Commission regulations. Assess eligibility of cultural resources under California Register of Historical Resources criteria. Write Preliminary and Final Staff Assessments for cultural resources, including conditions for the permit to assure the impacts to cultural resources are minimized to be less than significant, if possible. Develop mitigation measures to minimize impacts to cultural resources. Review and evaluate the work of consultants. Provide testimony to commissioners in Evidentiary Meetings. Work with other staff to draft changes in the Commission regulations. Review and provide comments to Compliance Project Manager regarding compliance with Conditions of Certification. Consult and coordinate with staff from other agencies.

*State of California, Department of Transportation* — *1999 to 2000*
*Associate Environmental Planner*

Duties: Conduct background research and prepare environmental documents for a variety of highway projects. Assess environmental impacts in accordance with the California Environmental Quality Act and the National Environmental Policy Act. Request permits from various state and federal agencies. Request record searches, conduct historic property surveys, write historic property survey reports, and coordinate with other agencies. Work with Project Management teams and other specialists to meet project deadlines.

*State of California, Department of Parks and Recreation* — *1989 to 1999*
*Associate State Archeologist*

Duties: Inventory of park properties and State lands from the north coast to the southern desert including prehistoric sites, historic sites and historic buildings. Excavate prehistoric and historic sites within State Parks for both test purposes and data recovery. Design inventory strategies and excavation strategies for projects on State lands and within State Parks. Provide mitigation measures for projects under the California Environmental Quality Act. Work with historians preparing detailed historic structures reports.

Other Duties: Catalogue and analyze archeological collections; write archeological reports, work with maintenance staff, equipment operators, construction crews, managers, rangers, historians, architects, engineers, personnel staff, accounting staff, crews or crews, and the general public; supervise seasonal employees and volunteers; work in both state (California Environmental Quality Act) and federal (National Historic Preservation Act) regulatory contexts and provide advice on the Archeological

Resource Protection Act, the Native American Graves Protection and Repatriation Act, National Environmental Protection Act, and State Burial Laws; write programmatic agreements and memorandum of agreements under Section 106 of the National Historic Preservation Act; work with federal agencies, private contractors, and local agencies; and develop public outreach and educational materials.

*Sacramento Archaeological Society* *1994 to 2001*
*Member of Board of Directors*
Planned activities of board and society as Director of Board for two and one half years. Worked with board members to ensure smooth and efficient operation of the Society. Worked with professional archeologists in providing educational and practical experiences for the interested public. Assisted in fund raising and public outreach activities for the Society. Coordinated with other interested groups and agencies to enhance the Society's activities.

*California Institute for Peruvian Studies* *1986 to 1987*
*Travel Coordinator and archeological crew chief*
Advanced planning for filed trips to Peru, escorted volunteers where in Lima, Peru and while continuing their trip until arrival in Acari, Peru. Supervised field crews and coordinated mapping and detailed mapping of Nazca period structural remains and other sites in Acari Valley.

*Additional Experience* *1972 to 1982*
Eastern Washington University, U.S. Forest Service (Ochoco National Forest), National Park Service (Petroleum Reserve #4, Alaska, Fort Vancouver National Monument, Vancouver, WA), Archaeological Associates, Northwest Archaeological Resources Consulting, California State Parks, Oregon Archaeological Society

**Professional Societies**
Society for California Archeology
Society for Historical Archeology
Society for American Archeology
California Council for the Promotion of History

# DECLARATION OF

I, Geoffrey Lesh declare as follows.

I am presently employed by the California Energy Commission in the Engineering Office of the Systems Assessments and Facilities Siting Division as a Mechanical Engineer

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the Worker Safety and Fire Protection and Hazardous Materials sections on June 20, 2003 for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated _____ Signed: 6/20/03

At: Sacramento, California

Geoffrey Lesh, P.E.
Mechanical Engineer

## WORK HISTORY

California Energy Commission — Mechanical Engineer — 2002-Current
-- Review and analyze applicants' plans for safe management of hazardous materials and for protecting worker safety

Self-Employed — Independent Investor — 2000-2002
Wrote market analysis computer software and traded personal account.

Read-Rite Corp — Wafer Engineering Manager — 1994-2000
-- Designed and developed wafer manufacturing processes for computer data storage systems. Managed team of engineers and technicians responsible for developing wet and dry chemical processes for manufacturing, including process and safety documentation.
-- Managed process and equipment selection for manufacturing processes.
-- Processes included vacuum-processed metals and ceramics, grinding polishing, plating, etching, encapsulation, process troubleshooting, and SPC reporting.

Dastek Corp — (Komag Joint Venture Start-up) — Wafer Engineering Manager 1992-1981
Developed wafer processes for new technology recording head for hard disk drives.
-- Managed team of engineers and technicians.
-- This position included start-up of wafer fab, including line layout, purchase, installation, and startup of new process equipment, etc.

Komag, Inc — Alloy Development Manager — 1989-1992
-- Developed new vacuum-deposited recording alloys
-- Responsible for planning and carrying-out tests, designing experiments, analyzing results, managing test lab conducting materials characterizations.
Extensive process modeling and data analysis.

Verbatim Corp. (Kodak) — Process Development Manager — 1983-1989
Mechanical engineering for computer disk manufacturing, including product, process, and equipment including metal-ceramic plastic processes for optical disk development
Production processes included plating, metal evaporation, reactive sputtering, laser based photolithography, injection molding.

IBM Corp — Mechanical/Process Engineer — 1977-1983
Product development for printer copiers and computer tape storage systems

## EDUCATION

| | |
|---|---|
| University of Santa Clara: | Certificate in Magnetic Recording Engineering |
| Stanford University, Master of Science Degree | Materials Science and Engineering |
| UC Berkeley, Bachelor of Science Degree | Mechanical Engineering<br>Materials Science and Engineering (Double Major) |

Registered Professional Engineer (Mechanical), California

# DECLARATION OF

Rick Tyler

I, Rick Tyler, declare as follows:

I am presently employed by the California Energy Commission in the Engineering Office of the Systems Assessments and Facilities Siting Division as a Senior Mechanical Engineer

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein

I supervised the preparation of the Hazardous Materials Management and Worker Safety / Fire Protection analyses for the for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated 8/4/03 Signed: _____

At: Sacramento, California

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION
1516 Ashore Ave.
Sacramento, California 95833
(916) 392-1661

**EDUCATION** B.S., Mechanical Engineering, California State University, Sacramento. Extensive course work in Statistics, Instrumentation, Technical Writing, Management, Toxicology, Risk Assessment, Environmental Chemistry, Hazardous Materials Management, Noise Measurement, and regulations regarding control of toxic substances.

Near completion of course work necessary to obtain a certificate in hazardous materials management from University of California, Davis.

**EXPERIENCE**

Jan. 1998-Present — California Energy Commission - Associate Mechanical Engineer
Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permitting) for large power plants including the review of handling practices associated with the use of hazardous and acutely hazardous materials, loss prevention, safety management practices, design of engineered equipment and safety systems associated with equipment involving hazardous materials use, evaluation of the potential for impacts associated with accidental releases and preparation and presentation of expert witness testimony and conditions of certification. Review of compliance submittals regarding conditions of certifications for hazardous materials handling, including Risk Management Plans, Process Safety Management.

April 1989-Jan. 1998 — California Energy Commission - Air Quality and Safety
Program Specialist: Energy Facility Siting and Environmental Protection Division.

Responsible for review of Public Health Risk Assessments, air quality, noise, industrial safety, and hazardous materials handling of Environmental Impact Reports on large power generating and waste to energy facilities, evaluation of health effects data related to toxic substances, development of recommendations regarding safe levels of exposure, effectiveness of measures to control criteria and non-criteria pollutants, emission factors, multimedia exposure models. Preparation of testimony providing staff's position regarding public health, noise, industrial safety, hazardous materials handling, and air quality issues associated with proposed power plants. Advise Commissioners, Management, other Staff, and the public regarding issues related to health risk assessment of hazardous materials handling.

| | |
|---|---|
| Nov. 1977 - April 1985 | California Air Resources Board - Engineer (last 4 years Associate level) |

Responsible for testing to determine pollution emission levels at major industrial facilities, including planning, supervision of field personnel, report preparation and case development for litigation, evaluate, select and acceptance-test instruments prior to purchase; design of instrumentation systems and oversight of their repair and maintenance; conduct inspections of industrial facilities to determine compliance with applicable pollution control regulations, improved quality assurance measures, selected and programmed a computer system to automate data collection and reduction; developed regulatory procedures and the instrument system necessary to certify and audit independent testing companies; prepared regulatory proposals and other presentations to classes at professional symposia and directly to the Air Resources Board in public hearings. As state representative, coordinated efforts with federal, local, and industrial representatives.

| | |
|---|---|
| PROFESSIONAL AFFILIATIONS/ LICENSES | Past President, Professional Engineers in California<br>Government Fort Street Section.<br>Past Chairman, Legislative Committee for Professional Association of Air Quality Specialists. Have passed the Engineer in Training exam. |
| PUBLICATIONS, PROFESSIONAL PRESENTATIONS AND ACCOMPLISHMENTS | Authored staff reports published by the California Air Resources Board and presented papers regarding continuous stress on monitoring at symposiums |

Authored a paper entitled "A Comprehensive Approach to Health Risk Assessment", presented at the New York Conference on Solid Waste Management and Materials Policy.

