EXECUTIVE SUMMARY

INTRODUCTION

This Staff Assessment (SA) contains the California Energy Commission (Energy Commission) staff's evaluation of the High Desert Power Project, Limited Liability Company's (the applicant) Application for Certification (97-AFC-1) for the High Desert Power Project (HDPP). The HDPP electric generating plant and related facilities, such as the electric transmission line, natural gas pipeline and water lines are under the Energy Commission's jurisdiction and cannot be constructed or operated without the Energy Commission's certification. Staff is an independent party in the proceedings. This SA is a staff document, and it examines engineering and environmental aspects of the HDPP. The SA contains analyses similar to those contained in Environmental Impact Reports required by the California Environmental Quality Act (CEQA). It is not a Committee document nor is the SA a preliminary or proposed decision on the proposal. The SA presents staff's conclusions and proposed conditions that staff recommends apply to the design, construction, operation, and closure of the proposed facility, if certified.

BACKGROUND

On June 30, 1997, the applicant filed an AFC with the Energy Commission to construct and operate the HDPP. On December 3, 1997, the Energy Commission deemed the AFC adequate, at which time staff began its analysis of the proposal. The analyses contained in this SA are based upon information from: 1) the AFC; 2) subsequent amendments; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. On May 15, 1998, staff filed its draft Preliminary Staff Assessment, based on the information available at that time. On June 15, 1998, the applicant amended its application to include a second natural gas pipeline.

PROJECT DESCRIPTION

The HDPP will be located on a 25-acre site in a portion of Section 24, Township 6 North, Range 5 West, (San Bernardino Base and Meridian). The site is located on of the Southern California International Airport (SCIA), formerly George Air Force Base, located within the northwest corner of the city of Victorville. The project will be owned and operated by the High Desert Power Project, Limited Liability Company. This company is comprised of Inland Energy (Newport Beach, CA) and Constellation Power Development (Baltimore, MD). Electrical energy produced from the proposed merchant power plant will be sold in California's newly created electricity market pursuant to sales agreements with municipalities or other customers. Construction of the facility is expected to begin in 1999. Depending on the configuration selected, commercial operation is expected to begin some time between October 2000 and January 2001. The project costs are estimated to be between $250 to $350 million. The project will create 350 construction jobs and 20-25 permanent operational jobs depending on plant configuration.

On April 8, 1998, the applicant informed staff that it is considering an additional 30-inch natural gas pipeline connection with the Pacific Gas and Electric or Kern River Pipeline systems. On June 15, 1998, the applicant amended its application to include the second natural gas pipeline. This second pipeline would be located mainly within previously developed utility and transportation corridors along State Highway 395.

The applicant has identified two alternative natural gas-fired design configurations for the HDPP. The first is a combined cycle design consisting of three combustion turbines and three steam turbines with a combined rating of 720 MW. The second is also a combined cycle design consisting of two combustion turbines and two steam turbines with a combined rating of 678 MW. A complete description of the proposal is contained the **PROJECT DESCRIPTION** section of this SA.

STAFF'S ASSESSMENT

Staff expects that for most technical areas the environmental consequences of the two configurations will be the same. This is because the proposed configurations will both use the same 25-acre site, transmission line, and natural gas and water pipelines. Staff believes environmental consequences only vary between the two configurations in air quality, and water resources. Therefore, the sections for most technical areas will only contain one discussion of Impacts, Mitigations and Conditions of Certification. The air quality, and water resources technical areas will contain subsections describing the environmental impacts, mitigation, and conditions of certification for each of the two configurations.

The SA includes staff's assessments of:

- the project's conformity with integrated assessment of need;
- the environmental setting of the proposal;
- impacts on public health and safety, and measures proposed to mitigate these impacts;
- environmental impacts, and measures proposed to mitigate these impacts;
- the engineering design of the proposed facility, and engineering measures proposed to ensure the project can be constructed and operated safely and reliably;
- project alternatives;
- compliance of the project with all applicable laws, ordinances, regulations and standards (LORS) during construction and operation; and

- proposed conditions of certification, where these can be identified at this time.

COMPLETE ANALYSES

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

1. need conformance,
2. public health
3. worker safety and fire protection,
4. transmission line safety & nuisance,
5. hazardous materials,
6. waste management,
7. land use,
8. traffic and transportation,
9. noise,
10. visual resources,
11. socioeconomics,
12. paleontological resources
13. facility design,
14. reliability,
15. efficiency, and
16. transmission line engineering

However, staff notes that the applicant, agencies, other parties, and the public have not had an opportunity to review and comment on these sections. Although staff had published a draft Preliminary Staff Assessment on May 15, 1998, that assessment did not address all features of the project which the applicant has subsequently included or modified (e.g., the second natural gas pipeline). Therefore, there is a potential that the applicant, other parties, agencies, and the public may have comments or suggestions regarding the findings, conclusions and recommendations we have not had the opportunity to consider. To the extent that staff believes it appropriate to address those comments, this SA should not be considered complete in those areas.

INCOMPLETE ANALSES

AIR QUALITY

Although the Mojave Desert Air Quality Management District's (District) has issued a revised preliminary Determination of Compliance (DOC), we believe substantial air quality technical and policies issues remain, including:

- best available {air pollutant emission} control technologies (BACT) for nitrogen oxides (NOx) and carbon monoxide (CO),
- the appropriate method for determinate the interpollutant offset ratio, and thus, the interpollutant offset ratio,
- South Coast Air Quality Management District approval of interpollutant offsets,
- U.S. Environmental Protection Agency approval of interpollutant offsets,
- reasonable available control technology (RACT) adjustment of proposed emission reduction credits (ERCs or offsets),

- evidence of the applicant's legal interest in the ERCs it has identified its November 9, 1998 offset plan,[1]
- appropriate methods to mitigate potential violations of the nitrogen dioxide ambient air quality standard from startup of the project.

Staff issued data requests on December 8, 1998 requesting information that could help resolve some of these issues. The applicant's data responses were received on January 13, 1998. Because of a lack of time, staff's air quality analysis in this SA does not reflect the information provided. We submitted our comments to the District regarding our concerns regarding the revised preliminary DOC on January 15, 1999. In addition, we expect the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (ARB) and California Unions for Reliable Energy (CURE) to provide comments on the PDOC on January 15, 1999. Comments from these parties will provide additional refinement of the issues described above. We note that the January 15, 1999, letter from Matt Haber, representing EPA, identifies that the District should issue a second preliminary DOC and provide for another 30 day public comment period before proceeding to a Final DOC.

At this time, we believe there is insufficient evidence to conclude that the project, as proposed, will comply with all applicable air quality regulations and will not result in significant air quality environmental impacts. However, because we are just now receiving new information from the applicant and the parties comments on the revised preliminary DOC, we are unable to provide concise, well-reasoned recommendations on how to address these issues. Should the High Desert Power Project Committee direct evidentiary hearings regarding air quality at this time, we would have to recommend that the application be denied, since the outstanding air quality issues have not been resolved. We believe a more expeditious approach would be to delay hearings on air quality to allow staff and other parties the opportunity to present revised or supplemental air quality testimony once the Final DOC is prepared.[2] Since we do not have the final DOC, this SA does not contain proposed air quality conditions of certification.

WATER RESOURCES

At the time of the publication of this SA, staff's analysis is incomplete for water resources, and for other areas affected by the second natural gas pipeline (e.g., biological and cultural resources). Regarding water resources, we believe that the proposed project may have a significant impact on the ground water aquifer in the region, which is already in an overdraft situation. We have received the information from the Victor Valley Water District (VVWD) and Mojave Water Agency (MWA) regarding their recommended preliminary conditions for approval of the water

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[1] The High Desert Power Project Committee's December 16, *1998* ***Notice of Prehearing Conference and Scheduling Order***, identified that the applicant should file the Letters of Intent on January 21, 1999.

[2] The High Desert Power Project Committee's December 16, *1998* ***Notice of Prehearing Conference and Scheduling Order***, identified that the District would issue its Final DOC on February 1, 1999. Given EPA's January 15, 1999 comments on the revised preliminary DOC, we are not confident that the District will issue its Final DOC on February 1, 1999. We note that should the District issue a second revised preliminary DOC, this would delay hearings on air quality 30 to 90 days from early March 1999.

supplies for the High Desert Power Project. However, we have not received the Lahontan Regional Water Quality Control Board (RWQCB) preliminary conditions for approval of the wastewater discharge permit, necessary for injection of State Water Project (SWP) water into to the ground water aquifer. The VVWD's approval of the applicant's water plan is contingent on injection of SWP water to mitigate overdraft impacts on the local ground water aquifer. Based on our last communication with the Lahontan RWQCB, we expect to receive their preliminary conditions in late January 1999. In addition, we understand that the U.S. Fish and Wildlife Service (USFWS) has identified concerns regarding impacts to riparian habitat due to pumping ground water. At this time, these concerns have not been fully addressed. Thus, we are unable to complete our water resources analysis, complete our evaluation of appropriate mitigation measures, or conditions of certification.

BIOLOGICAL AND CULTURAL RESOURCES

Regarding biological and cultural resources, we believe the second natural gas pipeline has a potential to result in significant environmental impacts to biological and cultural resources if not properly mitigated. The second natural gas pipeline crosses habitat of both state and federal listed endangered species. The pipeline also crosses land containing cultural resources; one cultural resources site has been identified as being eligible for nomination for listing on the national register of historic places. If this site were registered, it would potentially affect the mitigation required to protect the site. The second natural gas pipeline is subject to federal review regarding both cultural and biological resources. The analyses contained in this SA are as complete as possible pending federal agency action. Our analyses identify what we believe are appropriate mitigation measures and conditions of certification.

FEDERAL REVIEW AND PERMITTING

Because the second natural gas pipeline crosses Bureau of Land Management (BLM) land, its approval is subject to BLM and U.S. Fish and Wildlife Service (USFWS) review. Preparation of an Environmental Impact Statement (EIS) is required by the National Environmental Policy Act (NEPA). The EIS would address all environmental impacts from both the power plant and from the second natural gas pipeline. USFWS would be the lead agency for the EIS. An incidental take permit, pursuant to Section 10(a)(1)(B) of the federal Endangered Species Act, must be obtained by the applicant in order to construct the power plant. A Section 7 consultation between BLM and USFWS must be concluded before BLM can issue a right-of-way grant for the second natural gas pipeline. The federal agencies would develop one Biological Opinion, which would address endangered species issues for both the power plant and second natural gas pipeline. The Biological Opinion will identify the terms and conditions required by the federal agencies for approval of the project with respect to listed species. The Biological Opinion will likely be concluded before completion of the EIS and would be incorporated into the EIS and, ideally, would be incorporated in the Energy Commission Decision on the project. Because the second natural gas pipeline is located in a designated utility corridor, we anticipate eventual approval, but we don't know what conditions will be applied to protect both biological and cultural resources.

On December 17, 1998, California Unions for Reliable Energy (CURE) served notice that it intends to sue the BLM for failure to consult with USFWS regarding the California Desert Conservation Area Plan. The California Desert Conservation Area Plan established the utility corridor in which the applicant has proposed to construct the second natural gas pipeline. Conceivably, resolution of the legal issues raised by CURE could significantly delay federal agency review and approval of the second natural gas pipeline. Even if the issues raised by CURE do not delay federal review and approval, it is not likely that the federal agencies will act on the proposal before them until the summer or fall of 1999.[3] Consequently, we are not certain precisely what mitigation and conditions the federal agencies will place on approval of the second natural gas pipeline. Staff believes that the Energy Commission's conclusions regarding whether the second natural gas pipeline will result in significant environmental impacts should rely in part on the federal agency review and approval of the proposal. However, the Energy Commission's decision on the High Desert Power Project would need to be significantly delayed to incorporate results of the federal review.

We believe that the Energy Commission has three options to address the timing inconsistencies between the federal process and our siting process:

1. Conditionally approve the High Desert Power Project application, including the second natural gas pipeline, on receipt of applicable federal permits.[4] If the Energy Commission were to pursue this option, the federal agencies would determine the appropriate permit conditions; the concerns of the parties in this proceeding could only be addressed by the federal agencies, not the Energy Commission. Any inconsistencies between federal permit conditions and Energy Commission conditions of certification would need to be brought back to the Energy Commission for amendment.

2. Delay the processing of the High Desert Power Project application until the federal agencies have issued their permits. Resolution of the legal issues raised by CURE could take some time. Even without the uncertainty of the legal issues raised by CURE, the Energy Commission's decision could be delayed for some time.

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[3] In early October 1998, the applicant had requested staff to provide a draft alternatives section to facilitate the federal agencies preparation of the Environmental Impact Statement (EIS) for the second natural gas pipeline. Staff first promised a draft in mid-November 1998. Staff was unable to provide a draft copy. Staff's delay in providing a draft alternatives section, may have contributed to delay in receiving federal agency review of the second natural gas pipeline. However, staff notes that delay in receiving federal agency review was also delayed by delay in receiving critical information regarding the applicant's Habitat Conservation Plan.

[4] A Section 10(a)(1)(B) permit must be obtained for the power plant. The applicant could construct and operate the power plant and related facilities (other than the second natural gas pipeline) once the Section 10 (a)(1)(B) permit is obtained. A Section 7 consultation between BLM and USFWS must be concluded before BLM can issue a right-of-way grant for the second natural gas pipeline. If the federal agencies were to issue the Section 10 (a)(1)(B) permit before concluding the work on the lease for the second natural gas pipeline, option 1 has a scheduling advantage for the applicant.

3. Sever the second natural gas pipeline from any Energy Commission certification of the proposed High Desert Power Plant or deny that portion of the application without prejudice. Staff would address potential cumulative impacts of the power plant and second natural gas pipeline in the analysis prepared for the evidentiary hearings. The applicant could later file an amendment to add the second natural gas pipeline when the federal agencies had issued their permits and the applicant wanted to construct the pipeline.