Authored a paper entitled "Risk Assessment A Tool For Decision Makers" at the Association of Environmental Professionals AEP Conference on Public Policy and Environmental Challenges.

Conducted a seminar at University of California, Los Angeles for the Doctoral programs in Environmental Science and Public Health on the subject of "Health Risk Assessment.

Authored a paper entitled "Uncertainty Analysis –An Essential Component of Health Risk Assessment and Risk Management" presented at the EPA/ORNL expert workshop on Risk Assessment for Municipal Waste Combustion: Deposition, Uncertainty, and Research Needs.

Presented a talk on off site consequence analysis for extremely hazardous materials releases. Presented at the workshop for administrative agencies conducted by the City of Los Angeles Fire Department.

Evaluated, provided analysis and testimony regarding public health and hazardous materials management issues associated with the permitting of more than 20 major power plants throughout California

Developed Departmental policy, prepared policy documents, regulations, staff instruction, and other guidance documents and reference materials for use in evaluation of public health and hazardous materials management aspects of proposed power plants

Project Manager on contracts totaling more than $500,000

RES R I

# DECLARATION OF
## DAVID FLORES

I, **David Flores** declare as follows

1. I am presently employed by the California Energy Commission in the **Land Use and Transportation Unit** of the Energy Facilities Siting and Environmental Protection Division as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use** for the **Salton Sea Unit No. 5** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: _____ Signed: _____

At: Sacramento, California

# DAVID FLORES

## WORK EXPERIENCE

Sept. 1998 to Present — **Planner I.** California Energy Commission, Energy Facilities Siting and Protection Division

- Provide technical analysis of proposed energy planning, conservation, and development programs on land use, visual and traffic and transportation resources. Specific tasks include the analysis of potential impacts, identification of suitable mitigation measures, preparation of testimony, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations.

March 29, 1995 to September 12, 1998 — **Senior Planner.** County of Yolo Planning And Public Works Department

Senior Planner - Current And Advanced Planning (Resources Management and Planning)

Personal responsibilities include the following:

Administer the establishment of Planning schedules and timeframe completion schedules; Administration and staff support to Planning Commission and Board of Supervisors; Staff support and liaison to citizens committees. Preparation of Environmental documents (Negative Declarations, preparation of Environmental Impact Reports and Categorical Exemptions) in accordance with State and Federal Regulations.

## PLANNING ACHIEVEMENTS

- Principal staff involved in development of the County Right to Farm and Williamson Act/ Blue Ribbon Ordinances.
- Staff liaison to citizen committees for the communities of Yolo County
- Substantial experience in working successfully with community organizations and committees on controversial projects.
- Responsible for the administration of the California Environmental Quality Act (CEQA) for all matters going before the Planning Commission and Board of Supervisors.

## EDUCATION

California State University @ Sacramento
University of California @ Davis
Major: Environmental Studies
Minor: Business Administration

Continuing education has included: Writing for Managers, CEQA Updates, Managing the Office, CEQA Update, Subdivision Map Act, General Plan Update

# DECLARATION OF

Steve Baker

I, Steve Baker, declare as follows:

I am presently employed by the California Energy Commission in the Engineering Office of the Systems Assessments and Facilities Siting Division as a Senior Mechanical Engineer.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I prepared the staff testimony on **Noise and Vibration**, and supervised preparation of the staff testimony on **Power Plant Efficiency**, **Power Plant Reliability**, and **Facility Design**, for the Salton Sea Unit #5 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 4/11/03 Signed: Steve Baker

At: Sacramento, California

**STEVE BAKER**, P.E.
Senior Mechanical Engineer

## Experience Summary

Twenty-nine years experience in the electric power generation field, including mechanical design, QA/QC, construction/startup and business development/licensing of nuclear, coal-fired, hydroelectric, geothermal and windpower plants; and engineering and policy analysis of thermal power plant regulatory issues.

## Education

- California State University, Long Beach—Master of Business Administration
- California State Polytechnic University, Pomona--Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical) California — No. M27737 expires 6/30/04

## Professional Experience

**1990 to Present**--Senior Mechanical Engineer, Siting & Environmental Division - California Energy Commission

Technical lead person for the analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases. Key contributor to Commission's investigation into market impediments to the deployment of advanced high-efficiency generating technologies.

**1987 to 1990**--Generation Systems/Facility Design Unit Supervisor, Siting & Environmental Division - California Energy Commission

Responsible for supervising the analysis of generating capacity, reliability, efficiency, safety, and mechanical, civil/structural, and geotechnical engineering aspects of power plant siting cases.

**1981-1986**--Operations Manager, Alternate Energy - Santa Fe Pacific Realty Corporation

Participated in and supervised identification, evaluation and feasibility analysis, licensing and permitting of hydroelectric, geothermal, windpower and biomass power projects.

**1974-1981**—Mechanical Engineer, Quality Engineer - Bechtel Power Corporation and Bechtel National, Inc.

Wrote equipment specifications, drew flow diagrams and P&ID's, performed system design and safety analysis for nuclear power plants and nuclear fuel processing plant. Wrote and implemented QA/QC procedures for nuclear power plant. Participated in construction/startup of large coal-fired power plant.

# DECLARATION OF
## RAMESH SUNDARESWARAN

I, **RAMESH SUNDARESWARAN** declare as follows:

1. I am presently employed by the California Energy Commission in the **ENVIRONMENTAL OFFICE** of the Systems Assessments and Facilities Siting Division as a **HEALTH & SAFETY PROGRAM SPECIALIST.**

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **PUBLIC HEALTH** for the **SALTON SEA UNIT # 6 PROJECT** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: _____ Signed _____

At: Sacramento, California

**RAMESH SUNDARESWARAN**

## SUMMARY

Over 17 years of progressively responsible experience in management, organizational, technical and policy areas related to urban environmental management and planning, pollution control, regulatory compliance and chemical engineering. Consulting experience, government experience, and teaching experience

## EMPLOYMENT

6/00-present *Associate (California Energy Commission, Sacramento,CA)*
Provided expert technical analyses/opinions of health and safety impacts on the public and facility workers, stemming from the use and transport of hazardous materials and adoption of fire prevention strategies as encountered in power generation and energy resource use. Conducted probabilistic safety assessments in determining health and safety risks. Prepared and presented expert witness testimonies and made recommendations to the Commission during proceedings concerning regulatory compliance of power plants

12/97-6/00 *Associate(SF Regional Water Quality Control Board, Oakland,CA)*
Performed a wide variety of consultative, advisory and evaluative duties in the areas of mitigation and preservation of impacts on public health and safety and the environment due to hazardous and toxic chemical usage/release. Used risk-based decision making in addressing human health and ecological risk issues. Provided testimony in formal hearings regarding regulatory compliance of responsible parties. Coordinated with other public agencies and informed and involved the public in addressing environmental risks mitigation and prevention

6/92 -12/97 *Group Manager/ Senior Engineer (RPS Inc , Torrance, CA)*
Developed, planned, coordinated and executed various projects in the areas of environmental protection, health and safety, pollution prevention and regulatory compliance. Directed staff in the preparation of workplans, reports, process designs, bids and specifications for projects. Liaised with governmental agencies and negotiated environmental permits and variances for clients. Advised clients on regulatory interpretations. Testified as fact and expert witness in environmental litigations. Oversight and supervision of staff subcontractors and vendors in completion of projects. Responsible for operations of environmental engineering group. P&L, strategy and business development and also technical and cost proposal writing.

4/90-6/92 *Project Manager (Dames & Moore, S. Ana, CA)*
Served as technical lead and also provided project team member support for various environmental engineering and industrial safety projects. Also managed and oversaw projects for technical, quality and financial performance.