STAFF RECOMMENDATION

Staff has identified "major issues" [5] on the proposed project in four technical areas: air quality, water resources, biological and cultural resources. Although our analysis is potentially complete in 16 areas, resolution of the remaining issues in the other four area areas will not be trivial, and may be crucial to the Energy Commission's Decision on this project. At this time, based on our conclusions about the air quality impacts of the project, we recommend denial of the project. Similarly, should the High Desert Power Project Committee hold evidentiary hearings on water resources, we would have to recommend that the application be denied, as our analysis is incomplete on this topic. We believe a better approach would be to delay hearings on air quality (once the Final DOC is prepared) and water resources to allow staff and other parties the opportunity to present revised or supplemental testimony. Regarding the second natural gas pipeline, in the previous section staff offered three options for the Committee's consideration. We believe that the first option is the best option because we have proposed adequate conditions in this SA to protect biological and cultural resources impacted by the second natural gas pipeline.

[5] Staff's identification of major issues was based on its estimate of whether any of the following circumstances will occur: 1) significant impacts may result from the project which may be difficult to mitigate; 2) the project as proposed may not comply with applicable laws, ordinances regulations or standards (LORS); or 3) conflicts arise between the parties about the appropriate findings or conditions of certification for the Energy Commission decision.

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High Desert Power Project (97-AFC-1) Staff Assessment

INTRODUCTION

Richard Buell

PURPOSE OF THIS REPORT

The Staff Assessment (SA) presents the California Energy Commission (Energy Commission) staff's independent analysis of High Desert Power Project, Limited Liability Company's (the applicant) Application for Certification (AFC). This report is prepared pursuant to sections 1742, 1742.5, 1743, and 1744 of Title 20, California Code of Regulations. The SA is a staff document. It is not a Committee document nor is it a draft decision or proposed decision. The SA describes the following:

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

The analyses contained in this SA are based upon information from: 1) the AFC; 2) subsequent amendments; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. The analyses for some technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The verification is not part of the proposed condition, but is the Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted requirements. The SA presents conclusions and proposed conditions 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 Regulations, section 1701 et seq., and the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) and its guidelines (Cal. Code Regs., Title 14, § 15000 et seq.).

ORGANIZATION OF THE STAFF ASSESSMENT

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

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

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

ENERGY COMMISSION SITING PROCESS

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

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

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

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

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

Traditionally, we use the PSA to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the period between publishing the PSA and FSA, we conduct workshops to discuss our findings, proposed mitigation, and proposed compliance monitoring requirements. Since we published our draft PSA in May 1998, staff has conducted workshops and has received written comments on our assessment. Based on these workshops and written comments, we have refined our analysis, corrected errors, and finalized conditions of certification to reflect areas where we have reached agreement with the parties. However, the High Desert Power Project Committee's December 16, 1998 order did not direct staff to file a FSA, but rather to prepare a SA. Thus, this SA may serve as staff's testimony in those area where parties agree that the issues are ready for evidentiary hearings. Where this SA does not represent staff's final analysis, staff may issue a supplemental or final staff assessment.

The staff's assessment is only one piece of evidence that will be considered by the Committee 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 distributed for a minimum of 30 days in order to receive written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. A revised PMPD is required to undergo a 15-day comment period. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for decision. Following Energy Commission adoption, any party may appeal the decision to the Energy Commission within 30 days.

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

PROJECT DESCRIPTION

Testimony of Richard K. Buell

NATURE AND PURPOSE OF PROJECT

The High Desert Power Project Limited Liability Company (applicant) proposes to construct and operate a 678 to 720 megawatts (MW) the High Desert Power Project (HDPP) natural gas fueled electricity generation power plant. The applicant's stated objectives for the project are to: serve identified need for power in the southern California electricity market, maximize market opportunities by locating in an area with potential access to northern California electricity markets, locate near key infrastructure (e.g., transmission, natural gas pipelines, cooling water supply), avoid constrained permitting areas such as the South Coast Air Quality Management District, and minimize project costs and environmental impacts. Electrical energy produced from the proposed merchant power plant will be sold in California's newly created electricity market pursuant to sales agreements with municipalities or other customers. To provide flexibility in meeting the project objectives in this new market structure, the applicant has identified two alternative combined cycle natural gas-fired design configurations rated at 720 MW and 678 MW, respectively. The project may be modified in the future to provide steam, hot water, or chilled water to other industrial operations at the Southern California International Airport (SCIA) site.

PROJECT LOCATION

The HDPP will be located on a 25 acre site in a portion of Section 24, Township 6 North, Range 5 West, (San Bernardino Base and Meridian). This site is on the Southern California International Airport (SCIA), formerly George Air Force Base, located within the northwest corner of the city of Victorville. See **PROJECT DESCRIPTION** Figures 1 and 2 for the location of the project.

PROJECT DESCRIPTION

The applicant has identified two alternative natural gas-fired design configurations for the HDPP. These are a combined cycle design consisting of three combustion turbines and three steam turbines with a combined rating of 720 MW, and a combined cycle design consisting of two combustion turbines and two steam turbines with a combined rating of 678 MW.

720 MW COMBINED CYCLE

PROJECT DESCRIPTION Figure 3 shows the proposed equipment layout for the three combustion and steam turbine combined cycle configuration. The 720 MW combined cycle design will consist of three AF≅ class combustion turbines (160 MW each) and three steam turbines (86.5 MW each). The applicant is currently considering two manufacturers for the "F" class combustion turbines: General Electric and Westinghouse. The combined cycle configuration will incorporate

PROJECT DESCRIPTION Figure 1
Regional Setting

PROJECT DESCRIPTION Figure 2
Local Setting

PROJECT DESCRIPTION Figure 3
720 MW Combined Cycle Layout

water treatment equipment, air compressor, inlet air evaporative coolers, turbine and generator set, continuous emission monitors, control room and administrative building, step-transformers, heat recovery steam generators, steam turbines, three 130 foot exhaust stacks, cooling towers, selective catalytic reduction (SCR) and aqueous ammonia storage and handling equipment. The SCR and ammonia are used to reduce nitrogen oxide (NOx) emissions. The SCR and dry low NOx combustion technology will reduce NOx emissions from the combined cycle configurations to 2.5 ppmvd, or less, at 15 percent oxygen. The heat recovery steam generators are used to recover waste heat from the combustion turbine exhaust to produce steam. This steam is then expanded in the steam turbines to produce electricity. The combined cycle power configurations are expected to have an overall availability of 95 percent and to operate up to 8,760 hours per year.

678 MW COMBINED CYCLE

PROJECT DESCRIPTION Figure 4 shows the proposed equipment layout for the two combustion and two steam turbine combined cycle configuration. The 678 MW combined cycle design will consist of two AG≅ class combustion turbines (236 MW each), two steam turbines (115 MW each), and two 130 foot exhaust stacks. The applicant is currently considering one manufacturer for the “G” class combustion turbines: Westinghouse. The major components of the two train combined cycle will be similar to the three train combined cycle described above. The combined cycle power configurations are expected to have an overall availability of 95 percent and to operate up to 8,760 hours per year.

WATER SUPPLY

Potable water will be provided by the Victor Valley Water District and will enter at the southeast corner of the site. Potable water will be used for safety showers, drinking, domestic use and fire water. See the **WORKER SAFETY** section of this staff assessment for additional discussion of fire and other safety issues associated with construction and operation of the project. Cooling water for the evaporative coolers will be required for both configurations. Both of the combined cycle configurations will require cooling water for the steam cycles and makeup water for the heat recovery steam generator. The 720 MW combined cycle configuration will require 3,597 acre-feet per year (Fluor Daniel 1998). The 678 MW combined cycle configuration will require 3,102 acre-feet per year (Fluor Daniel 1998). The applicant has proposed two sources of cooling water for the evaporative coolers and combined cycle configurations. Victor Valley Economic Development Authority (VVEDA), under contract with the Victor Valley Water District (VVWD) will supply ground water from wells to be drilled in the project area. The locations of the wells are shown on **PROJECT DESCRIPTION** Figure 2. The Mojave Water Agency (MWA) will provide, when available, State Water Project (SWP) water for cooling. The SWP water will also be used to provide ground water recharge to replace ground water used by the project. SWP water will be supplied via the Mojave River Pipeline Project. The SWP is expected to supply the bulk of the cooling water for the project.

PROJECT DESCRIPTION Figure 4
678 MW Combined Cycle Layout

The City of Victorville has, on behalf of the High Desert Power Project, applied to the Mojave Water Agency (MWA) to receive 4,000 acre feet of State Water Project (SWP) water. To meet MWA requirements for SWP water, the Victor Valley Water District and the city have indicated to the agency that they will, subject to certain conditions, provide the project with groundwater when SWP water is not available. Although the application is for water delivery in calendar year 2002, the MWA has developed draft conditions necessary for approval of the application, which were adopted at the November 10, 1998 board meeting.

On November 9, 1998, the applicant submitted its revised water plan reflecting these changes. To comply with the conditions that the High Desert Power Project inject SWP water into the groundwater aquifer, a waste discharge requirement or a waiver will have to be issued by the Lahontan Regional Water Quality Control Board. The applicant has indicated that the report of waste discharge necessary to apply for this permit will be filed by the end of December 1998. Without this information, staff's analysis contained in this Staff Assessment (SA) of the water impacts of the proposal will not be complete. See the **WATER RESOURCES** section of this staff assessment for a discussion of the issues that need to be addressed in order to provided a complete assessment of the environmental consequences from use of the proposed water supplies.

WASTE WATER TREATMENT

Process wastewater will be processed and reused. Most cooling water will be consumed in the cooling towers and evaporated. Chemicals and solid material contained in the cooling water will be concentrated in a brine, which will be removed from the cooling cycle. The concentrated brine will be sent to a forced circulation crystallizer, where the remaining water will be removed, producing a solid crystalline material which will be disposed of in a land fill. See the **WASTE** section of this staff assessment for additional discussion of the environmental consequences of the wastes from the project. Storm runoff from the facility will be permitted in accordance with the State of California's General Permit for Stormwater Discharges associated with industrial activities. The project will develop and implement a Stormwater Pollution Prevention Plan identifying Best Management Practices employed at the facility to prevent pollution of stormwater runoff from the industrial activities. Domestic wastewater will be disposed to the sewer system at the SCIA. See the **WATER RESOURCES** section this staff assessment for additional details of the proposed wastewater treatment facilities.

TRANSMISSION LINE

A new 7.2 mile 230 kilovolt (kV) overhead (single circuit) electric transmission line will be built to interconnect the project to the Southern California Edison Company's (Edison) electrical transmission system at the Victor Substation. The route of the proposed transmission line is shown in **PROJECT DESCRIPTION** Figure 2. **PROJECT DESCRIPTION** Figures 5 and 6 show the two types of transmission towers under consideration by the applicant. A new electric 230-kV switchyard will be constructed on the eastern end of

PROJECT DESCRIPTION Figure 5
Typical Single Circuit Delta 230 kV Lattice Steel Tower

PROJECT DESCRIPTION Figure 6
Typical Single Circuit Delta 230 kV Steel Pole

the project site. Additions will also be made at the Victor Substation to accommodate the project load. On October 8, 1998 the California Independent System Operator (Cal-ISO) submitted its evaluation of the Edison's transmission interconnection study. The Cal-ISO's analysis indicated that transmission system reliability and congestion effects resulting from the High Desert Power Project could be addressed through congestion management and remedial action schemes (RAS), without the need for new downstream transmission facilities. See the **TRANSMISSION SYSTEM ENGINEERING** section of this staff assessment for additional details of the proposed transmission facilities. The environmental consequences of the transmission line are addressed in the separate technical sections of this staff assessment.

NATURAL GAS PIPELINE

A 2.75-mile 16-inch natural gas pipeline will be constructed by Southwest Gas Company to provide fuel for the project and will enter at the southeast corner of the site (see **PROJECT DESCRIPTION** Figure 2). The environmental consequences of the natural gas pipeline are addressed in the separate technical sections of this staff assessment.

On April 8, 1998, the applicant informed staff that it is considering an additional 30-inch natural gas pipeline connection with the Pacific Gas and Electric or Kern River Pipeline systems. On June 15, 1998, the applicant amended its application to include the second natural gas pipeline. This second pipeline would be located mainly within previously developed utility and transportation corridors along State Highway 395. From the project site, the pipeline would proceed north along Perimeter and Helendale Roads to Colusa Road. The pipeline would then proceed west along the south side of Colusa Road, crossing State Highway 395. The pipeline would then proceed north along the west side of State Highway 395. The pipeline would cross Highway 395 north of Kramer Hills and continue north to the Kern River Pipeline approximately one quarter-mile south of Highway 58 and one mile east of the intersection of the highways. See **PROJECT DESCRIPTION** Figure 7. Southwest Gas Corporation would construct and operate the 30-inch pipeline. This pipeline will cross U.S. Bureau of Land Management (BLM) lands and coordination of BLM, U.S. Fish and Wildlife Service (USFWS) and Energy Commission review will be required.

WATER PIPELINES

Proposed water supply pipelines will be 24 inches in diameter in order to accommodate the maximum water consumption project configuration (i.e., the 720 MW combined cycle configuration). The ground water supply will be connected to the existing VVWD water system. The VVWD water system connection to the project will be located at the corner of Phantom Street and El Evado Road and will be used for both potable and cooling water needs. The SWP water supply pipeline from the Mojave River Pipeline will be approximately 2.5 miles long from the pipeline connection at Colusa Road to the project site (see **PROJECT DESCRIPTION** Figure 2). The pipeline will be buried in a trench 4 feet wide and 6 feet deep. On AFC page 3.4-22, the applicant estimated that the construction of the pipeline(s) could take 10 to 12 months to permit and construct.

The AFC also identifies the construction of a water pipeline to the Victor Valley Water Reclamation Authority (VVWRA) wastewater treatment facility located 2.25 miles north of the project site. Since the applicant is no longer considering the VVWRA tertiary treated water as a source of cooling water for the project, this staff assessment will not address the environmental consequences from construction and operation of this pipeline. Thus, staff does not recommend that this pipeline be certified as part of the proposed project. The environmental consequences of the proposed water pipelines are addressed in the separate technical sections of this staff analysis.