8/88-4/90 *Project Manager (JKB Assoc., Carson, CA)*
Provided management and technical support for various projects ranging from environmental assessments to rehabilitation of impaired natural resources. Controlled project budget/schedule/performance.

6/86-8/88 *Hazardous Waste Specialist (Orange County Health Care Agency, S. Ana, CA)*
Rendered regulatory oversight for various projects to protect public health, safety and environment. Involved in policy-making and development of environmental regulations.

1/87-5/88 *Instructor (US Environmental Protection Agency(USEPA)Air Pollution Training Institute, San Luis Obispo, CA)*
Taught various air pollution courses to both industry and government. Assisted course director in program administration.

**OTHER EMPLOYMENT**
Marketed corrosion mitigation technologies to the oil and gas industries in South East Asia for over 6 years.

**EDUCATION**

1987-1988 Master of Engineering, Environmental Engineering, California Polytechnic State University, San Luis Obispo, CA

1980-1982 Master of Business Administration, Armstrong University, Berkeley, CA

1974-1979 Bachelor of Chemical Engineering, Kakatiya University, India

**PROFESSIONAL AFFILIATIONS**

- Board of Engineers, Malaysia
- American Institute of Chemical Engineers
- American Society of Safety Engineers
- USEPA's Industrial Accident Release Prevention Requirements peer reviewer
- Expert panel member on USEPA's solvent extraction treatability testing guidance document
- World Environment Center
- Registered Environmental Assessor, State of California ( in progress )

# DECLARATION OF

Joseph Diamond Ph. D _____ . ___

I, __Joseph Diamond. _____ declare as follows:

I am presently employed by the California Energy Commission in the Systems Assessments and Facilities Siting Division as a ___Planner II- Economist _____ .

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the PSA and FSA__ on ___Socioeconomics__ ___ . _____ for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 6/12/2003 Signed: Joseph Diamond

At: Sacramento, California

Dr. Joseph Diamond
Work (916) 654 3877

Ph.D. with experience in economic policy.

## BUSINESS AFFILIATION

California Energy Commission
1516 9th St. MS 40
Sacramento, CA 95814

## EDUCATION

| | | |
|---|---|---|
| Michigan State University | Ph.D. | Resource Development |
| University of Rhode Island | M.A. | Economics |
| University of New Hampshire | B.A. | Economics |

# DECLARATION OF

Kenneth F. Peterson

I, _Kenneth F. Peterson declare as follows:

I am presently employed by the California Energy Commission in the Environmental Office of the Systems Assessments and Facilities Siting Division as a Planner II.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein

I helped prepare the staff assessment on Traffic and Transportation for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief

Dated: June 11, 2003 Signed: _____

At: Sacramento, California

# RESUME

Ken Peterson

## EXPERIENCE

**Planner II** California Energy commission, Environmental Unit, October, 2001 to present; land use, traffic and transportation, and visual resources environmental review for power plant licensing.

**Housing and Community Development Representative II**, State of California Department of Housing and Community Development, October, 1982 to October, 2001; low-income housing policy development and program implementation

**Housing Specialist**, Housing Authority of the County of Los Angeles, July, 1979 to September, 1982 coordination of low-income housing project planning and development.

## EDUCATION

University of New Mexico Albuquerque, New Mexico Architecture School Graduate Program, 1978 - 1979 school year

San Jose State University, San Jose, California Master of Urban Planning degree, 1978

Northern Illinois University, Dekalb, Illinois, Bachelor of Arts degree, History, 1968

# DECLARATION OF

Dr. Obed Odoemelam

I, Obed Odoemelam declare as follows:

I am presently employed by the California Energy Commission in the Environmental Protection Office of the Systems Assessments and Facilities Siting Division as a Staff Toxicologist.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the staff testimony on Transmission Line Safety and Nuisance for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 7/18/[illegible] Signed: [illegible]

At: Sacramento, California

**RESUME**

DR. OBERD OOGEMEAM

EDUCATION:

1979-1981 University of California, Davis, California Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989
The Present California Energy Commission. Staff Toxicologist

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas. Energy conservation related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

# DECLARATION OF

James S. Adams

I, James S. Adams declare as follows.

I am presently employed by the California Energy Commission in the Environmental Protection Office of the Systems Assessments and Facilities Siting Division as an Environmental Planner.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the Visual Resources section of the Final Staff Assessment for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 18, 2003 Signed: James S. Adams

At: Sacramento California

**James S. Adams**
**Environmental Protection Office**
**California Energy Commission**
**1516 Ninth Street**
**Sacramento, CA 95814-5504**
**PH (916) 653-0702, FAX (916) 654-3882**
**Jadams@energy.state.ca.us**

5/1999
Present **Environmental Planner**
Review applications for certification to acquire permits from the California Energy Commission to build electric generating power plants. Specific technical fields include socioeconomics and traffic and transportation.

11/1997
Present **Energy and Resource Consultant**
Provide clients with technical expertise on various issues related to natural resource use and development. Current activities include managing an intervention by the Redwood Alliance before the California Public Utilities Commission regarding the decommissioning of the Humboldt Bay Power Plant's nuclear reactor.

9/1994--
10/1997 **Senior Analyst - Safe Energy Communication Council (SECC)**
Responsible for developing and/or implementing campaigns on various energy issues involving the promotion of energy efficiency and renewable energy and advocating less reliance on nuclear power. Managed educational outreach efforts to newspaper editorial writers throughout the U.S. to encourage coverage of energy issues. Participated in meetings and negotiations with key Clinton administration officials, members of Congress and staff, national coalitions, and grassroots organizations on important energy issues (e.g. U.S. Department of Energy Budget for Fiscal Years 1996-1998). Successfully raised $140,000 from private foundations to support SECC activities.

6/1978--
12/1992 **Principal Consultant - Redwood Alliance**
Provided consulting services to the Alliance, a renewable energy/political advocacy organization. Major responsibilities included managing and/or participating in several interventions/appearances before the California Public Utilities Commission, California Energy Commission, California Legislature, U.S. Congress and the U.S. Nuclear Regulatory Commission. Issues included electric utility planning efforts, greater reliance on energy efficiency and renewable energy, nuclear power economic analyses, decommissioning cost estimates, and nuclear waste management and disposal.

2/1983--
8/1986 **Natural Resource Specialist**
Assisted private consulting, firms, non-profit corporations and government agencies in various projects related to the enhancement and protection of national forests in Northern California and Southern Oregon. This included contracts with the U.S. Forest Service, Fish and Wildlife Service, National Park Service, the California Coastal Conservancy, and private landowners.

6/1978--
present Consultant/Journalist/Paralegal/Lobbyist
Throughout the period of work outlined above, I have written a considerable amount of news articles and reports connected to ongoing projects and issues of personal interest. The legal/administrative interventions have required extensive paralegal work to support attorneys, and technical expertise to identify and assist consultants. In addition, many of the projects required consulting services and lobbying, at the local, state and federal level whenever necessary, as well as working with the print and television media as appropriate

From 1978 through 1984 I served on the Board of Directors for two locals non-profit agencies devoted to sustainable community development. Redwood Community Development Council and Renwood Community Action Agency (RCAA). I also was hired on staff at RCAA as a natural resource specialist which is explained more fully above. I am proficient with computers, printers, fax machines and related equipment.

## EDUCATION

M.A. Social Science, Political science and natural resources emphasis. California State University at Humboldt. Graduated December 1998.

B.A. Political Science. Political and economic aspects of natural resource development, with a particular emphasis in forest ecology and appropriate technology. California State University at Humboldt. Graduated June 1978.

Academic Honors. Member of PI GAMMU MU Honor Society since 1986

## MILITARY SERVICE

7/1969--
5/1975 U.S. Navy, Air Traffic Controller.
Honorable Discharge.

# DECLARATION OF

Dale Edwards

I, Dale Edwards declare as follows:

I am presently employed by the California Energy Commission in the Environmental Protection Office of the Systems Assessments and Facilities Siting Division as a Energy Facilities Siting Planner III

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein

I helped prepare the Final Staff Assessment on Visual Resources for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 21, 2003 Signed: _____

At: Sacramento California

**DALE B. EDWARDS**
Planner III

## EXPERIENCE SUMMARY

Experience in oversight and review of socioeconomic, land use, transportation, visual and cultural resource analyses relating to electrical energy projects. Educational background in environmental studies and biology.