CONSTRUCTION

Construction is expected to require 18 months. Construction is expected to take place between July 1999 and October 2000 or February 2001. See the **SOCIOECONOMIC** section of this staff assessment for additional details on project construction schedule and the work force necessary to support this project. The overall sequence of construction and start-up includes: site preparation, construction foundations, erecting major structures, installing major equipment, connecting major site interfaces (pipelines and transmission line), start-up testing, and final siting cleanup and landscaping.

PROJECT DESCRIPTION Figure 7
Additional Natural Gas Pipeline Route

NEED CONFORMANCE

Testimony of Donna Stone

INTRODUCTION

Under State law, the Energy Commission cannot certify a proposed electric generating facility unless it finds that the project conforms with the Integrated Assessment of Need contained in the Energy Commission's most recent ***Electricity Report***. This analysis examines whether the project proposed by the High Desert Power Project, LLC, is in conformance with the Energy Commission's most recently adopted Integrated Assessment of Need.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

STATE

California Code of Regulations

California Code of Regulations, Title 20, section 1752 requires the presiding member's proposed decision to contain the presiding member's findings and conclusions on whether and the circumstance under which the proposed facilities will be in conformance with the 12-year forecast of statewide and service area electric power demands adopted pursuant to Section 25309(b) of the Public Resources Code. (Cal. Code of Regs., tit. 20, э 1752 (a))

Need Conformance Criteria

The ***1996 Electricity Report*** (***ER 96***) continued the ***1994 Electricity Report's*** (***ER 94***) significant break with past practices and established need conformance criteria more consistent with the free-market approach that government has taken. The Energy Commission has decided not to prevent investors from putting their money where they believe investments will be competitive, as long as those investments do not put ratepayers at financial risk. The criteria governing this determination are contained in ***ER 96*** on page 72:

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

CONCLUSIONS AND RECOMMENDATIONS

ER 96 was adopted by the Commission on November 5, 1997. The High Desert Power Project was found data adequate on December 3, 1997. Therefore, ***ER 96*** is the ***Electricity Report*** adopted most recently prior to the project being found data adequate. Staff evaluated the project based on ***ER 96*** Need Conformance Criteria.

No other power plant has been certified since ***ER 96*** was adopted. The certification of the High Desert Power Project will not cause the number of megawatts permitted to exceed 6,737. Therefore, the High Desert Power Project is in Conformance with the Integrated Assessment of Need adopted in ***ER 96***.

AIR QUALITY

Testimony of Tuan Ngo

INTRODUCTION

This analysis addresses the potential air quality impacts resulting from criteria air pollutant emissions created by the construction and operation of the High Desert Power Project (HDPP). Criteria air pollutants are those for which a state or federal standard has been established. They include nitrogen dioxide (NO2), sulfur dioxide (SO2), carbon monoxide (CO), ozone (O3) and its precursors (NOx and VOC), volatile organic compounds (VOC), particulate matter less than 10 microns in diameter (PM10) and its precursors: NOx, VOC, SOx, and lead (Pb).

Specifically, staff addresses the following questions:

- Whether the project is likely to conform with applicable air quality laws, ordinances, regulations and standards,
-
- Whether the process equipment and the pollution control devices are properly sized and will perform their functions as expected,
-
- Whether the project is likely to cause significant adverse environmental effects; that is, cause new violations, or contributions to existing violations, of the applicable ambient air quality standards,
-
- Whether any identified significant adverse effects are adequately mitigated, and
-
- Whether any specific project configurations, including gas turbines, associate generating equipment, or emission control devices, alone or in combination, will result in lesser impacts to the environment, and thus be considered as potential alternative mitigation measures.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

A new, major facility, located in a non-attainment area, is subject to the federal New Source Review (NSR) program. The proposed project is located in an area that is designated as non-attainment for ozone and PM10, and is therefore subject to the NSR requirements for these pollutants. These requirements are implemented by the Mojave Desert Air Quality Management District (District) through its Regulation 13. Under NSR, the HDPP must comply with the Lowest Achievable Emission Rate (LAER) for NOx, PM10, VOC, SO2 and provide offsets for emissions of these pollutants because they contribute directly or indirectly to ambient levels of ozone and PM10. In addition, the applicant must certify that all facilities that are owned and operated by it comply with applicable requirements in the State Implementation Plan.

The HDPP facility is located in an attainment area for NO2, SO2 and CO, and is therefore subject to the Prevention of Significant Deterioration (PSD) review for those air contaminants. In general, the project must comply with Best Available Control Technology (BACT) for NO2, SO2 and CO and demonstrate that its emission impacts will not significantly degrade the existing ambient air quality in the region.

The power plant's gas turbines are also subject to the federal New Source Performance Standards (NSPS). These standards include a NOx emissions concentration of no more than 75 ppm at 15 percent excess oxygen (ppm@15%O2), and a SOx emissions concentration of no more than 150 ppm@15%O2.

STATE

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

LOCAL

The proposed facility is subject to the following District rules and regulations:

<u>Rule 102:</u> Prohibits any person from circumventing any applicable section of rules and regulations.

<u>Rule 201:</u> Requires District's authorization prior to construction of the new facility.

<u>Rule 203:</u> Requires District's authorization before commencing operation of the new facility.

<u>Rule 401:</u> Limits the discharge of air contaminants into the atmosphere through visible emissions and opacity.

<u>Rule 402:</u> Protects the public's health and welfare from the emission of air contaminants, which constitute a nuisance.

<u>Rule 403:</u> Regulates operations, which periodically may cause fugitive dust emissions into the atmosphere.

<u>Rule 406:</u> Limits the emissions of sulfur compounds to no greater than 500 ppmv, and other contaminants to specific ppmv levels.

Rule 407: Limits CO emissions to 2,000 ppm over a 15-minute averaging period.

Rule 409: Limits discharging of combustion contaminants (PM10) to no greater than 0.1 grains per dry standard cubic foot (gr/dscf).

Rule 431: Limits sulfur content of gaseous fuel to 800 ppm, and liquid or solid fuel to 0.5 percent by weight.

Rule 475: Limits the NOx emissions of any electrical power generating equipment to no more than 80 ppm, 160 ppm and 225 ppm if using gaseous, liquid and solid fuel, respectively.

Rule 476: Limits the emissions of any fuel combustion equipment to no more than 200 pounds per hour of SOx, 140 pounds per hour of NOx, or 10 pounds per hour of combustion contaminants.

Rule 900: Establishes requirements for general definitions, monitoring, records, and administrative requirements applicable to the federal New Source Performance Standard (NSPS).

Also establishes limits for NO2 and SO2 from new or modified stationary gas turbines with a designed heat rate input of 10 MMBtu/hr or more. The proposed turbines' NOx concentrations shall not exceed 75 ppm dry at 15% oxygen, and SO2 concentrations shall not exceed 150 ppm dry at 15% oxygen.

Rule 1000: Establishes the general definitions, monitoring and administrative requirements applicable to the federal National Emission Standards for Hazardous Air Pollutants (NESHAP).

Rule 1158: Establishes NOx emission standards and other requirements for electric utility operations including installation of an approved continuous emission monitoring system, reporting and an approved emission control plan.

Rule 1200: Establishes administrative requirements for obtaining a federal operating permit (Title V operating permit).

Rule 1300: Provides general discussions of the NSR Purposes, Applicability, Exemption, and Interaction with other Federal, State and District rules, regulations and plans. The NSR applies to all new and modified stationary sources that are required to have permits to construct and operate within the Mojave Desert AQMD.

Rule 1301: Provides various definitions for the NSR regulations.

Rule 1302: Provides administrative procedures for the processing of applications for permits to construct and operate of new and modified stationary sources.

Section 1302 (C)(3) "Determination of Offsets", part (b) states "[u]pon receipt of the notification [from the district regarding specific amount and type of offset required], the applicant shall provide the APCO a proposed Offset package which contains evidence of Offset eligibility for use pursuant to the provisions of District Rule 1305."

Section 1302 (C)(3)(b)(iii) also states "[a]fter determining that the Offsets are real, enforceable, surplus, permanent and quantifiable and after any permit modifications required pursuant to District Rule 1305 or Regulation XIV have been made, the APCO shall approve the use of the Offsets subject to the approval of CARB and USEPA during the comment period required pursuant to subsection (D)(2) below."

<u>Rule 1303:</u> Provides specific requirements for new or modified stationary sources including Best Available Control Technology (BACT) and offsets.

<u>Rule 1304:</u> Provides methods to calculate emissions changes from the new or modified stationary sources.

<u>Rule 1305:</u> Provides the procedures and formulas for quantifying and determining the eligibility of emission reduction credits (ERC) available for use as offsets in accordance to Rule 1303.

<u>Rule 1306:</u> Provides administrative requirements for new or modified power plants that are required to obtain licensing from the California Energy Commission.

<u>Rule 1401:</u> Provides various definitions for the banking rules.

Section (N) defines the historic actual emissions of a facility would be its emissions averaging from the two year periods, or from any two years of the previous five years, prior to the date of application for ERC.

<u>Rule 1402:</u> Provides administrative procedures for the register of ERC for stationary sources. The requirements include the specific timing of an application for ERC and criteria for approval of ERC.

Section (A)(1)(e)(ii) defines that emission reductions can be eligible for ERC if such reductions are actual emission reductions and be either recognized by the District in writing and were included in the emission inventory after the shut down or modification occurred.

Section (B)(1)(c)(i) requires that an application for ERC for emission reductions, which occurred prior to June 28, 1995 must be submitted within one year after June 28, 1995.

Section (B)(1)(c)(iii) requires a timely application for ERC for military base subject to closure or realignment shall be determined pursuant to the provisions of State Health and Safety Code (H&SC) 40709.7. H&SC 40709.7 states that, among other provisions to determine the rightful ownership of the ERC, the credits may only be used for base reuse within the jurisdiction of the District.

Section (C)(1) requires that ERC must be real, enforceable, permanent, quantifiable and surplus.

Rule 1404: Provides methods to calculate the ERC available.

Section (A)(2)(c) indicates that the ERC shall be the different between the historical actual emissions and the proposed emissions.

SETTING

METEOROLOGICAL CONDITIONS

The project is located in the southern Mojave Desert, at an elevation of approximately 2,850 feet above sea level. Relatively high daytime temperatures, large variation in relative humidity, large and rapid diurnal temperature changes and occasional high winds, sand and dust storms, and thunderstorms characterize the climate of the Mojave Desert area.

The aridity of the region is caused by the influence of a sub-tropical high-pressure system off the coast of California and topographical barriers that effectively block the flow of moisture to the region. Seasonally, the precipitation totals in the area range from a minimum of 0.5 inch in the spring to a relative maximum of 2.0 inches in winter. Total annual precipitation averages about 4 inches.

The most recent meteorological (weather) data was collected at George Air Force Base in 1992. The measured wind data are graphically represented by quarterly wind roses, provided in Appendix A. These wind roses show that for most of the year, the winds are predominately from the south and the west, although between July to September, high winds are predominately from the south.

Mixing heights in the area, which represent the altitudes to which different air masses mix together, have been estimated to be 70 meters in the morning to as high as 1,600 meters in the afternoon.

EXISTING AMBIENT AIR QUALITY

The ambient air quality standards (AAQS) represent the allowable maximum ambient concentrations of air pollutants, and are established by both the U.S. Environmental Protection Agency (EPA) and the California State Air Resources Board (CARB). The state AAQS, established by CARB, are typically lower than those established by EPA. The state and federal air quality standards are listed in AIR QUALITY Table 1. The averaging times for the various air quality standards (the times over which they are measured) range from one-hour to one year. The standards are expressed either as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 and $\mu g/m^3$).

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

The HDPP is located in the Mojave Desert Air Basin and is under the jurisdiction of the Mojave Desert Air Quality Management District. This area is designated as non-attainment for both the state and the federal ozone and PM10 standards, attainment for the state's CO, NO2, SO2, SO4 and Pb standards, and unclassified for the federal CO, NO2 and SO2 standards (ARB 1995). A new standard for PM2.5 was adopted by EPA in 1998, but specific district rules implementing those standards will not occur until 2003. The District is expected to be nonattainment for the PM2.5 standard, but its attainment status will not be determined until 3 years of ambient data have een collected, beginning in 1999.

Ambient air quality monitoring data for ozone, CO, NO2, SO2, and PM10, showing the highest readings recorded between 1991 through 1996 (the last year for which data is currently available) at the Amargosa Road (Victorville) monitoring station are tabulated in AIR QUALITY Table 2. This monitoring station is located 8 miles southwest of the project site, and is operated by the District staff. Although there are other ambient air quality monitoring stations in the vicinity of the proposed project site, staff chose to use the data from the Victorville monitoring station because the other stations are either located too far away or are upwind of the project site. Thus the measured data at the other monitoring stations may not represent the conditions of existing ambient air quality in the project vicinity, or these stations may not be affected by the emissions from the proposed project.

AIR QUALITY Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary	Secondary
Ozone (O3)	1-hour	0.09 ppm (180 $\mu g/m^3$)	0.12 ppm (235 $\mu g/m^3$)	same as primary
	8-hour	---	0.08 ppm (157 $\mu g/m^3$)	
Particulate Matter (PM10)	Ann.Geo. Mean	30 $\mu g/m^3$		same as primary
	24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	
	Ann.Arit. Mean	---	50 $\mu g/m^3$	
Fine Particulate Matter (PM2.5)	24-hour	No state standard	65 $\mu g/m^3$	same as primary
	Ann.Arit. Mean		15 $\mu g/m^3$	
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	None
	8-hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
Nitrogen Dioxide (NO2)	1-hour	0.25 ppm (470 $\mu g/m^3$)	---	same as primary
	Ann.Arit. Mean	---	0.053 ppm (100 $\mu g/m^3$)	
Lead (Pb)	30-day	1.5 $\mu g/m^3$	---	same as primary
	Cal. quarter	---	1.5 $\mu g/m^3$	
Sulfur Dioxide (SO2)	Ann.Arit. Mean	---	0.03 ppm (80 $\mu g/m^3$)	---
	24-hour	0.04 ppm (105 $\mu g/m^3$)	0.147 ppm (365 $\mu g/m^3$)	---
	3-hour	---	---	0.5 ppm (1300 $\mu g/m^3$)
	1-hour	0.25 ppm (655 $\mu g/m^3$)	---	---
Sulfates	24-hour	25 $\mu g/m^3$	No federal standard	
H_2S	1-hour	0.03 ppm (42 $\mu g/m^3$)	No federal standard	

Source: California Air Resources Board

The data in AIR QUALITY Table 2 indicate that the ambient concentrations of the criteria air contaminants in the proposed project vicinity, with the exception of ozone and PM10, are below the most restrictive ambient air quality standards.

Ozone is not directly emitted from stationary or mobile sources, but is formed as the results of chemical reactions in the atmosphere between directly emitted air pollutants. Nitrogen oxides (NOx) and hydrocarbons (Volatile Organic Compounds [VOC]) interact in the presence of sunlight to form ozone. AIR QUALITY Table 2 shows that violations of the state 1-hour ambient air quality standard for ozone occurred from 41 to 76 times every year from 1991 to 1996, with the highest ozone reading of 19 pphm recorded in 1991 and 1992. Peak ozone levels and numbers of violations of the state 1-hour ozone standard have remained relatively constant since 1993. The collected air quality data (not shown in Air QualityTable 2) indicate that the ozone violations occurred primarily during the period June through September.

The ARB report: "Second Triennial Review of the Assessment of the Impacts of Transported Pollutants on Ozone Concentrations in California" (ARB 1996) provided the following observations regarding ozone violations in the Mojave Desert area:

- There are days when a combination of local emissions and transported ozone or precursors contribute to the exceedances of 1-hour ozone standards,
-
- There is a possibility that at least one day of the year the violations of the 1-hour ozone standards are the direct result of local source emissions.

The area is also non-attainment for PM10. PM10 can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. Gaseous emissions of pollutants like NOx, SOx and VOC from the turbines, and NH3 from the NOx control equipment can, given the right meteorological conditions, form particulate matter known as nitrates (NO3), sulfates (SO4), and organic compounds. These pollutants are known as secondary particulates, because they are not directly emitted but are formed through complex chemical reactions between directly emitted pollutants in the atmosphere. Staff acknowledges that the project's emissions of NOx, SOx and VOCs will form secondary particulates. However, we are unable to numerically evaluate the project's contribution to secondary particulate in our analysis because an acceptable method to conduct such an analysis is not available.

AIR QUALITY Table 2 indicates that the state 24-hour ambient air quality standard for PM10 was exceeded every year from 1991 through 1996, with no reductions in peak PM10 levels since 1992. The state annual PM10 air quality standard was only exceeded in 1994. The Federal PM10 air quality standards were not violated from 1991 through 1996.

The available ambient PM10 data indicate that violations of the state 24-hour PM10 standard tend to spread out over the year, with peaks occurring during different months for different years. However, the data are incomplete and so should not be used as an indicator of the general trend of the ambient air quality in the project area.

AIR QUALITY Table 2
Ambient Air Quality Data Recorded at the Victorville Monitoring Station
(1991 through 1996)

Pollutant	Averaging time	1996	1995	1994	1993	1992	1991	Most Restrictive Ambient Air Quality Standard
Ozone (pphm)	1-hr	16[2]	15	16	16	19	19	9 (CAAQS)
No. of violations[1]		61	41	63	64	76	59	
PM_{10} ($\mu g/m^3$)	24-hr	67	80	108	62	62	88	50 (CAAQS)
	Annual	25	20	36	29	NA	NA	30 (CAAQS)
No. of violations[1]		3	1	16	6	5	9	
NO2 ($\mu g/m^3$)	1-hr	162	207	226	244	NA	NA	470 (CAAQS)
	Annual	40	43	51	49	NA	NA	100 (NAAQS)
CO ($\mu g/m^3$)	1-hr	9600	3450	5750	4600	NA	NA	23000 (CAAQS)
	8-hr	8300	3450	2760	3450	NA	NA	10000 (CAAQS & NAAQS)
SO2 ($\mu g/m^3$)	1-hr	35	52	105	52	78	52	655 (CAAQS)
	24-hr	21	26	26	13	38	33	105 (CAAQS)
Sulfates (SO_4) ($\mu g/m^3$)	24-hr	NA	5	5	7	NA	NA	25 (CAAQS)

Notes: CAAQS = California Ambient Air Quality Standard
NAAQS = National Ambient Air Quality Standard
[1] The numbers of ozone and PM10 violations reported are not complete.
[2] Highest measured ambient pollutant concentration.
NA = data are not available

Source: CARB: California Air Quality Data.

PROJECT EMISSIONS

CONSTRUCTION ACTIVITIES

The construction of the proposed project will last approximately 18 months, and generally consists of two major activities; site preparation, and construction and installation of major equipment and structures. Staff reviewed the applicant's estimated construction emissions, as shown in AIR QUALITY Table 3, and believes that they are reasonable. Because all configurations would be constructed at the same site using similar construction equipment, staff believes that the construction impacts for all three configurations are similar.

In addition to fugitive dust emissions resulting from the site preparation, emissions from exhausts of construction equipment, such as vehicles and internal combustion engines, are also expected during the project construction phase, which would last approximately 15 months. Also, a small amount of hydrocarbon emissions may occur as a result of the temporary storage of petroleum fuel at the site. Estimated peak hourly, daily and annual construction equipment exhaust emissions were provided by the applicant (HDPP 1997b, Table 5.12-24 and HDDP 1998s and t). The applicant's estimated construction-related combustion emissions are tabulated in AIR QUALITY Table 3.

Site preparation, which would last for approximately two-and-one-half months, involves clearing and grading of the site, which is approximately 23 acres, and completion of the facility's foundations. Construction equipment used at this phase includes a motor grader, four tractors, one excavator hydraulic crawler, one vibrator compactor, three cranes, and various heavy duty construction equipment and trucks, including concrete and water spray trucks. The fugitive dust PM10 emissions estimates from site preparation provided by the applicant (HDPP 1997b, Tables 5.12-22) are tabulated in AIR QUALITY Table 3 for each activity, including excavation, compacting, grading, back-filling, wind erosion, and construction vehicles traveling on unpaved areas.

In addition to construction of the main facility, there will be a new water line, two new natural gas pipelines and a new transmission line, all of which will be built and operated by entities other than the applicant. The estimated emissions from these construction activities were also provided by the applicant (HDPP 1998b, Data Responses, Tables AQ-2 through AQ-3 a, and b) and are tabulated in AIR QUALITY Table 3 below.

For the water and natural gas pipelines, construction will consist of excavation/trenching, pipe laying, back filling and compaction. Equipment used in the construction of the water and natural gas pipeline include two backhoes, two trenchers, two compactors, one welding machine and various trucks for supplies and water. It is assumed that the construction activities of these two linear facilities will be a continuous 8 hrs/day, five days per week for the entire construction period of these two facilities (approximately 17 weeks). The construction emissions

AIR QUALITY Table 3
Maximum Daily Construction Emissions (lbs/day)

Construction Emission Sources	Nox	SO2	VOC	CO	PM10
Facility Construction					
Equipment & Delivery Trucks	380	35	97	1,026	40
Worker Vehicles	14	Neg.	10	74	6
Wind Erosion					20
Fugitive Dust					117
Total	394	35	107	1,100	183
Water Pipeline					
Equipment	54	5	7	44	3
Trucks	51	6	15	24	5
Wind Erosion					13
Fugitive Dust					73
Total	105	11	22	68	94
Natural Gas Pipeline					
Equipment	59	6	8	47	4
Trucks	51	6	15	24	5
Wind Erosion					16
Fugitive Dust					73
Total	110	12	23	71	98
Transmission Line					
Equipment	200	18	23	128	15
Trucks	312	28	69	321	25
Wind Erosion					2
Fugitive Dust					90
Total	**512**	**46**	**92**	**449**	**132**
Sources: AFC Tables 5.12-17 through 5.12-24, and the Applicant's January 15, 1998 Data Request Response, Tables AQ-2, 3, 3a, 3b, 3c.					

estimates provided by the applicant (HDPP 1998b, Data Responses, Tables AQ-2 through AQ-3a and b, and HDDP 1998s and t) are tabulated in Table AQ-3.

Construction of the transmission line includes preparation of access roads and tower pads, material spotting, pile excavation, structure assembly and erection, conductor stringing and clean up. Equipment used in these activities includes various trucks, two bulldozers, a backhoe, two mobile cranes, and various small internal combustion engines used to power specialized equipment and compressors. The applicant assumed that some equipment would be utilized on an 8-hours/day basis while others will be operated on 2, 4 or 6 hours/day in the calculations of daily emissions from the construction of the transmission line. The transmission line construction emissions (HDPP 1997b, Data Responses, Tables AQ-3 a and b, and HDDP 1998s and t) provided by the applicant are tabulated in AIR QUALITY Table 3.

PROJECT OPERATION

The proposed project will be built with either a 720 MW or a 678 MW combined cycle configuration (HDPP 1998s). The applicant, citing rapid technology advancement and economic advantages, wishes to delay the selection of the specific project configuration, the specific turbine generators, and the control devices, until approximately 6 months prior to construction of the facility.

720 MW COMBINED CYCLE

The major components of this scenario consist of:

- Three frame 7F natural gas fired combustion turbines (from GE or Westinghouse) operating in combined cycle mode to produce approximately 720 MW of electricity. The facility is expected to be at least 95 percent available and can operate up 6,750 hours per year.
- Three heat recovery steam generators (HRSG) each equipped with a duct burner to increase steam production.
- Three steam turbines.
- Three cooling towers.

The applicant proposes to equip each combustion turbine with a dry low NOx combustion technology and a selective catalytic reduction (SCR) system in the HSRG, which limit the NOx emissions to 2.5 ppm@15%O2. To control the CO and VOC emissions, the applicant also proposed to equip each combustion turbine/HRSG with a high-temperature CO oxidation catalyst system, which limits the CO emissions to 8 ppm and has an effective VOC control efficiency of about 40 percent.

678 MW COMBINED CYCLE

The major components of this scenario consist of:

- Two Westinghouse 501G, natural gas fired combustion turbines operating in combined cycle mode to produce approximately 678 MW of electricity. The facility is expected to be at least 95 percent available and can operate up 6,750 hours per year.
-
- Two heat recovery steam generators (HRSG) each equipped with a duct burner to increase steam production.
-
- Two steam turbines.
-
- Two cooling towers.
-
- The applicant proposes to equip each combustion turbine with a dry low NOx combustion technology and a selective catalytic reduction (SCR) system in the HSRG, which limit the NOx emissions to 2.5 ppm@15%O2. To control the CO and VOC emissions, the applicant also proposed to equip each combustion turbine/HRSG with a high-temperature CO oxidation catalyst system, which limits the CO emissions to 8 ppm and has an effective VOC control efficiency of about 40 percent.

Staff estimated the total facility emissions and emissions for each individual turbine models (GE7F, Westinghouse 501F, and Westinghouse 501G), and tabulated the results in AIR QUALITY Table 5. Staff used the following assumptions in the calculations of the emissions results:

- For each 24-hour day, all three turbines can simultaneously start, followed by about 20 hours of normal operation, and then shut down.
-
- Each model turbine has a different start-up time, which ranges from 3.5 hours for the GE to 4.5 hours for the Westinghouse.
-
- The turbine emissions provided by the applicant with consultation from the turbine manufacturers are accurate.
-
- The cooling tower emissions are estimated from a recirculation rate of 65,000 gallons per minute (gpm) for the GE7F and the Westinghouse 501F configurations, and 80,000 gpm for the Westinghouse 501 G configuration.
-
- The cooling towers will be equipped with drift eliminators, which will effectively maintain the drift rate at 0.0008 percent.
-
- The recirculation water has a 5,000 ppm total dissolved solids (TDS) content.

AIR QUALITY Table 5
Staff Estimated Facility Emissions

Turbine	Pollutant	Cold-Start	Hot-Start	Warm-Start	Shut Down	Normal[1]	Total Emissions(TPY)	
		lbs.	lbs.	lbs.	lbs.	lbs/yr	per Unit[2]	Facility[3]
GE7FA	Nox	2,150	9,625	9,000	7,500	112,980	70.63	212
	VOC	800	2,100	3,600	5,100	28,406	20.00	60
	CO	7,500	31,500	51,000	17,500	220,800	164.15	492
	SO2						3.86	12
	PM10						33.67	114
Cooling Tower[4]	PM10						4.38	
W501F	Nox	914	5,875	8,280	4,850	116,208	68.06	204
	VOC	4,250	30,010	53,310	5,100	25,180	58.93	177
	CO	17,700	125,860	223,770	23,880	226,605	308.91	927
	SO2						3.70	11
	PM10						26.73	93
Cooling Tower[4]	PM10						4.38	
W501G	Nox	2,805	9,415	12,900	13,260	152,360	95.37	191
	VOC	6,540	30,660	39,360	640	41,000	59.10	118
	CO	34,450	111,195	162,660	28,770	308,600	322.84	646
	SO2						5.05	10
	PM10						38.71	88
Cooling Tower[4]	PM10						5.39	

Notes:
1. Normal emissions were calculated using 6,456 hours per year operation.
2. Unit emissions were calculated using 5 cold-starts, 35 warm-starts, 60 hot-starts, 100 shutdowns and 6,456 hours of normal operation.
3. Facility emissions include all turbines and cooling towers.
4. Cooling tower emissions were calculated using recirculation rates of 65,000 gpm for F model turbines and 80,000 gpm for G model turbines, 5,000 ppm TDS and 0.0008 percent drift rate.

Reference: HDDP 1998a and b

IMPACTS

The applicant has provided staff with their own modeling analysis and results. However, staff has reservations about the applicant's choice of locations of receptors, which do not show the point of maximum impact caused by the project.

Since staff agreed to perform an independent modeling analysis, staff did not ask the applicant to correct this deficiency in their analysis.