## EXPERIENCE RECORD

October 1998 to present
California Energy Commission, Energy Facilities Siting & Environmental Protection Division (EFS&EPD), Environmental Protection Office. Supervise staff working in the Community and Cultural Resources Unit. Oversight of staff analyses for land use, socioeconomics, cultural, visual and traffic and transportation resources for inclusion in staff assessments of power plant siting applications. Prepared and sponsored socioeconomic testimony for the La Paloma Generating Project.

June 1995 to October 1998
Compliance Program Manager (EFS&EPD, Siting Office) Supervised compliance project managers and secretary to ensure facilities approved by the Commission were constructed, operated and closed in accordance with all applicable laws, ordinances, regulations, standards and Commission conditions, and that documentation received was properly tracked and filed. Managed development of the Access based compliance tracking program.

December 1985 to June 1995
Lead Compliance Project Manager (EFS&EPD, Siting Office) Responsible for monitoring the most complex power plants for compliance with conditions; facilitated complaint resolution procedures and responsible for project management of amendments to Commission decisions. Managed two major amendments that involved significant land use and biological issues.

March 1984 to December 1985
Grant Program Manager (EFS&EPD, Siting Office) Responsible for planning and administration of the Siting and Permit Assistance Grant Program, and the improvement and operation of the Residuals Model for projecting statewide power plant emissions. Wrote Biomass Energy Development in California, Status Report, and co-authored Wind Energy Development in California, Status Report.

March 1978 to March 1984
Loan Program Manager (Energy Efficiency Division) Responsible for administration of the Schools and Hospitals, and Streetlight Loan Programs, including technical review of applications and recommendations for funding. Co-authored the Draft California State Plan for the Commercial and Apartment Conservation Service.

## EDUCATION

B.A. in Environmental Studies with a Biology minor, June 1977, California State University Sacramento.

- Course work in Economics, Environmental Law, Sociology, Statistics, and CEQA updates.

# DECLARATION OF
**William D. Walters**

I, **William Walters** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, in the Agoura Hills office as a senior associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein

3. I helped prepare the staff testimony on **VISUAL RESOURCES** (visible plume analysis), for the **SALTON SEA UNIT #6 PROJECT** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 1, 2003 Signed: _____

At: Agoura Hills, California

**WILLIAM WALTERS, P.E.**
**Air Quality Specialist**

**ACADEMIC BACKGROUND**

B.S., Chemical Engineering, 1985, Cornell University

**PROFESSIONAL EXPERIENCE**

Mr. Walters has over sixteen years of technical and project management experience in environmental compliance work, including environmental impact reports, RCRA/CERCLA site assessment and closure, site inspections, source monitoring, emissions inventories, source permitting, and energy and pollution control research.

**Aspen Environmental Group** **2000 to Present**

Responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Preparation and/or project management of the air quality section of the Staff Assessment and/or Initial Study for the following California Energy Commission (CEC) licensing projects:
  - Hanford Energy Park.
  - United Golden Gate, Phase I
  - Huntington Beach Modernization Project (including Expert Witness Testimony)
  - Woodland Generating Station 2
  - Gentile Energy Project, Phase I
  - Magnolia Power Project
  - Colusa Power Project
  - Henrietta Peaker Project
  - Tracy Peaking Power Plant Project
  - San Joaquin Valley Energy Center
- Assistance in the preparation of the noise assessment section of the Staff Assessment for the Contra Costa Power Plant CEC licensing project.
- Preparation of the staff paper "Emission Offsets Availability Issues" and preparation of the Emission Offsets Concurrent Workshop Summary paper for the CEC.
- Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 CEC licensing project.
- Issue area coordinator providing support for the air quality analyses and/or visual plume assessments for the Inland Empire Energy Center, Los Estanos Critical Energy Facility, Palomar Energy Project, Avenal Energy Project, and the Tesla Power Plant Project.

- Preparation and/or project management of the visual plume assessment for the following California Energy Commission (CEC) licensing projects
  - Metcalf Energy Center Power Project (including Expert Witness Testimony)
  - Contra Costa Power Plant Project (including Expert Witness Testimony)
  - Moorpark Power Project
  - Potrero Power Plant Project
  - El Segundo Modernization Project
  - Magnolia Power Project
  - Morro Bay Power Plant Project
  - Valero Cogeneration Project
  - East Altamont Energy Center (including Expert Witness Testimony)
  - Russell City Energy Center
  - SMUD Cosumnes Power Plant Project
  - City of Vernon McBay Combined Cycle Plant
  - Inland Empire Energy Center
  - Palomar Energy Project
  - San Joaquin Valley Energy Center
  - Woodland Generating Station 2
  - Hanford Energy Park
  - United Golden Gate, Phase I
  - Huntington Beach Modernization Project
  - Oroville Energy Project, Phase I
  - Colusa Power Project
  - Hermosa Peaker Project
  - Tracy Peaking Power Plant Project
  - Avenal Energy Project

- Preparation of the air quality section of the PG&E Hydrodivestiture Draft EIR/EIS for the California Public Utilities Commission (CPUC)

- Emission inventory for the construction activities forecast for the San Jose/Old San Jose Creeks Ecosystem Restoration project for the United States Army Corps of Engineers (USACE)

- Preparation of emission inventory and Conformity Analysis of the Murieta Creek Flood Control Project for the USACE

- Preparation of permit applications, emission calculation spreadsheets, and an air quality compliance manual for Desa International's Southern California manufacturing facility.

**Camp Dresser & McKee, Inc.** **1998 to 2000**

Mr. Walters was responsible as lead technical and/or project manager on environmental projects. Specific responsibilities and projects include the following:

- Preparation of emission inventories and dispersion modeling for criteria and air toxic pollutants for the Los Angeles International Airport Master Plan (LAXMP) EIS/EIR.

- Project manager/technical lead for the completion of Risk Management Plans (RMPs) for four J.R. Simplot food processing facilities in Oregon, Idaho and Washington and the Consolidated Reprographics facility located in Irvine, California. Project manager for the concurrent Process Safety Management plan support for the J.R. Simplot Hermiston Oregon and Heyburn Idaho facilities and the project manager/technical lead for the RMP support for the ASI food processing facility in Weiser, Idaho and the Atlantic Cheese Processors food processing facility in Fort Fairfield, Maine.

- Project Manager/Technical lead for the completion of air permit applications and air compliance audits for two Dexa International fireplace accessory manufacturing facilities located in Santa Ana, California

- Air quality audit for a metal, metal can manufacturing company at two manufacturing sites.

- Completion of an environmental tax credit application for the J.R. Simplot Hermiston Oregon food products facility.

**Planning Consultants Research** **1997 to 1998**

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Project Manager for a stationary source emission audit of the entire Los Angeles International Airport complex for Los Angeles World Airports (LAWA) in support of the LAXMP.

- Review of the Emission Dispersion Modeling System (EDMS) and preparation of a report with findings to the Federal Aviation Administration for LAWA in support of the LAXMP.

- Project manager for the ambient air monitoring and deposition monitoring studies performed for LAWA in support of the LAXMP, including the selection of the monitoring sites and specialty subcontractor, and review of all monitoring data.

- Completion of intersection "CO Hotspot" modeling, ambient monitoring, and deposition monitoring reports for LAWA in support of the LAXMP.

**Aspen Environmental Group/Clean Air Solutions** **1995 to 1996**

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Manager of the Portland, Oregon, office of Clean Air Solutions from March 1995 to December 1995, with responsibilities including Project Management, Business Development, and Administration.

- Control technology assessment, engineering support and Notice of Intent to construct preparation for J.R. Simplot's Hermiston, Oregon food processing facility.

- Air quality compliance report including an air emission inventory, regulatory and permit compliance determination, and recommendations for compliance for Lumber Tech, Inc.'s Lebanon, Oregon wood products facility.

- Review and revision of an Air Contaminant Discharge Permit application, Title V permit application, and PSD modeling analysis for J.R. Simplot's Hermiston, Oregon food processing facility.

- Source test methodology and equipment selection for testing inlet and outlet concentrations of total gaseous hydrocarbon and benzene from soil gas extraction/oxidation units for Cascade Earth Sciences, Ltd.

- Preparation of a Tier II (synthetic minor) permit application for the American Lamb Foods, Payette, Idaho food processing facility.

- Emission inventory and compliance evaluation for Simplot's Aberdeen, Idaho feed processing facility.

- Preparation of an Air Contaminant Discharge permit application for Marlette Homes, Inc. Hermiston, Oregon manufactured housing facility.

- Preparation of a Title V permit application for Simplot's Helm, California fertilizer manufacturing facility.

- Source test contractor selection and test oversight for J.R. Simplot's feed processing plant in Hermiston, Oregon and Boise Cascade's wood-fired boiler in Willamina, Oregon.

**Fluor Daniel, Inc.** **1990 to 1995 and 1996 to 1997**

Mr. Walters was responsible as lead technical or project manager for major environmental projects for both government and private clients. His projects included:

- Prepared several air permit applications for the ARCO Los Angeles Refinery Polypropylene Plant Project.

- Phase I environmental assessments for seven properties located in Southern California.

- Prepared Environmental Baseline Reports for 3 sites in Guam for the U.S. Navy.

- Prepared site investigation and RCRA closure plan report for Olin Hunt Specialty Chemicals Vernon, California hazardous waste storage site.

- Project manager of the Anaconda Smelter site for the U.S. Environmental Protection Agency's (EPA) Alternative Remedial Contract System (ARCS) project during the conclusion of technical activities and project closeout. Prepared a cost recovery report for the project.

- Task manager for nine site investigations under the EPA Region VI ARCS contract. Project activities included data collection, work plan preparation, field sampling, final report preparation, and Hazard Ranking System (HRS) PRE-score preparation.

- For the Hanford (Washington) Waste Vitrification Project,
  - prepared an air emission inventory for criteria pollutants
  - prepared an emission inventory and compliance evaluation of toxic air pollutants
  - performed compliance review of design drawings and equipment specifications
  - analyzed failure probability and consequence analysis of design basis accidents

- Prepared fugitive and point source VOC emission estimates and performed a "Top Down" BACT analysis for a 217 MMBtu/hr steam boiler for a proposed ethanol production facility in Great Falls, Montana.

- Performed environmental analysis for the Bonneville Power Authority, including air pollution BACT analysis, wastewater analysis, and evaluation of secondary environmental effects of electric power producing technologies.

**Jacobs Engineering Group** **1988 to 1990**

Mr. Walters was responsible for a wide range of air pollution regulatory and testing projects, including the following:

- Project manager of air toxic emission inventory reports for for California's AB2588, prepared for U.S. Borax's boron mining and refining facility and the Naval Aviation Depot (North Island Naval Base, San Diego, California).

- Prepared air permit applications and regulatory correspondence for several facilities.

  - U.S. Department of Energy's Feed Material Production Center uranium processing facility in Fernald, Ohio
    - Emission sources at a confidential high technology electronics manufacturing facility
  - Evaluation of a sludge dewatering process at Unocal's Wilmington, California, Refinery
    - United Airlines blade repair facility at the San Francisco Airport
  - Relocation of Kerr-McGee's rocket fuel storage and blending facility to Apex, Nevada

- Prepared source testing plans, Quality Assurance/Quality Control (QA/QC), and testing oversight for several facilities including:

  - QA/QC for RCRA air emissions sampling plan for the Department of Defense's Cherry-Point facility on Johnston Atoll
    - Prepared plan and provided QA/QC and field oversight for emissions testing at Baxter Healthcare in Irvine, California
  - Prepared plan and provided testing oversight for Kerr-McGee's existing ammonium perchlorate manufacturing facility in Henderson, Nevada

- Completed identification of air permitting regulations and control technology requirements for a proposed 30,000 barrel per day catalytic cracking unit for Coastal Corporation's Pacific Refinery, located in Hercules, California

- Characterized and quantified air emissions for offshore oil and gas development activities associated with Federal oil and gas Lease Sale 95, offshore southern California, for the U.S. Minerals Management Service

- Assisted in selection and design of air pollution control equipment for various clients

- Prepared environmental reports, including waste stream quantification and characterization for several proposed facilities, including:

  - Lake Minerals proposed soda ash plant at Owens Lake, California
    - Minsal's proposed potash facility located on the Salar de Atacama in Chile

**San Joaquin County Air Pollution Control District** **During 1987 and 1988**

Mr. Walters served as an air pollution engineer and was responsible for the following: start-up site inspections of air pollution sources, monitoring source tests and evaluating source test reports; permitting minor and major sources of air pollutants; processing emissions or banking applications; and aiding in the preparation of the District's Best Available Control Technology (BACT) quarterly reports, Reasonable Further Progress reports, and emission inventories.

**Adelphi Center for Energy Studies** **1985 to 1986**

Mr. Walters served as a combustion facility manager/research engineer and was responsible for the following: management and implementation of all conventional and advanced fuel combustion projects, including the preparation of interim and final reports, conducting source tests using EPA methods 1-4 and 17, and the data analysis of all combustion tests; maintenance and repair of all combustion facility equipment; preparation of all combustion project proposals; and implementation and data analysis of fuel atomization studies, fuel rheology research, and bench scale fuel ash removal research.

CERTIFICATIONS

[illegible]

Chemical Engineer, California License 5973
CARB, Fundamentals of Enforcement Seminar
EPA Methods 1-8, 17 Training Seminar

**PAPERS**

**Authored**

"Current and Future Air Pollution Emission Offset Requirements and Impacts to the Pacific Northwest", PNWIS/CPANS Air and Waste Management Chapters Annual Meeting, November 17, 1995.

**Co-Authored**

"Gas Co-Firing of Fuel CWF for Package Boiler Applications", Presented at the Third Annual Pittsburgh Coal Conference, September 1986

"Implications of Slurry Fuel Rheology on Atomization," American Society of Engineers.

"Factors Affecting Atomization of CWF", Presented at the Eighth International Symposium of Coal Slurry Fuel Preparation and Utilization, Orlando, FL May 1986

# DECLARATION OF
**Lisa A. Blewitt**

I, **Lisa Blewitt** declare as follows

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, in the Agoura Hills office as an associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **VISUAL RESOURCES** (visible plume analysis), for the **SALTON SEA UNIT #6 PROJECT** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: Agoura Hills, California

**LISA A. BLEWITT**
**Associate Engineer/Physical Scientist**

**ACADEMIC BACKGROUND**
B.S., Chemical Engineering, University of California, Santa Barbara, 1991

**PROFESSIONAL EXPERIENCE**

Miss Blewitt is a chemical engineer with experience in air, plume and noise analysis. Prior experience includes refinery and power plant design. Project management experience includes helping manage the Aspen team (Aspen employees plus all subcontractors) for several California Energy Commission (CEC) projects, and support on various proposals.

**Aspen Environmental Group** **August 2001 to present**

Miss Blewitt's project experience at Aspen includes the following:

***California Energy Commission (CEC):*** Miss Blewitt performed plume analysis and/or air quality analysis on several projects to support the Staff Assessments for the CEC's CEQA equivalent review process. She helps manage the Aspen team as Power Plant Coordinator (PPC). Coordination of the Aspen team with CEC project managers includes providing up to date information to all members of the team, identifying key issues, and preparing monthly progress reports. She also manages the Aspen team as the overall Aspen PPC for all CEC projects by providing weekly progress reports to all Aspen PPC's.

- **Avenal:** AFC for 600 MW combined cycle plant located in Avenal, Kings County. Miss Blewitt performed the plume analysis for the cooling tower, heat recovery steam generators (HRSGs), and auxiliary boiler.
- **Blythe 2:** Aspen Team Power Plant Coordinator to support the Staff Assessment of the AFC for a 520 MW combined cycle power plant located entirely within the previously approved Blythe Energy Project facility boundaries west of the City of Blythe, Riverside County. Miss Blewitt will be performing the plume analysis. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.
- **Central Valley Energy Center:** Aspen Team Power Plant Coordinator to support the Staff Assessment of the AFC for a 1,060 MW combined cycle power generation facility located in the City of San Joaquin, Fresno County. Miss Blewitt assisted with the air quality analysis, and performed the plume analysis for the cooling tower, HRSGs, and auxiliary boiler. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.
- **Colusa CC:** AFC for a 500 MW combined cycle power generation facility located west of the City of Williams in Colusa County. Miss Blewitt assisted with the air quality analysis.
- **East Altamont:** AFC for a 1,200 MW combined cycle power generation facility located southeast of Tracy in Alameda County. Miss Blewitt assisted with the cooling tower plume analysis. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.