STAFF MODELING APPROACH

Staff estimated the impacts associated with the construction and operation of the facility through the use of air dispersion modeling. Air dispersion models predict the location and magnitude of the air contaminant impacts at ground level. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions. The model results are often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$). They are an estimate of the concentration of the pollutant emitted by the project that will occur at ground level.

An air quality impact analysis usually starts with a screening type model, such as SCREEN3. This type of model uses simple calculations and is based on conservative assumptions which are likely to over-predict the possible emission impacts. Thus, if a screening model predicts an impact that staff concludes is insignificant, no further modeling is needed. On the other hand, if the screening model predicts a significant impact, staff uses more detailed and complex models to analyze the impacts. Because of its simplicity and ability to evaluate the impacts of area-wide emission sources, staff used SCREEN3 model to estimate the impacts associated with the construction of the project.

Staff used the more refined ISCST3 model to estimate the project's operating emissions impacts. The major difference between this model and SCREEN3 is that ISCST3 uses actual measured meteorological data instead of mathematical simulations of the ambient conditions. Using measured meteorological data more accurately predicts impacts at a particular site. Use of the ISCST3 model for regulatory purposes is approved by EPA.

Staff performed air dispersion modeling to estimate the impacts of the project's NOx, PM10, CO and SOx emissions resulting from construction and operation. We then added these impacts to the highest ambient concentrations measured during the previous three years at the nearest monitoring station (Victorville). We then compared the results with the air quality standards for each respective air contaminant to verify that the project's emission impacts would not cause a new violation of the ambient air quality standards.

For inputs, staff used source-specific data, which includes stack information (exhaust flow rate, temperature, stack dimensions) and specific emission data. Staff also used meteorological data, such as wind speed, atmospheric conditions, and the site elevation description. For this project, the meteorological data used as input for the modeling included the hourly wind speed and direction data measured at the George Air Force Base.

CONSTRUCTION IMPACTS

The construction impacts were analyzed using the SCREEN3 model. The results are tabulated in AIR QUALITY Table 4. The modeling analyses included both the fugitive dust and vehicle exhaust emissions, which include PM10, NOx and CO. In AIR QUALITY Table 4, which presents staff's modeling results, the first column represents the air contaminant, i.e., NO2, PM10, CO and SO2. The second column presents the time averaging for each air contaminant analyzed. The third column presents the project emission impacts. The fourth column presents the highest measured concentration of the criteria air contaminants in ambient air (background). The fifth column presents the total impact, i.e., the sum of project emission impact and background measured concentration. As indicated in AIR QUALITY Table 4, the emission impacts from the construction of the facility are not expected to create any new violations of any CO ambient air quality standards. However, the project construction PM10 emissions could contribute to existing violations of the state 24-hour PM10 standard. Staff believes that this PM10 emission impact, which is common for this type of construction activity, is significant, but is of short duration and unavoidable

AIR QUALITY Table 4
Facility Construction Impacts

Pollutants	Avg. Period	Impacts (ug/m^3)	Background (ug/m^3)	Total Impacts (ug/m^3)	Standards (ug/m^3)	Percent of Standard
NO2	1-hr.	186	244	430[1]	470	91%
CO	1-hr.	950	5,750	6,700	23,000	29%
	8-hr.	237	3,450	3,687	10,000	37%
PM10	24-hr.	14	122	122	50	244%

Note: (1) 1-hour NO2 emission impacts were estimated using ozone-limiting method.

Staff's modeling results identify an oxides of nitrogen (NOx) emissions impact of 340 µg/m3, which, when added to the background NO2 concentration of 244 µg/m3, appears to be higher than the state 1-hour NO2 standard of 470 µg/m3. However, this value is not reported in AIR QUALITY Table 4 because the impact identified is actually a NOx impact not an NO2 impact. The estimated NO2 impact is 186. The total NO2 impact calculated by staff is
430.

To find the actual NO2 emission impacts, staff needed to find the rate of conversion of NO to NO2 and add the amount converted to the directly emitted NO2. EPA, in its Guidelines on Air Quality Models (EPA 1987), recommends the use of the Ozone Limiting Method (OLM) for refined estimations of NO2 emission impacts. The California Air Pollution Control Officer's Association (CAPCOA 1987) also recommends the use of the OLM for refining the estimation of NO2 emission impacts on ambient pollutant levels.

The OLM assumes that approximately ten percent of the oxides of nitrogen emissions from a combustion source are NO2, and that conversion of the remaining 90 percent of NO to NO2 is strongly influenced by the available ozone. If the concentration of ozone in the atmosphere is less than 90 percent of the maximum estimated NOx impact identified by the model, the NO2 impact can be estimated using the following formula:

$$[NO2max] = [O3ambient] + 0.1[NOxmax]$$

where:
[NO2max] = maximum 1-hour NO2 impact (ppm)
[O3ambient] = background ambient ozone concentration (ppm)
[NOxmax] = maximum oxides of nitrogen impacts from modeling (ppm).

Because the observed ambient ozone level is lower than 90 percent of the identified NOx impact, staff used this equation to determine the NO-to-NO2 conversion rate. Staff calculated the estimated maximum 1-hour NO2 impacts at a given hour by adding the measured ambient concentration of ozone to the corresponding hourly measured background NO2. Using this method, staff estimated the NO2 impact by using the NOx modeling results with each 1-hour measurement of background ozone and NO2 in 1992 and 1993 (these are the two years ambient data measurement available without a large gap of data). The highest estimated NO2 impact is entered in AIR QUALITY Table 4 as the total impact. This value is 91 percent of the standard, indicating that construction of the facility will not cause a new violation of the short-term 1-hour NO2 standards.

OPERATION IMPACTS

The applicant provided staff with a modeling analysis of the project’s operating emissions impacts, which they believe demonstrates that no violations of ambient air quality standards will be caused by the project. Staff reviewed the applicant’s modeling analysis and concluded that the modeling receptors were not placed properly to detect the project’s maximum impact. To address this concern staff conducted its own modeling analysis.

Staff conducted one modeling analysis for each model turbine considered by the applicant. Each modeling analysis identifies the possible short-term and long-term impacts. The short-term impacts are caused by excess emissions during start-up of the facility. To identify these impacts, staff used the emissions and flue gas parameters for each turbine operating at 50 percent load. Staff analyzed the project’s long-term impacts using the emissions and flue gas parameters of each turbine operating at normal full load.

AIR QUALITY Table 6 presents the results of the modeling analysis for the project start-up and normal operation modes. The results indicate that the project may cause a new violation of the 1-hour NO2 ambient air quality standard every time the

AIR QUALITY Table 6
Staff Estimated Facility Emission Impacts on Ambient Air Quality

Pollutants	Avg. Period	Impacts ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impacts ($\mu g/m^3$)	Standards ($\mu g/m^3$)	Percent of Standard
Three GE7FA Combustion Turbines						
NO2	1-hour	467	38	505[1]	470	107%
	Annual	5	51	56	100	56%
SO2	1-hour	4	105	109	655	16%
	24-hour	1	26	27	105	26%
CO	1-hour	1,890	9,600	11,490	23,000	50%
	8-hour	394	8,300	8,690	10,000	87%
PM10	24-hour	36	108	144	50	288%
	Annual	12	36	48	30	160%
Three W501F Combustion Turbines						
NO2	1-hour	410	38	448[1]	470	95%
	Annual	6	51	57	100	57%
SO2	1-hour	4	105	109	655	16%
	24-hour	1	26	27	105	26%
CO	1-hour	12,360	9,600	21,960	23,000	96%
	8-hour	966	8,300	9266	10,000	93%
PM10	24-hour	36	108	144	50	288%
	Annual	12	36	48	30	160%
Two W5012 Combustion Turbines						
NO2	1-hour	409	38	447[1]	470	95%
	Annual	4	51	55	100	55%
SO2	1-hour	3	105	108	655	16%
	24-hour	1	26	27	105	26%
CO	1-hour	5,695	9,600	15,295	23,000	66%
	8-hour	472	8,300	8,770	10,000	88%
PM10	24-hour	20	108	128	50	256%
	Annual	8	36	42	30	140%

Notes: (1) 1-hour NO2 emission impacts were estimated using ozone-limiting method.

turbines are all started up together if the GE 7FA turbines are used. Thus, with a proposed 100 start-ups per year, the project could potentially cause 100 violations of the NO2 air quality standard per year. If the Westinghouse 501F or 501G model turbines are used, the project is expected to create an impact of at least 95 percent of the 1-hour NO2 air quality standard during simultaneous turbine start-up. In either scenario, the project will contribute a pollutant load equal to between 90 to 99 percent of the 1-hour NO2 air quality standard.

In addition, although the project does not cause a new violation of the 8-hour CO air quality standard, the modeling indicated that the total impacts could be as high as 95 percent of the standard.

As for PM10 emission impacts, the project itself does not cause a violation of either the 24-hour or the annual PM10 air quality standard; however, because the area is classified as non-attainment for PM10, project emissions of both directly emitted PM10 and PM10 precursors could contribute to existing violations of the air quality standards.

MITIGATION

APPLICANT PROPOSED MITIGATION

Construction Phase

The applicant proposes to water the unpaved roads and stockpiles, to apply soil stabilization and revegetation, and to use soil binding products to keep the PM10 emissions to a minimum. Because the construction emissions are short-term, no emission reduction credits are proposed as offsets.

Operation Phases

The applicant proposes to mitigate the emission increases from the proposed facility using a combination of clean fuel, emission control devices and emission reduction credits.

The applicant proposes to use a combination of dry low-NOx combustion design, Selective Catalytic Reduction (SCR) and high-temperature CO oxidation catalyst technology for each of the combined cycle turbine trains to minimize their NOx and CO emissions. The proposed control devices are designed to maintain the turbine/duct burner emissions to 2.5 ppm NOx and 8 ppm CO, and to reduce VOC emissions by approximately 40 percent. Natural gas will be the only fuel used, which should minimize the project's PM10 and SOx emissions.

OFFSETS

On November 6, 1998, the applicant submitted a plan to acquire emssion reduction credits (ERC) from various sources (HDPP 1998ac). District rules and regulations require approximately 267 tons per year (TPY) of NOx, 187 TPY of VOC, 155 TPY of PM10, and 13 TPY of SO2 ERC to offset the emission increases from the power plant (MDAQMD 1998ac). For NOx emission offsets, the applicant proposes to purchase NOx ERC from Southern California International Airport (SCIA), and VOC ERC from General Motors, Mobil Oil, Chemoil Refining, Crown Cork & Seal and BASF, all located in the South Coast Air Basin. For VOC, the applicant proposes to purchase offsets from SCIA, and ERC from the aforementioned South Coast sources. For PM10, the applicant proposes to pave some dirt roads in the City of Adelanto to generate the ERC. Below is a specific description of the applicant's proposed offsets:

NOX OFFSETS:

ERC from SCIA: The applicant proposes to purchase 134 TPY of NOx ERC that were recently banked with the District.

Other ERC from the South Coast: The applicant proposes to purchase a total of 503 TPY of VOC ERC from General Motor (in Van Nuys), Mobil Oil Corp. (in Torrance), Chemoil Refining (in Carson), Crown Cork & Seal (in Los Angeles), and BASF (in Orange County). All ERC except those from Chemoil Refining are the result of shut down of equipment. The proposal includes a combination of inter-air basin and inter-pollutant ERC trading, i.e., trade the VOC ERC for the NOx emission increase at a ratio of 1.3 to 1, and mitigate each pound of NOx emission increase with one pound of VOC ERC (1 to 1).

The applicant has provided a listing of the amount of ERC available from each company. With the exception of the General Motors ERC, all other ERC are currently being negotiated with the ERC owners. Staff does not know when letters of intent (LOI) or purchase contracts will be submitted.

VOC OFFSETS:

ERC from SCIA: The applicant proposes to purchase 151 TPY of VOC ERC that were recently banked with the District.

Other ERC from the South Coast: The applicant proposes to use the excess VOC ERC that are in excess of those needed to offset project NOx emissions to offset the VOC emission increase from the facility.

PM10 OFFSETS:

The applicant proposes to pave sections of dirt roads in the City of Adelanto. They state that candidate roads have been identified, and estimate the possible ERC available from each road segment (HDPP 1998r). The applicant has entered into a contract with the City of Adelanto and the District for these ERC.

ADEQUACY OF PROPOSED MITIGATION MEASURES

CONSTRUCTION PHASE

The applicant's proposed dust control measures, which staff finds acceptable for this analysis, represent standard methods for minimizing fugitive dust (HDPP, 1997b, AFC page 5.12-52). However, a detailed dust control plan should be developed and approved prior to construction of the facility to assure that fugitive dust emissions from the construction of the proposed facility are minimized. At a minimum, the plan should include:

- The frequency of watering of unpaved roads and disturbed areas (at least twice a day),
-
- Vehicle speed limits on the construction areas (no more than 10 MPH),

- Vehicle tires washing prior to entering a public roadway,
- Treatment of the entrance roadways to the construction site with soil stabilization compounds,
- The use of dust sweeping vehicles to regularly sweep the public roadways that are used by construction and worker vehicles (at least twice a day),
- Regular sweeping of newly paved roads (at least twice weekly),
- Limit on equipment idle times (no more than five minutes),
- Use electric motors for construction equipment when feasible,
- Apply covers or dust suppressants to storage piles and disturbed areas that remain inactive over long periods,
- Pre-wetting of the soil to be excavated during construction of the pipelines.

OPERATION PHASE

NOx Control Technology Mitigation: The applicant proposes a combination of dry low-NOx and SCR technology that will maintain the combustion turbine and duct burner exhaust emissions at a maximum of 2.5 ppmvd@15 O_2, averaged over a 3-hour period. Ammonia slip emissions will be maintained at 10 ppm at the exhaust stacks.

Staff believes that the proposed dry low-NOx and SCR system control level may not represent the most effective feasible NOx control level that can be applied to a project of this type and size. Currently, the Commission is reviewing the Sutter Power project, which is proposing a similar dry low-NOx/SCR combination with a NOx emissions limit of 2.5 ppmvd@15%O_2, averaged over a 1-hour period. In addition, the EPA indicated in their comments on the first PDOC for the HDPP that an SCR system that achieves 2.5 ppm NOx over a 1-hour period is qualified as BACT for the proposed gas turbines. Because the HDPP needs a PSD permit from EPA and an operating permit from the District approved by EPA, non-conformance with the EPA BACT standard may result in a denial of the project by EPA. Therefore, we recommend that the Commission require the applicant to comply with EPA's recommended NOx control level of 2.5 ppm averaged over one hour.

VOC and CO Control Technology Mitigation: The applicant proposes the use of a CO oxidation catalyst system to minimize VOC and CO emissions, and has committed to a CO emission level of 8 ppm, averaged over 3 hours. EPA has identified 4 ppm over a 1-hour averaging time, as BACT for CO for the Sutter Power Plant. Staff is concerned that unless the applicant agrees to a CO BACT level of 4 ppm they may not be able to secure the PSD and operating permits needed.

OFFSETS

The applicant has proposed to provide ERC to fully mitigate the facility's potential emission increases of NOx, SOx, PM10 and VOC. At this time, staff only has a list of potential sources that may provide ERC to offset the emission increases from the facility. The list of the potential ERC sellers does not provide staff with sufficient confidence to make a recommendation that the project's emission impacts will be mitigated. Below is staff's review of the applicant's possible offset sources.

ERC FROM ROAD PAVING

The applicant proposes to purchase 168 TPY of PM10 emission reduction credits from the City of Adelanto that will be created by paving of unpaved roads. District Rule 403-2(C)(4) requires that the Cities, Towns, and the County of San Bernardino shall collectively stabilize sufficient heavily traveled unpaved roads to reduce at least 1541 TPY of PM10 emissions within the District. Staff does not know whether the unpaved road emission reductions claimed by the applicant are part of this requirement, or whether this requirement is being met by other means. If they are part of the required reductions, they are not surplus and cannot be used to offset the project's PM10 emissions.

In addition, because paving of roads is identified as a required control measure by the District, it is "reasonably achievable control technology" (RACT). Thus, ERC resulting from paving of the unpaved roads in the City of Adelanto may need to be reduced or "RACT adjusted" to determine the quantity of emission reductions that are surplus, and therefore, qualify as ERC. The applicant does not state whether RACT adjustment is required or has been made to these ERC. Staff has raised this issue with the District staff in its comments on the PDOC.

Southern California International Airport (SCIA)

The applicant has initiated the process to purchase 134 TPY of NOx, 151 TPY of VOC, 3 TPY of SO2 and 14 TPY of PM10 of ERC from SCIA to partially offset the project's emission increases. These ERC have recently been banked with the District for the shut down of various equipment that were used to fuel aircraft and provide emergency services. The CEC, ARB and EPA staff, as well as California Unions for Reliable Energy (CURE), provided comments on the District's proposed issuance of SCIA ERC for these sources, stating that the ERC are not quantifiable, permanent and surplus. The District considered all comments received and granted the ERC to SICA anyway. Staff still believes that the SCIA ERC are not quantifiable, not permanent and not surplus. Since EPA's concerns were not addressed by the District, they are likely to arise in the District's issuance of an operating permit for the project which must be approved by EPA. Therefore, we recommend that the Commission resolve this matter now by ensuring that the project not use ERC that are not satisfactory to EPA.

ERC from South Coast

Approval of ERC usage by the Regional Boards: District Rule 1305(B)(1)(c) requires that ERC from another district that are used as offsets must comply with Health & Safety Code Section 40709.6. This Code Section requires that such offsets shall be approved by a resolution adopted by the governing boards of the upwind and downwind districts, taking into consideration the impact on offsets, public health and the regional economy. Staff believes that neither the governing board of the MDAQMD or of the SCAQMD has adopted such a resolution. We recommend that the required resolutions be provided to the Commission before the final decision on the project is issued.

Lack current letters of intent for offsets: The applicant proposes an offset plan, which contains a list of possible ERC sources and amounts. In many cases (Mobil Oil, Chemoil and BASF), the applicant has identified that letters of intent (LOI) have been executed, but the LOI have never been provided to CEC staff, despite the fact that we have requested them. Sketchy information provided in the applicant's proposed offset plan indicates that the ERC providers agreed not to sell or offer to sell the ERC for a thirty (30) day period starting in November, 1998. These agreements are now expired. There is nothing in the applicant's proposed offset plan to guarantee that the ERC will be available at the time the project is licensed. Given the difficulty the applicant has experienced to date in obtaining offsets, staff believes the applicant should be more forthcoming in providing the Commission with assurances that the identified ERC are and will actually be available.

RACT adjustment of ERC: District Rule 1305(C)(5) requires the District to adjust any proposed ERC from the shut down of equipment for RACT at the time such ERC are to be used for offsets. All ERC from the South Coast are the result of equipment shut down. If RACT adjustments have not been made to these ERC, then additional ERC may need to be provided to satisfy the project's offset requirements.

Inter-basin offset:

Although State and Federal laws allow the use of emission reductions from an upwind air basin to offset emission increases from sources in another air basin (CalEPA 1998), the laws do not specifically identify the appropriate offset ratios to use to ensure the effectiveness of the mitigation measures. The District Rule 1305 "Emission Offsets" specifies an inter-basin offset ratio, which is applicable to inter-basin offset trading, of 1.3 pounds of ERC for each pound of new emissions from a proposed facility. The District proposes to apply this ratio to the inter-basin use of ERC for the proposed project. Although this ratio is not supported by a technical analysis, the rule has been approved by EPA. Staff may provide additional information on the validity of this ratio in supplementary testimony if it is raised as an issue in comments filed on the District's PDOC.

Inter-pollutant offsets:

EPA approval of inter-pollutant offsets: In addition to the inter-basin offset, the applicant also proposed, and the District agreed to, an inter-pollutant offset trading ratio of one pound of VOC from the South Coast for one pound of new NOx emissions from within the District. District Rule 1305(B)(6)(a) requires that inter-pollutant offsets may be used pending approval from the APCO and EPA. To date, EPA has not approved the proposed inter-pollutant offsets. Staff has contacted the EPA staff, who stated that they have not received a formal request for approval of the methodology and, as a result, they do not anticipate approval of the inter-pollutant offset proposal in the near future. EPA's recently filed written comments on the District's PDOC for the HDPP have confirmed that position.

Inter-pollutant offsets cannot be used because the project will cause violations of the 1-hour NO2 ambient air quality standard: District Rule 1305(B)(6)(a) requires that inter-pollutant offsets may be used as long as they are technically justified, and the new facility will not cause or contribute to a violation of an ambient air quality standard. According to staff's modeling analysis, the project will cause a new violation of the State 1-hour NO2 air quality standard during simultaneous start up of all the turbines. To avoid the problem, staff recommends the Commission require the applicant to stagger the start-up of the gas turbines, so that violations of the state 1-hour NO2 air quality standard will not occur.

Staff concerns about the proposed 1 to 1 inter-pollutant offset trading ratio: The following staff comments were filed on the District's PDOC for the HDPP. The applicant proposes an inter-pollutant offset trading ratio of one pound of VOC for every pound of new NOx emissions. They justify this trading ratio by using a modeling analysis that was used to develop the SCAQMD 1997 Air Quality Management Plan (AQMP). The model predicts that the Palm Spring and Lancaster areas will achieve attainment by 2007 with the current control measures provided in the plan. Based on this attainment date, a path to attainment was drawn across the lines (isopleths) of decreasing ozone concentrations. The modeling results and the assumed path to attainment were used to derive an inter-pollutant offset trading ratio by determining the ratio of VOC and NOx reductions that are required to bring the South Coast, Palm Springs and Lancaster areas into attainment with the federal ozone air quality standard.

We believe that there are many serious flaws in the applicant's application of the method to derive the inter-pollutant offsets. The most serious flaw was that the model results do not respond to the level of controls as assumed in the plan. The modeling analysis yields 11 and 10 pphm ozone concentrations for a future year baseline (FBL) and a future year control case (FCC), respectively. [Future year baseline means the projected emissions from the SCAQMD without any control measure identified in the plan being implemented, and future control case means the predicted emissions from the SCAQMD with all identified control measures implemented]. However, when the anticipated reduction of VOC and NOx for each of the FBL and FCC were drawn on the ozone chart produced by the same modeling analysis, the corresponding ozone concentrations were 14 and 15 pphm, respectively. This indicates that the modeling analysis is not responding to the modeling areas, specifically the Victorville area. This, alone, would indicate that the use of such a modeling analysis is not appropriate for determining the inter-pollutant offset ratio for the HDPP. It also indicates that attainment is not projected with the reduction proposed in the FBL or FCC cases. Thus, drawing a line depicting the path to attainment does not provide any useful information to identify an inter-pollutant offset ratio. We recommend against the use of such a modeling analysis to determine the inter-pollutant offset ratio.

Staff also has other comments regarding the application of the modeling analysis. They are:

- The method used to identify the inter-pollutant offset ratio relies on the regional efforts to reduce NOx and VOC emissions for the entire region. The use of such a methodology to derive an offset trading ratio for individual project is not appropriate, since the method was not intended for project-specific application.
- The South Coast AQMD modeling analysis encompasses the South Coast air basin, part of Ventura County, and part of Mojave Desert, including Lancaster and Palm Springs. However, it is not clear that the emission inventory from the Victorville area was actually used in the modeling exercise.
- The modeling analysis only considered the localized ozone impacts in the Victorville area; no areas down wind of Victorville where the project may actually contribute to ozone formation, are considered.
- Assuming that the modeling analysis is applicable to Victorville, and that the applicant applied the analysis correctly, the inter-pollutant offset ratio that derives from the path to attainment slope and the 12 pphm ozone concentration isopleth, should be 1.8 to 1.

Staff issued a set of data requests on December 8, 1998, which asked the applicant to address a number of these concerns. We did not receive written responses until January 13, too late to incorporate in this analysis.

Staff believes that the applicant’s proposed modeling method is not appropriate for determining the inter-pollutant offset ratio of VOC for NOx. Our position is supported by EPA’s written comments on the PDOC, which state that the interpollutant trading proposal is not technically justified. CURE has also filed significant comments, which conclude that the applicant’s proposed interpollutant trading ratio is not technically justified. We have not been able to review and fully consider either of these comment letters on the PDOC in this staff assessment. Following our review of the recent data responses from the applicant and all comments filed on the PDOC, we plan to file supplementary testimony that may include discussion of an alternative interpollutant trading ratio.

CONCLUSIONS AND RECOMMENDATIONS

- Staff cannot recommend certification of the High Desert Power Plant project at this time due to the fact that the project, as proposed, will cause adverse impacts on air quality, does not meet BACT requirements, and because of remaining questions about the quantity, validity and availability of the proposed offsets. Staff recommends that the Committee direct the applicant to take the following steps to resolve the issues identified in this analysis:

- Commit to meet the EPA BACT requirements for NOx and CO emissions.
- Provide to the Committee and staff, letters of intent or other binding agreements with individual ERC holders, such as General Motor, Mobil Oil Corporation, Chemoil Refining, Crown Cork & Seal, BASF, SCIA and the City of Adelanto.
- Seek EPA approval of the proposed inter-pollutant offsets.
- Seek approval from the South Coast and the Mojave Desert boards, for the proposed inter-basin offsets.
- Provide clarification from the District that PM10 offsets generated from the City of Adelanto for road paving are surplus.
- Agree to a condition requiring staggared start-up of the combustion turbines.

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APPENDIX A

Quarterly and Annual Wind Roses Recorded at George Air Force Base

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PUBLIC HEALTH

Testimony of Obed Odoemelam

INTRODUCTION

The High Desert Power Project, Limited Liability Company (the applicant) proposes to construct and operate the gas-fired High Desert Power Plant (HDPP) at the site of the former George Air Force Base located within the northeast corner of the city of Victorville, California. Operating the facility would create emissions of nonregulated toxic air pollutants, commonly known as "noncriteria pollutants." The purpose of this public health analysis is to determine whether a significant health risk would result from public exposure to these toxic air pollutants. Regulated or criteria air pollutants, for which ambient air quality standards have been established, are discussed in the **Air Quality** section.

LAWS ORDINANCES, REGULATIONS AND STANDARDS (LORS)

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

LOCAL

The Mojave Desert Air Quality Management District (District) requires the results of a health risk assessment as part of the application for the authority to construct (ATC).

District Rule 1503 prohibits the use of carcinogenic hexavalent chromium in cooling towers constructed after September 23, 1991. The applicant (HDPP 1997) has stated their intention to comply with the requirements of this rule by using a phosphate-based alternative, which is acceptable to staff.

SETTING

The proposed project site is zoned for commercial activity and has no residences immediately adjacent to it. A large number of sensitive receptor sites, such as schools, day care centers, retirement centers and hospitals, are located within a 10-

mile radius of the proposed project (Resource Management International 1997). Such sites are occupied by children, the elderly and the sick, who are usually more susceptible than the general population to the effects of environmental pollutants.

IMPACT ASSESSMENT

The applicant is considering two possible types of configurations for the project:

- A 720 MW combined cycle plant with three natural gas-fired generators with associated heat recovery steam generators which will be operated for up to 8,760 hours per year.

- A 678 MW combined cycle plant with two natural gas-fired generators with associated heat recovery steam generators which will be operated for up to 8,760 hours per year.

Details of the nature and components of each configuration are presented in the **Project Description** section. What is most important in evaluating potential health effects of toxic air pollutants is that the estimates of emissions are different under each of the configurations.

Any operations-related effects of this project would be mainly associated with pollutants originating from the combustion turbines and the cooling towers. Thus, exposure of the surrounding population is estimated through air dispersion modeling. After estimating the exposure levels, staff assesses whether these levels are below the applicable reference exposure levels for noncancer health effects or below levels at which any possible cancer risks are considered insignificant by regulatory agencies. The procedure for evaluating the potential for these noncancer and cancer health effects is known as a health risk assessment process, which consists of the following steps:

- A hazard identification step in which each pollutant of concern is identified along with the types of health effects it can cause.