- **Henrietta:** AFC for a 91.1 MW simple cycle power plant to be located west of the City of Lemoore, in Kings County. Miss Blewitt assisted with the air quality analysis and performed the plume analysis for the HRSGs. This plant did not require a cooling tower.
- **Inland Empire:** AFC for a 670 MW combined cycle power plant to be located near the town of Romoland and Perris, within an unincorporated area of Riverside County. Miss Blewitt performed the plume analysis for the cooling tower, HRSGs, and auxiliary boiler.
- **Los Esteros Critical Energy Facility:** Aspen Team Power Plant Coordinator to support the Staff Assessment of the AFC for a 180 MW simple cycle peaking plant in San Jose, CA.
- **Magnolia:** AFC to add 250 MW of new generation at Magnolia Generation Power Plant in Burbank, CA. Miss Blewitt assisted in the air quality analysis and performed the plume analysis for the cooling tower and HRSGs. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.
- **Roseville Energy Facility:** AFC for 900 MW combined cycle power plant five miles northwest of downtown Roseville in Placer County. Miss Blewitt performed the plume analysis for the cooling towers.
- **SMUD Consumnes:** AFC for 1000 MW combined cycle power plant to be located at the Rancho Seco Nuclear Power Plant in Sacramento County. Miss Blewitt performed the plume analysis for the cooling towers and HRSGs.
- **South Star:** AFC for 100 MW simple cycle power plant (SSI) located in the Texaco South Midway-Sunset Oilfield, Kern County. Miss Blewitt assisted with the air quality analysis. Project cancelled.
- **Spartan:** Power Plant Coordinator for Aspen team to support the Staff Assessment of the AFC for a 96 MW simple cycle peaking plant in San Jose, CA. Project cancelled.
- **Tracy:** Aspen Team Power Plant Coordinator to support the Staff Assessment of the AFC for a 169 MW simple cycle power plant to be located southwest of the City of Tracy, in western San Joaquin County. Miss Blewitt also assisted with the air quality analysis and performed the plume analysis based on results from Spartan I Energy Center Project.
- **Vernon:** AFC for the Malburg Generating Station (MGS), a 139 MW combined cycle power plant to be located in the City of Vernon, Los Angeles County. Miss Blewitt performed the plume analysis for the cooling tower and HRSGs. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.

***Los Angeles Unified School District (LAUSD):*** Miss Blewitt performed noise analysis and/or parking studies for the following projects:

- **Wonderland:** Three story stick building classroom addition to an existing elementary school. Miss Blewitt attended a site visit to analyze the current project alternative, and provided an update to the project manager regarding the impact to issues previously identified for the original configuration. Miss Blewitt performed the noise analysis for the proposed project in October 2002.
- **Northridge:** Portable additions to an existing high school. Miss Blewitt performed a parking study to determine baseline parking conditions prior to addition of new portables.
- **Wilson:** Portable additions to an existing high school. Miss Blewitt performed a parking study to determine baseline parking conditions prior to addition of new portables.

- **Reseda:** Portable additions to an existing high school. Miss Blewitt performed a noise analysis in October 2002 to determine the significance of noise impacts due to the addition of 12 new classroom buildings and two sanitary buildings on the existing school campus. Coordinated with staff to incorporate all District comments into the Initial Study, and prepared the draft Mitigated Negative Declaration.

*Proposals:* Miss Blewitt assisted in the development of the following proposals.

- **Department of Water and Power On-Call:** Miss Blewitt coordinated the subcontractors including collecting all resumes, project descriptions, firm descriptions and references.
- **Miguel Mission:** Miss Blewitt coordinated the subcontractors including collecting all letters of participation, conflict of interest statements, disclosure tables, resumes, project descriptions, technical approaches, and references.

**Fluor Daniel, Inc.** **August 1996 to July 2001**

Miss Blewitt was a Process Engineer at Fluor Daniel, Inc. in Aliso Viejo, CA from August 1996 to July 2001. She did process design work for both refineries and power plants.

- **Occidental Chemical Taft Cogeneration Project:** Worked with Duke Fluor Daniel to independently develop the design of multiple process systems including wastewater treatment, storm water, potable water, hydrogen and natural gas. Coordinated and discussed design issues with civil/structural, architectural, piping, mechanical, project engineers and the client to develop and optimized, cost-effective design. Developed process flow diagrams (PFD) and piping and instrument diagrams (P&ID) to meet all safety and operability requirements set by the client and industry standards. Confirmed piping layouts met system hydraulic requirements for proper operation considering design and alternate operating cases.
- **Georgia-Pacific Steam Reformer Project:** Lead flue gas recycle study to determine operating requirements for combustion in pulse heaters.
- **Syncrude Canada Upgrader Expansion (UE-1) Project:** Prepared the Design Basis Specifications and defined the revamp modifications required to debottleneck a Naphtha Hydrotreater Plant. Conducted the P&ID Review for design approval with the client in Fort McMurray, Alberta, Canada. Simulated the Naphtha Hydrotreater Plant. Completed multiple configuration studies to determine the best configuration for UE-1.

**ADDITIONAL TRAINING AND COURSES:**
Engineer In Training Certificate
UCSB Extension 2-day class - Preparing CEQA/NEPA Documents
UCSB Extension Project Management Professional Certification Program (9/02 - 06/03) - 16 units total

**PROFESSIONAL AFFILIATIONS:** UCSB Alumni Association

# DECLARATION OF
ELLEN TOWNSEND-HOUGH

I, Ellen Townsend-Hough declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Systems Assessments and Facilities Siting Division as an Associate Mechanical Engineer

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Waste Management for the Salton Sea Unit 6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: _____ Signed: _____

At: Sacramento, California

# Ellen Townsend-Hough

## SUMMARY

I am a chemical engineer with over 20 years of experience. My professional career has afforded me many unique growth and development opportunities. Working knowledge of the California Environmental Quality Act. Strength in analyzing and performing complex engineering analyses. Also worked as a policy advisor to a decision-maker for three years.

## PROFESSIONAL EXPERIENCE

**Writing**

- Write letters, memos, negative declarations, environmental impact reports that require technical evaluation of mechanical engineering and environmental aspects of pollution control systems, environmental impacts, public health issues and worker safety.

**Technical Analysis and Presentation**

- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems.

- Review and process compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects.

- Provides licensing recommendations and function as an expert witness in regulatory hearings.

- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.

- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure.

- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts.

**Technical Skills**

- Establish mitigation that reduces the potential for human exposure to levels which would not result in significant health impact or health risk in any segment of the exposed population.

- Assist with on-site audits and inspection to assure compliance with Commission decisions.

- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.

- Work with the following software applications: WORD, Excel, and PowerPoint.

**Policy Advisor**

- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission's power plant licensing, research and development and export programs.

- Track and provide research on various California Energy Commission (CEC) programs. Prepare analysis of economic, environmental and public health impacts of programs, proposals and other Commission business items.

- Represent Commissioner's position in policy arenas and power plant siting discussions.

- Write and review comments articulating commission positions before other regulatory bodies including Air Resources Board, California Public Utilities Commission, and the Coastal Commission.

- Wrote speeches for the Commissioner's presentations.

## EMPLOYMENT HISTORY

| | | |
|---|---|---|
| 2002 Present | Associate Mechanical Engineer | CEC<br>Sacramento CA |
| 1999-2002 | Advisor to Commissioner | CEC<br>Sacramento CA |
| 1989-1999 | Associate Mechanical Engineer | CEC<br>Sacramento CA |
| 1992 1993 | Managing Partner | EnvironNet<br>Sacramento CA |
| 1988-1989 | Sales Engineering Representative | Honeywell Inc<br>Commerce CA |
| 1987-1988 | Chemical Engineer | Groundwater Technology<br>Torrance CA |
| 1986 1986 | Technical Marketing Engineer | Personal Computer Engineers<br>Los Angeles CA |
| 1980 1985 | Energy Systems Engineer | Southern California Gas Company<br>Anaheim CA |
| 1980-1985 | Design and Cogeneration Engineer | Southern California Edison<br>Rosemead CA |
| 1979 1980 | Student Chemical Engineer | Gulf Oil Company<br>Pittsburgh PA |

## EDUCATION

Bachelor of Science, Chemical Engineering
Drexel University, Philadelphia Pennsylvania

Continuing Education

*Hazardous Material Management Certificate, University California Davis*
*Urban Redevelopment and Environmental Law, University of California Berkley*
*Analytical Skills, California Department of Personnel Administration (DPA) Training Center*
*Legislative Process/Bill Analysis, DPA Training Center*
*Federally Certified Environmental Justice Trainer*

***References furnished upon request.***

# DECLARATION OF
Mike Krolak

I, Mike Krolak declare as follows.

I am presently employed by the California Energy Commission in the Environmental Office of the Systems Assessments and Facilities Siting Division as a Planner II.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the Final Staff Assessment on Soil and Water Resources for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 2, 2003 Signed: [signature]

At: Sacramento, California

**Mike Krolak**
Planner II

## EDUCATION

Bachelor of Science, Environmental Resource Science (Hydrobiology Emphasis), University of California, Davis, 2000.