- A dose-response assessment step in which the relation between the magnitude of exposure and the probability of effects is established

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- An exposure assessment step in which the possible extent of pollutant exposures from a project is established for all possible pathways by air dispersion modeling.

- A risk characterization step in which the nature and often the magnitude of the possible human health risk is assessed and presented.

Health risks associated with a project can result from short-term, high-level exposure, which creates acute effects, or from prolonged, low-level exposure, which creates long-term chronic effects. For projects of this type, the acute effects could occur only during major accidents and are not expected from routine operations, during which emissions are much lower. Therefore, this analysis focuses on long-term, low-level exposures. Chronic effects resulting from such exposures may be related to cancer or health effects other than cancer.

Since noncancer effects are assumed to result after exposure above specific thresholds, an analysis of the potential for these effects will include a consideration of background pollutant levels in the area. Such background measurements are usually possible for the major (criteria) pollutants but not for the noncriteria pollutants, which are generally emitted at much lower levels. However, as cancer is currently assumed possible from every exposure to a carcinogen, no thresholds are assumed, with the result that the risk of cancer is generally higher than the risk of noncancer health effects when assessing the environmental acceptability of a source of both carcinogens and noncarcinogens. This accounts for the prominence of theoretical cancer risk estimates in the health risk assessment process.

In the assessment process, a screening-level analysis is first conducted using simplified conservative assumptions to avoid underestimating the health risks involved. The potential for noncancer health effects is assessed by dividing the project-related exposure estimate by the applicable reference exposure level to obtain a number known as the hazard index for that pollutant. These hazard indices are then added together for all the noncarcinogens emitted to obtain the aggregate hazard index value for the project. The possible cancer risk is obtained by multiplying the exposure estimate by the potency values for the individual carcinogens. The total cancer risk is then obtained by adding together the risk values for the individual carcinogens. Failure to pass the screening test will usually point to the need for more refined analysis using more accurate assumptions.

STAFF'S SIGNIFICANCE CRITERIA

In its health risk assessment, staff considers a potential risk of one in a million as the threshold of significance with regard to the possible cancer risk associated with project operations. For the noncarcinogenic pollutants, significant health effects are considered unlikely if the hazard index is less than 1.0. If it is more than 1.0, such effects would be considered likely.

PROJECT SPECIFIC IMPACTS

The applicant conducted their health risk assessment for the project according to procedures specified in the October 1998 CAPCOA guidelines for sources of this type. Results of this assessment (ENSR 1998a, 1998b and 1998c) have been provided to staff along with the documents supporting the appropriateness of all underlying assumptions (Resource Management International 1997, ENSR 1998d). Such documentation was provided with regard to the following:

- pollutants considered
- emission levels assumed for the pollutants involved
- dispersion modeling used to estimate potential exposure levels
- exposure pathways considered

- the cancer risk estimation process
- hazard index calculation
- the characterization of project-related health risk estimates

Staff has found these assumptions to be accurate and concurs with the applicant's findings with regard to the numerical health risk estimates expressed either in terms of the hazard index for each noncarcinogenic pollutant, or a cancer risk for estimated levels of each carcinogenic pollutant. Information from the applicant shows that the background levels of noncriteria pollutants in the project area were not measurable. As a result, only the project-related emissions were considered in calculating the hazard index value for each of the noncarcinogenic pollutants involved. The analyses were conducted for each of the configurations to determine the potential for acute and chronic effects on the liver, central nervous system, the immune system, kidneys, the reproductive system, the skin and the respiratory system.

The following pollutants were considered for potential to produce noncancer effects: ammonia , acetaldehyde, acrolein, benzene, formaldehyde, naphthalene, toluene, xylene, manganese, nickel, propylene oxide, chlorine and chloroform. The following were considered with regard to a possible cancer risk: acetaldehyde, benzene, butadiene, formaldehyde, polycyclic aromatic hydrocarbons, nickel, propylene oxide, and chloroform.

Hazard index values of less than 1.0 were calculated for all the noncarcinogenic pollutants. This suggests that significant noncancer health effects would be unlikely during operations from exposure to the noncriteria pollutants considered in this analysis.

The highest cancer risk estimate was 0.7 in a million. This represents the risk for an individual exposed at the highest possible levels to all the carcinogenic pollutants from the 720 MW combined cycle configuration. The risk for the 678 MW combined cycle configuration is 0.5 in a million. These risk values are all below the one in a million level considered significant by staff in evaluating the potential public health impacts of the project.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that neither of the configurations under consideration will be likely to pose a significant risk of cancer or noncancer public health impacts in the project area. Staff therefore recommends that the project be permitted in whichever configuration chosen.

REFERENCES

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

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WORKER SAFETY AND FIRE PROTECTION

Testimony of Ellen Townsend-Smith

INTRODUCTION

Industrial workers handle process equipment and hazardous materials on a daily basis. Accidents involving relatively small amounts of material can result in serious injuries to workers. Worker protection measures can include special training, protective equipment and procedural controls. The employer must also comply with applicable Laws, Ordinances, Regulations, and Standards (LORS) designed to protect the health and safety of workers during construction and operation of the facility, and to establish adequate fire protection and emergency response procedures. This analysis assesses the completeness and adequacy of the measures proposed by the applicant in terms of applicable health and safety standards and other reasonable requirements (Cal. Code Regs., tit. 20, э 1743), and presents conclusions about the compliance of the proposed project with applicable LORS (Cal. Code Regs., tit. 20, э 1744.)

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

- United States Code, title 29, section 651 et seq. (Occupational Safety and Health Act of 1970)
- Code of Federal Regulations, Title 29, sections 1910.1 - 1910.1500 (Occupational Safety and Health Administration Safety and Health regulations)
- Code of Federal Regulations, Title 29, sections 1952.170 - 1952.175 (Approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the federal requirements found in ээ 1910.1 - 1910.1500)

STATE

- Labor Code э 142.3 (Authorizes the Occupational Safety and Health Board to establish safety and health standards)
- Labor Code э 6300 et seq. (Establishes the responsibilities of the Division of Occupational Safety and Health)
- California Code of Regulations, Title 8, section 450 et seq. (Applicable requirements of the Division of Industrial Safety, including Unfired Pressure Vessel Safety Orders, Construction Safety Orders, Electrical Safety Orders, and General Industry Safety Orders)

INDUSTRY STANDARDS

- Uniform Fire Code (UFC). The uniform fire code contains provisions necessary for fire prevention and information about fire safety, special occupancy uses special processes, and explosive, flammable, combustible and hazardous materials.

- Uniform Fire Code Standards. This is a companion publication to the UFC and contains standards of the American Society for Testing and Materials and of the National Fire Protection Association.
- California Building Code. (Cal. Code Regs., tit. 24, э 501 et seq.) The California Building Code is designed to provide minimum standards to safeguard human life, health, property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, etc. of buildings and structures.

EVALUATION CRITERIA

Staff has reviewed the High Desert Power Plant Application for Certification (AFC) to determine whether the applicant has proposed adequate measures to:

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

Staff assesses both the adequacy of the measures proposed by the applicant to protect workers and provide fire protection, and the compliance of the proposed project with applicable LORS. Unless features of the project present unusual industrial safety or fire protection problems, staff believes that compliance with applicable LORS will be sufficient to ensure worker safety and fire protection.

ENVIRONMENTAL SETTING

SITE AND VICINITY DESCRIPTION

The Victorville Fire Department has four stations, which can respond to fires and other emergencies during construction and operation of the project. One of these stations is located at the Southern California International Airport near the project. **SAFETY** Table 1 provides information on staff, equipment and response time of fire stations located nearest to the project. Primary and alternative access to the project will be via Air Base Road and either El Evado Road or Phantom Street and Nevada Avenue (Haynes 1998). These routes will be used by both fire and ambulance response teams (HDPP 1998f, Data Request Responses 70 and 71).

SAFETY Table 1
Station Number, Personnel, and Equipment of Fire Stations

Stations	312	311	313	314
Response Times	5 minutes	10 minutes	12 minutes	13 minutes
Equipment	Type 1 engine	Type 1 engine	Type 1 engine	Type 1 engine
Personnel*	Captain Engineer	Captain Engineer Fire Fighter	Captain Engineer Fire Fighter	Captain Engineer Fire Fighter

* The personnel listed are located at the various stations and primarily respond to medical emergencies or vehicle fires. When there is a structure fire it is considered a three-alarm fire for which three engines are required to fight the fire (Petersen 1998b)

Source: Operations Chief Keith Peterson, City of Victorville Fire Department, March 9, 1998.

IMPACT

PROJECT SPECIFIC IMPACTS

Worker Safety

Industrial environments are dangerous. Workers are exposed to chemical spills, hazardous waste, fires, confined space entry egress problems, and to moving equipment. It is important for the applicant to have well defined policies and procedures, training, hazard recognition and control at their facility to minimize such hazards and protect workers.

Separate Injury and Illness Prevention Programs (IIPPs), as discussed below, will be prepared for the construction and operational phases of the project to minimize worker hazards. Staff requires both a Construction Safety and Health Program and an Operation Safety and Health Program which identify the measures the applicant will take to ensure compliance with applicable LORS during the construction or operation phases of the project. The major measures in these plans, described below, are derived from applicable sections of state and federal law.

CONSTRUCTION

The Construction Safety Orders found in Title 8, California Code Regulations, Section 1500 et seq., contain requirements promulgated by Cal/OSHA, which are applicable to the construction phase of the project. The elements required by the regulations are incorporated in the project Construction Safety and Health Program, and include the following:

- Construction Injury and Illness Prevention Program (IIPP) (Cal. Code Regs., tit. 8, э 1509);
- Construction Fire Protection and Prevention Plan (Cal. Code Regs., tit. 8, э 1920);
- Personal Protective Equipment Program (Cal. Code Regs., tit. 8, ээ 1514 - 1522);

The Construction Safety Orders also contain additional specific worker safety and health requirements applicable to construction activities. In addition, the requirements of the Electrical Safety Orders (Cal. Code Regs., tit. 8 ээ 2299 - 2974) and Unfired Pressure Vessel Safety Orders (Cal. Code Regs., tit. 8, ээ 450 - 544) are applicable to the project.

OPERATION

During the operation phase of the project, Electrical Safety Orders and Unfired Pressure Vessel Safety Orders referenced under Construction may continue to be applicable. In addition, the Division of Industrial Safety has also promulgated regulations applicable solely to operations. These are contained in the General Industry Safety Orders (Cal. Code Regs., tit. 8, э 3200 et seq.). The applicant will incorporate these requirements into its Operation Safety and Health Program, the major elements of which include:

- Injury and Illness Prevention Program (Cal. Code Regs., tit. 8, э 3203)
- Emergency Action Plan (Cal. Code Regs. tit. 8, э 3220)
- Fire Prevention Plan (Cal. Code Regs., tit. 8, э 3221)
- Personal Protective Equipment Program (Cal. Code Regs., tit. 8, ээ 3401 - 3411)

Safety and Health Program Elements

Injury and Illness Prevention Program (IIPP)

The applicant has provided a draft outline for an Injury and Illness Prevention Program (IIPP) (HDPP 1998f, Response to Data Request 72). The outline contains sections on management responsibilities, hazard management, safe work practices, inspections, training and communication procedures. Staff has recommended Conditions of Certification SAFETY-1 and 2 which requires that the final program contain detailed information regarding procedures for identifying, evaluating, and preventing occupational safety and health hazards, establishing safe work practices and specifying protective equipment requirements. The program will also include a discussion of proposed practices for safety inspections, injury and illness investigations, safety training, and record keeping. As required by Condition of Certification SAFETY -2 the applicant will also need to submit their detailed Operations Illness and Injury Prevention Program to Cal/OSHA 30 days prior to construction for review and comment.

Cal-OSHA will review and provide comments to the applicant on the operation IIPP 30 days prior to operation. At the request of the applicant for an onsite consultation, a Cal-OSHA representative will complete a physical survey of the site, analyze the work practices, and point out those practices which are likely to result in illness or injury. The on-site consultation will give Cal-OSHA an opportunity to evaluate the applicant's IIPP and apply it directly to activities taking place on-site (Glendenning 1998).

Emergency Action Plan

California Code of Regulations, title 8, section 3220 contains the requirements for an Emergency Action Plan. The AFC contains an outline for an emergency action plan, which identifies procedures during ammonia releases, chemical spills, earthquakes, fires and natural gas leaks (HDPP 1998f, Response to Data Requests 69). Staff has recommended Condition of Certification SAFETY-2, which requires the applicant to submit a final Operation's Emergency Action Plan to Cal/OSHA. In accordance with SAFETY-2 Cal/OSHA will provide comments and suggestions on the plan to the applicant after an on-site consultation. The applicant will incorporate OSHA's comments into the emergency action plan prior to filing the final plan with the Commission.

Fire Protection Plan

Cal Code Regulations, title 8, section 3221 establishes the requirements for an Operation Fire Prevention Plan. The AFC contains information regarding the proposed fire protection plan, which discusses the following topics:

- On-site Fire Protection Systems, including carbon dioxide extinguishing systems, preaction sprinkler systems, a dry pipe deluge system, hand-held fire extinguishers, and fire detection and alarm systems (HDPP 1997a, AFC page 3.4-36);
- Local Fire Protection Services (see Safety and Fire Protection Table 1).

Staff is proposing that the applicant submit a final Fire Protection Plan to the California Energy Commission Compliance Project Manager (CPM) and the Victorville Fire Department for review and approval to satisfy proposed Conditions of Certification SAFETY-1 AND SAFETY-2.

All employees at the project are designated as incipient fire personnel. "Employees will be trained to respond to small fires in their beginning stages, not to those which require specialized training or fire-fighting equipment. Employees will receive initial and annual training in the use of hand-held extinguishers, fire hoses of 2-inch diameter or less, and fire monitors. Training will be conducted by the Victorville Fire Department. No special equipment or clothing will be provided for fire response personnel since their duties will only involve the suppression of small fires" (HDPP 1998f, Response to Data Requests 70).