**Technical Coursework** in Hydrology, Aqueous Geochemistry, Soil Science, Ecology, Environmental Planning, Environmental Law and Policy.

## PROFESSIONAL EDUCATION

Introduction to Groundwater, National Ground Water Association January 2001.

## EXPERIENCE

April 2002 to Present

**Planner II**, California Energy Commission, Systems Assessment and Facilities Siting Division, Environmental Protection Office.

Provide analysis in a similar capacity to Planner I duties; however, Planner II duties often include more complex projects.

April 2001 to April 2002

**Planner I** California Energy Commission, Systems Assessment and Facilities Siting Division, Environmental Protection Office.

Organize, research, and analyze soil and water resource data associated with the siting of power generation facilities. Identify issues, impacts and mitigation measures. Oversee and coordinate the actions of consultants in gathering, organizing and analyzing soil and water resource data associated with the siting of power generation facilities. Coordinate with local governments, resource protection agencies, environmental organizations and business organizations. Participate in workshops and meetings concerning Commission projects and programs. Evaluate existing and proposed laws, ordinances, regulations, standards, and policies pertinent to the soil and water resources aspect of proposed energy facilities. Perform written assessments of energy related documents.

November 2000 to April 2001

**Energy Analyst** California Energy Commission, Energy Facilities Siting & Environmental Protection Division, Environmental Protection Office.

Provide assistance in gathering, organizing and analyzing water and soil resources data and identification of issues, impacts and mitigation measures. Assist in coordinating with local governments, resource protection agencies, environmental

organizations and business organizations. Participation in workshops and meetings concerning Commission projects and programs. Evaluation of existing and proposed laws, ordinances, regulations, standards, and policies pertinent to the water and soil resource aspect of proposed energy facilities. Perform written assessments of energy related documents.

January 2000 to August 2000

**Student Assistant.** California Energy Commission, Energy Facilities Siting & Environmental Protection Division, Environmental Protection Office

Assisted in gathering and preliminary analysis of water and soil resource data used by staff in siting analyses. Assisted in evaluation of laws, ordinances, regulations and standards pertinent to water and soil resources.

June 1996 to September 1998

**Summer Intern.** Marin Municipal Water District: Water Quality Laboratory.

Assisted in field collection and lab analysis of water samples, of both treated and source waters. Assisted in lake water quality treatments and in developing a lake treatment schedule. Investigated consumer water quality complaints.

# DECLARATION OF
## KEVIN ROBINSON

I **Kevin Robinson** declare as follows

I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Systems Assessments and Facilities Siting Division as a **MECHANICAL ENGINEER**.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the staff testimony on **FACILITY DESIGN** for the **Salton Sea Unit #6 project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief

Dated: 6-18-03 Signed: Kevin Robinson

At. Sacramento, California

**KEVIN ROBINSON**
Mechanical Engineer

## Experience Summary

Two years experience in the electric generation field, including mechanical design, QA/QC and construction of hydroelectric plant systems; and engineering and policy analysis of geothermal, natural gas-fired and thermal power plant regulatory issues.

## Education

- California State University, Chico—Bachelor of Science, Mechanical Engineering
- Certified EIT, California

## Professional Experience

**2001 to Present**—Mechanical Engineer, Systems Assessment & Facility Siting Division, Engineering Section – California Energy Commission

Responsible for analysis of generating capacity, reliability, efficiency, and the mechanical, civil/structural engineering aspects of power plant siting cases

**2000 to 2001**—Mechanical Engineer, Oroville Field Division, Engineering Section - California Department of Water Resources

Assist in the preparation of designs, technical specifications and cost estimates for mechanical equipment at a hydroelectric power plant. Coordinate the design installation, and inspection of mechanical equipment. Assist in preparing test reports, and recommendations for corrective action.

# DECLARATION OF

Al McCuen

I, Al McCuen declare as follows:

I am presently employed by the California Energy Commission in the Engineering Office of the Systems Assessments and Facilities Siting Division as a Senior Electrical Engineer.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the Final Staff Assesment on Transmission System Engineering for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 4-03 Signed: _____

At: Sacramento, California

**Albert A. McCuen**
SENIOR ELECTRICAL ENGINEER

**Education**

A.S., Electronic Engineering, College of the Siskiyous, Weed, CA
B.S., Electrical Engineering, California State University, CA

**Professional Background**

1990 to present--Senior Transmission Planner for Regulatory Transmission Engineering, Electrical Engineering, and Transmission System Evaluation. Special consultant for Transmission Safety and Nuisance discipline.

1987 to 1989--Supervisor of Transmission Evaluation Unit for Transmission Safety and Nuisance, Electrical Engineering, Transmission Engineering and Transmission System Evaluation technical disciplines.

1978 to 1987--Transmission System Program Specialist/Health and Safety Program Specialist, California Energy Commission (CEC), Siting and Environmental Division.

Expert witness for the Commission's power plant approval process and Commission staff transmission planner. Major assignments in transmission engineering and transmission system planning. Duties emphasize determination of the adequacy, acceptability and relative merit of applicant proposals for major transmission facilities (and staff proposed alternatives) in consideration of economics, reliability, conformance with transmission system planning criteria and coordination of regional transmission and generation facilities. Major assignments have also included scoping macro transmission policies for California, Developing Commission transmission system planning regulations and guidelines, developing common forecasting methodology for transmission system planning utility reporting.

1977 – 1978--Manager, Transmission Line Effects Section, CEC, Compliance and Safety Office.

Research, analysis and evaluation of public health, safety and nuisance concerns for transmission lines. Duties included engineering calculations of transmission line electrical effects, review and assessment of technical publications and health, safety and nuisance standards.

1976 – 1977--Energy Facility Siting Planner, CEC, Compliance and Safety Office

Research and evaluation of existing material and health and safety standards applicable to thermal power plants and transmission lines. Responsible for coordination of expert witness to testify at hearings, preparation of cross examination questions, analysis of impact of effects and preparation of staff summary reports on Notice of Intent(s) and hearing testimony.

1969 – 1976--Electrical Engineering, Private firm - Electrical, Mechanical and Systems Engineering Construction Contractor. Engineering duties and coordination responsibilities for the construction of power plants, switchyards, power lines, industrial buildings and process control systems. Responsible for code and specification interpretation and compliance, design, project cost estimates and installation.

# DECLARATION OF
**Dal Hunter, Ph.D., C.E.G.**

I, **Dal Hunter, Ph.D., C.E.G.**, declare as follows:

1. I am presently employed by Black Eagle Consulting as Vice President under contract with the California Energy Commission Energy Facilities Siting and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **GEOLOGY AND PALEONTOLOGY** for the **Salton Sea Unit #6 project (02-AFC-2)**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 19, 2003 Signed

At: Black Eagle Consulting, Inc.
Reno, Nevada

REGISTERED GEOLOGIST
ROBERT DALTON HUNTER
No 1451
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

**Robert D. Hunter, Ph.D., C.E.G.**
**Engineering Geologist**
**Vice President**

**Education**

Ph.D. Geology 1989 University of Nevada, Reno
M.S. Geology 1976 University of California - Riverside
B.S. Geology 1972 California State University, Fullerton

**Registrations**

Professional Geological Engineer Nevada
Registered Geologist California
Certified Engineering Geologist California

**Experience**

1997 to Present. Black Eagle Consulting, Inc.; Vice President — Dr. Hunter is in charge of all phases of geological, geotechnical, and geochemical projects and is responsible for conducting, coordinating, and supervising these investigations for public and private sector clients. He is very familiar with power generating project requirements, both from a geotechnical and geologic hazards reference and has reviewed over a dozen power plant projects on behalf of the California Energy Commission.

1978 to 1997. SEA, Incorporated, Geotechnical Manager, Engineering Geologist. Dr. Hunter was in charge of all phases of geotechnical projects for SEA, including project coordination and supervision. Field exploration, geotechnical analysis, slope stability analysis, soil mechanics, engineering geochemistry, mineral and aggregate evaluations and report preparation. Numerous investigations were undertaken on military, commercial, industrial, airport, residential, and roadway projects. He worked on many geothermal power plants, providing expertise in foundations design, slope stability, seismic assessment, geothermal hazard evaluation, expansive clay, and settlement problems. Project types included high-rise structures, airports, warehouses, shopping centers, apartments, subdivisions, storage tanks, roadways, mineral and aggregate evaluations, slope stability analyses, and fault studies.

1977 to 1978. Fugro (Pacific) Incorporated, Consulting Engineers and Geologists; Staff Engineering Geologist, Long Beach, California

**Affiliations**

Association of Engineering Geologists, Great Basin Section

**Publications**

Hunter, 1988. *Lime Induced Heave in Sulfate Bearing Clay Soils*. Journal of Geotechnical Engineering. ASCE. Vol. 14, No. 2, pp. 150-157.

Hunter, 1989. *Applications of Stable Isotope Geochemistry in Engineering Geology*: Proceedings of the 25th Annual Symposium on Engineering Geology and Geotechnical Engineering

Hunter, 1993. *Evaluation of Potential Settlement Problems Related to Salt Dissolution in Foundation Soils*. Proceedings of the 29th Annual Symposium on Engineering Geology and Geotechnical Engineering

# DECLARATION OF
**Shahab Khoshmashrab**

I, **Shahab Khoshmashrab** declare as follows.

1 I am presently employed by the California Energy Commission in the **Engineering Office** of the Systems Assessment and Facility Siting Division as a **Mechanical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3 I prepared the Staff Testimonies on **Reliability and Efficiency**, for the **Salton Sea Unit #6 project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared Testimonies are valid and accurate with respect to the issues addressed therein.

5 I am personally familiar with the facts and conclusions related in the Testimonies and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 12, 2003 signed: Sh. Khoshmashrab

At: Sacramento, California

**Shahab Khoshmashrab**
Mechanical Engineer

## Experience Summary

Eight years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, and engineering and policy analysis of thermal power plant regulatory issues

## Education

- California State University, Sacramento– Bachelor of Science, Mechanical Engineering

## Professional Experience

**2001-2003**--Mechanical Engineer, Systems Assessment and Facilities Siting– California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

**1998-2001**--Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

**1995-1998**- Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes

# DECLARATION OF
## Demetrio Bucaneg

I, **Demetrio Bucaneg** declare as follows:

I am presently employed by the California Energy Commission in the **Engineering** Office of the Systems Assessments and Facilities Siting Division as a **Associate Electrical Engineer**

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein

I helped prepare the **Final Staff Assessment** on **Transmission System Engineering** for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief

Dated: August 4, 2003 Signed: Demetrio S. Bucaneg Jr. PE

At Sacramento, California

# DECLARATION OF

Sudath Arachchige

I Sudath Arachchige declare as follows

I am presently employed by the California Energy Commission in the Transmission System Engineering Office of the Systems Assessments and Facilities Siting Division as an Electrical Engineer.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein

I helped prepare the TSE testimony on 08-04-03 for the Salton Sea Unit #6 project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 4th August - 03 Signed: Sudath Arachchige

At: Sacramento, California

**Sudath Arachchige**
**12655 King Fisher Drive**
**Grand Terrace CA 92313 USA** **Phone 916-630-1187**

**EDUCATION:**
Bachelor of Science in Electrical Engineering at California State University Fullerton

**ATTAINMENTS:**
Member of the Professional Engineers in California Government
Vice President Electrical Engineering Society-California State University Fullerton

**EXPERIENCE:**

**November-2001 to Present** – Associate Electrical Engineer, System Assessment and Facilities Siting Division, California Energy Commission
Conduct and perform planning studies and contingency analysis including power flow, short-circuit, stability, and post-transient analysis to maintain reliable operation of the power system. Investigates and analyzes Grid Planning problems and provides appropriate information to Grid Planning Engineers. Develops automated computer programs and other advance analysis methods for comprehensive evaluation of the operational performance of the transmission system.
Understanding of regulatory and reliability guidelines, WECC and NERC planning and operation criteria, CPUC and FERC requirements. Review technical analyses for WECC/SOPTO transmission systems and proposed system additions, provide support and analyses associated with Reliability Must-Run (RMR) contracts and the Local Area Reliability Services (LARS) process; review new generation interconnection studies; provide congestion analyses; and provide support for regulatory filings

**June-1998 to November-2001:** – Project Electrical Engineer, Design Electrical Engineering Section, Department of Transportation, California.
Electrical Engineering knowledge and skills in the design, construction and maintenance of California state work projects involving all the public work areas; contract administration, construction management, plan checking, field engineering and provide liaison with consultants, developers, and contractors. Plan review in facility constructions, highway lighting, sign lighting, rest area lighting, preparation of project reports, cooperative agreements, review plans for compliance of construction and design guide lines for national electrical code, standards and ordinance. Review process included breaker relay coordination, detail wiring diagrams, layout details, service coordination, load, conductor sizes, derated ampacity, voltage drop calculations, harmonic and flicker determination.

**June-1993 to May-1998:**- Substation Electrical Engineer, City of Anaheim, California
Performed protective relay system application, design and setting determination in Transmission & Distribution Substation. Understanding of principles of selective

coordination system protection and controls for Electric Utility Equipment. Understanding of Power Theory and Analysis of symmetrical components. Ability to review engineering plans, specifications, estimates and computations for Electrical Utility Projects. Practices of Electrical Engineering design, to include application of Electro-mechanical and solid state relays in Electrical Power Systems. Software skills in RNPDC (Fuse Coordination Program), Capacitor bank allocation program, and Load Flow Program. Design projects using CAD, Excel spread sheets including cost estimates, wiring diagrams, material specifications and field coordination.

Performed underground service design 12kV and 4kV duct banks; pole riser, getaway upgrade, voltage drop calculation, ampacity calculation; and wiring diagrams. Design and maintenance of substations in City Electrical Utility System. Upgrade Station Light and power transformers; upgrade capacitor banks, replacement of 12kV–4kV power circuits; Breakers at Metal Clad Switchgear. Design one line diagrams; three line diagrams; grounding circuits, schematics; coordination of relay settings; conduit and material list preparation. Calculation of derated ampacity; inrush current, short circuit current and fault current.

# DECLARATION OF
**Connie Bruins**

I, Connie Bruins declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Protection of the Energy Facilities Siting and Environmental Protection Division as a Compliance Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Compliance Monitoring Plan and General Conditions, for the Salton Sea Geothermal #6 Power Plant Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: [illegible] Signed: [illegible]

At: Sacramento, California

**Constance (Connie) Bruins**
Sacramento, California 95818

## CALIFORNIA ENERGY COMMISSION: FULL-TIME EMPLOYMENT FROM MAY 15, 1989 TO PRESENT

### *August 23, 1999 to present: Planner II-Compliance Project Manager*

Facilities Siting and Environmental Protection Division

- Manage multiple compliance projects for the Compliance Unit including amendments to Commission siting case decisions and active siting cases.
- Review and approve specific Conditions of Certification or Exemption written by technical staff, according to criteria defined by the Compliance Unit (specific, measurable, agreed upon, realistic, time framed and enforceable).
- Prepare the General Conditions including the Monitoring, Compliance and Closure Plan sections of Preliminary and Final Staff Assessments for active siting cases.
- Prepare and present testimony on compliance, general conditions and closure issues in public forums, workshops and hearings.
- Assist technical staff in preparation of facility closure analyses.
- Develop and draft Memoranda of Understanding between the Commission and other agencies or third party contractors, authorizing parties to serve as Commission delegates to ensure that projects are designed, constructed and operated in conformity with the Commission Decision and all applicable laws, ordinances, regulations and standards.

### *June 15, 1998 to August 22, 1999: Associate Energy Specialist*

Renewable Technologies Program, Technology Development Division

- Manage multiple renewable energy projects (biomass, landfill gas, digester gas and small hydro) for the Renewables Program New Account. Represent the Renewables Program in meetings and workshops with project owners, agencies, interest groups and/or the public.
- Oversee project activities concerning pre-construction and construction milestones. Ensure compliance with program conditions and requirements for permits, licenses, and approvals from federal, state, regional and/or local agencies needed to construct and operate the project including environmental, land-use, siting or other issues pertinent to the project.

### *March 1, 1996 to June 14, 1998: Energy Analyst*

Export Program, Technology Development Division

- Assist in the management of International Energy Fund grant awards. Perform technical evaluation of proposals to conduct feasibility studies of international energy projects that meet standards acceptable in California. Proposals include geothermal, solar, biomass, wind, waste-to-energy, and small hydroelectric. Monitor all project activities.
- Coordinate and administer public workshops and briefings for international visitors on energy project opportunities in foreign countries

## EDUCATION: CALIFORNIA STATE UNIVERSITY AT SACRAMENTO BA ENGLISH, 1995