Personal Protective Equipment Program

The purpose of the Personal Protective Equipment Program is to ensure that employers comply with applicable requirements for the provision and use of Personal Protective Equipment (PPE), and to provide employees with the information and training necessary to implement the program. The applicant has provided an outline of a proposed PPE program. (HDPP 1997a, AFC page Q2)

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

The applicant's PPE Program should include a written policy on the use of PPE and methods of communicating it to the employees, selection of the proper type of equipment, training of employees on the correct use and maintenance of the equipment, and enforcement of PPE use.

The applicant's PPE program will include the use of devices, which provide respiratory protection, hearing conservation, eye protection, and head protection (HDPP 1998f, Response to Data Requests 73). Staff believes that if the applicant develops and implements a PPE Program that contains the elements listed above, the program will be in compliance with applicable regulations and will significantly reduce the potential for adverse impacts to workers.

General Safety

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

Lighting

To protect workers from inadequate lighting, staff has added Condition of Certification SAFETY-3, which addresses the design and installation of exterior lighting. The **Visual Resources Section** provides further detail concerning off-site consequences and performance requirements for exterior lighting.

Hazardous Materials Releases

The system design and administrative procedures proposed by the applicant to reduce the likelihood of and to manage accidental release of acutely hazardous materials will minimize the potential for impacts to workers from such releases. See the **Hazardous Materials Section** of the AFC, pages 5.8-12, 5.8-13, Appendix Q-3, and Appendix Q-4 for more detail.

Smoking

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

Lock-out/Tag-out

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

Confined Spaces Entry Program

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

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

Hot Work

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

FACILITY CLOSURE

Closure activities may include demolition and removal of all equipment and structures at the power plant. The project owner and operator are responsible for maintaining an operational fire protection system during closure activities. The project must stay in compliance with all applicable health and safety LORS during the closure process.

COMPLIANCE WITH LORS

Staff has reviewed the proposed project to determine compliance with the listed LORS and has proposed Conditions of Certification to ensure that the project will be constructed and operated to comply with the LORS. Staff believes that if the applicant agrees to the proposed Conditions of Certification and submits the information required by the Conditions, then the Commission will be able to make a finding that the project will comply with all applicable LORS and will not create any potential worker safety or fire protection impacts.

CONCLUSION AND RECOMMENDATIONS

CONCLUSIONS

Based on staff review, the proposed project, which has no unusual features, will comply with all applicable LORS and, therefore, not have any adverse effects on workers due to industrial accidents or fires. Staff has proposed conditions of certification to ensure that the project will be constructed and operated so as to comply with applicable LORS and industry design codes.

RECOMMENDATIONS

Staff recommends that the Commission adopt the following proposed Conditions of Certification. The proposed Conditions of Certification provide assurance that the Project Construction and Operation Safety and Health Programs proposed by the applicant will be provided and be reviewed by the appropriate agencies prior to implementation. The conditions also provide verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable LORS.

CONDITIONS OF CERTIFICATION

SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program as follows:

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

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

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

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

- Operation Injury and Illness Prevention Plan
- Emergency Action Plan
- Operation Fire Protection Plan
- Personal Protective Equipment

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

The Operation Fire Protection Plan and the Emergency Action Plan shall be submitted to the City of Victorville 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 Operation Safety & Health Program. It shall incorporate CAL-OSHA Consultation Service comments and a letter from the Victorville Fire Department stating that they have reviewed and accept the specified elements of the Operation Safety and Health Plan.

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

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

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

REFERENCES

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Haynes, Dan. 1998. City Engineer and Airport Manager of City of Victorville. Personal communication with Ellen Townsend-Smith regarding streets accessibility.

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TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam

INTRODUCTION

The electricity generated at the High Desert Power Plant will be transmitted into the existing area transmission network through a single-circuit 230-kilovolt (kV) overhead transmission line capable of conducting power at 850 megawatts (MW), (HDPP 1997 AFC, p 4.1-1). Operating such a line could create several health and safety hazards which are described in the submittal by the applicant (HDPP 1997, AFC, pp 4.2-1 through 4.2-14). However, such hazards can be reduced through compliance with laws, ordinances, regulations and standards (LORS) identified by the applicant as applicable to the project.

The purpose of this analysis is to assess the proposed transmission line design for compliance with all applicable LORS. Given the 850 MW-capacity of the transmission line proposed, the same design and operational measures would be appropriate for the transmission line whether the power is generated at 720 MW or 678 MW. The assessment will be made for the proposed transmission line with regard to the issues listed below.

- Aviation safety
- Interference with radio-frequency communication
- Audible noise
- Fire hazards
- Nuisance shocks
- Electric and magnetic field exposure

LAWS, ORDINANCES REGULATIONS AND STANDARDS (LORS)

FEDERAL

Listed and discussed below are the design-related LORS applicable to the physical dimensions of transmission lines of the type proposed for the High Desert Power Project.

Aviation Safety

- Title 14, Part 77, Code of Federal Regulations (CFR), "Objects Affecting Navigation Airspace". These regulations specify the criteria used by the Federal Aviation Administration (FAA) to determine when a "Notice of Proposed Construction or Alteration" is required to be filed for an object that could pose an obstruction hazards to aviation. The need for such a notice depends on factors related to the height of the structure in question, the slope of an imaginary surface extending from the end of nearby runways to the top of the structure, and the length of the runways involved. The applicant has filed for, and will obtain the necessary FAA permit for the proposed line.

- FAA Advisory Circular (AC) No. 70/7460-2H, “Proposed Construction or Alteration of Objects that May Affect the Navigation Space”. This circular informs proponents of projects that may pose a navigation hazard of the need to file the “Notice of Construction or Alteration” with the FAA before construction.

- FAA, AC No. 70/7460-1G, “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 specified in Title 14, Part 77 of the CFR.

Interference with Radio-Frequency Communication

- Title 47, CFR, Section 15.25. Provisions of these Federal Communications Commission (FCC) regulations prohibit operation of any devices producing energy which interferes with radio communications even when (as with transmission lines), such devices are not intentionally designed to produce radio-frequency energy. Transmission lines create radio noise by the action of the electric field at the conductor surface. 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 this noise is generated around the conductor, it usually manifests as interference with radio or television signal reception. Since the level of interference will depend on factors such as distance from the line to the receiving device, line voltage, orientation of the antenna, signal level, line configuration and weather conditions, no maximum interference level is specified as a design criterion for modern transmission lines.

Since the spark gap discharges are mostly responsible for the line-related radio interference, and are avoided through line maintenance, their occurrence around modern lines is minimized through appropriate maintenance regimens, as proposed for this line (HDPP 1997 AFC, pp 3.5-17 and 3.5-18). Staff has proposed a condition of certification (TLSN-2) to ensure resolution of any communications interference issue on a case-specific basis, in keeping with FCC’s requirements.

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 the implementation of measures to prevent or mitigate interference with radio and television communications from induced currents in large metal objects caused by transmission lines. The applicant has stated that all requirements of the order will be implemented in the construction and operation of the proposed line (HDPP 1997, AFC p 4.2-4).

Audible Noise

As noted for radio noise, any audible noise from a transmission line mostly results from the electric field-related corona discharges at the conductor surface and could be perceived in the vicinity of the line as a characteristic crackling, frying, or hissing sound or hum. Such noise is usually generated during wet weather (when rain drops create discontinuities that facilitate such discharges), and from lines of 345 kV or higher (whose voltage is high enough to facilitate the corona discharges involved). Research by the Electric Power Research Institute (EPRI, 1982) has shown the fair-weather audible noise of all modern transmission lines to be generally indistinguishable from ambient noise at the edge of a 100-ft right-of-way.

As with radio noise, there are no design-specific regulations on the physical dimensions of a transmission line to limit the noise from operations. Such noise is minimized, instead, through a careful balancing of the factors influencing field strength. According to information from applicant, the operation-related noise at the edge of the 100-ft right-of way of the proposed line should fall within 5.0 dBA of the current ambient levels at the project site which range from 50 dBA to 70 dBA (HDPP 1997, AFC pp 4.2-5 through 4.2-7). As with communications interference, the 400-ft distance from the nearest residential development to the transmission line right-of-way (HDPP 1997, AFC p 4.2-7) should serve to further minimize the potential for complaints about audible noise impacts from the line. For an assessment of the noise impacts from both construction and operation of the proposed power plant and related facilities, please refer to staff's analysis in the section under **Noise**.

Fire Hazards

- General Order 95 (GO-95), CPUC. "Rules for Overhead Electric Line Construction". Regulations in this order specify the clearance requirements necessary to minimize the potential for power line-related fires.

- Title 14 CCR, Section 1250-1258, "Fire prevention Standards for Electric Utilities". Requirements in this regulation are intended to minimize accumulation of combustible materials within the power line environment.

The fires addressed by these regulations are those that could be caused by sparks from conductors of the overhead lines or could result from direct contact between the line and nearby trees. Staff expects the potential for any line-related fires to be low given that (a) the line will be designed and constructed according to the requirements of GO-95 and (b) the applicant's plan for preventing the accumulation of combustible material in the right-of-way (HDPP AFC 1997 p 4.2-14)

Hazardous Shocks

- GO-95, CPUC, "Rules for Overhead Electric Line Construction". The regulations in this order specify the minimum requirements for overhead line construction with regard to ground clearance, grounding, maintenance and inspection necessary to prevent hazardous shocks to humans.

- Title 8, CCR, Section 2700 et seq. "High Voltage Electrical Safety Orders". These regulations establish essential requirements and minimum standards for installing, operating and maintaining electrical installations and equipment without hazardous shocks. The hazardous shocks that are addressed in these regulations are those that could result from direct or indirect contact with an energized line. Compliance with these requirements will ensure that the line is far enough from the ground to avoid hazardous shocks. Such shocks are capable of serious physiological harm or death.

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The applicant will comply with the applicable Title 8 requirements, as specified in the guidelines of the Southern California Edison Company (Edison), which apply to the service area in which the line will be located (HDPP 1997, AFC pp 4.2-12 through 4.5-14). Staff has included a condition of certification (TLSN-1) to ensure compliance with the applicable requirements.

SETTING

According to information from the applicant (HDPP, 1997, AFC pp 3.5-10 through 3.5-24), the proposed transmission line will be located in an area with a transmission network consisting of 500-kV, 287-kV, 230-kV and 115-kV lines and related facilities, as designed and operated by Edison or the Los Angeles Department of Water and Power (LADWP). The line will traverse a sparsely populated desert area, with the nearest residential development located approximately 400 feet from the proposed route. When completed, the line will become a part of the existing Los Angeles Basin system of interconnected transmission lines.

PROJECT DESCRIPTION

Project Description Figure 2 shows the route of the proposed transmission line, which will consist of the following components:

- A single-circuit 230-kV connecting line between the proposed power plant and the existing Victor Substation;
- A 230-kV switchyard at the eastern end of the plant site and;
- Additions at the existing Victor Substation.

The line will be approximately 7.2 miles long and located along a route running parallel to existing Edison and LADWP transmission lines for approximately 64 percent of its length. The completed line will consist of the segments listed below.

Segment A originating from the power plant and located within its own corridor. It will run parallel to the proposed route of El Evado Road in a southwesterly direction for approximately 1.8 miles.

Segment B running parallel to the direct-current (DC) line of the Intermountain Power Project in a southerly direction for approximately 0.7 miles.

Segment C located within its own corridor and crossing underneath two of LAPWD's 500-kV lines between Victorville and Adelanto, from where it will later cross underneath both the DC line, and LAPWD's Victorville-Rinaldi 500-kV line. This segment will be approximately 1.4 miles long.

Segment D running parallel to Edison's Victor-Gale 115-kV line and approximately 3.9 miles long.

The 129-ft lattice steel support structures (as shown in PROJECT DESCRIPTION Figure 6) will be utilized for the line in areas where it runs parallel to exiting lines with similar structures. Steel poles of the same 129-ft height (as shown in PROJECT DESCRIPTION Figure 7) will be utilized in other areas. The width of the right-of-way will vary along the route from approximately 100 feet to 120 feet depending on support structure and span length.

IMPACTS

PROJECT SPECIFIC IMPACTS

As noted in the LORS Section, GO-95 and Title 8, CCR, Section 2700 et seq., provide the minimum requirements necessary to avoid line-related hazardous shocks to humans. These requirements are implemented in ways that reduce both the surface-level impacts (manifesting as radio noise) and the ground-level field strengths responsible for the perceivable nuisance shocks and imperceivable electric and magnetic fields. Measures to decrease surface-level impacts may in some cases increase the ground-level field strengths. Since the line-related audible noise and radio noise are produced in ways not allowing for specific regulatory criteria, only the ground-level strengths of fields from transmission and other high-voltage lines can be used to evaluate operation-related impacts in quantifiable terms. The most important of these evaluative criteria are EMF exposure levels and the potential for nuisance shocks.

NUISANCE SHOCKS

Nuisance shocks around transmission lines are non-hazardous but unpleasant experiences caused by current flow at levels generally incapable of significant physiological harm. Such shocks mostly result from contact with objects in which electric charges were induced by the fields from the energized line. For modern high-voltage lines, shocks of this type are effectively minimized through grounding procedures specified in the National Electric Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and electronics Engineers (IEEE). As with all lines of the type proposed, the applicant will be responsible for ensuring compliance with these grounding-related practices within the right-of-way. Staff has recommended two conditions of certification (TLSN-5 and TLSN-6) to ensure that such grounding is made within the right-of-way in all applicable cases.

ELECTRIC AND MAGNETIC FIELD (EMF) EXPOSURE

The possibility of health effects in individuals exposed to electric and magnetic fields has increased public concern in recent years about living near high-voltage lines. Since both fields (electric and magnetic) occur together whenever electric current flows, exposure to them is generally considered together as EMF exposure. As noted by the applicant (HDPP 1997 pp 4.2-7 through 4.2-9), the available evidence has not established that such fields pose a significant public health hazard to exposed individuals. As a result, staff believe that any health hazard to an exposed individual would be small. It is also clear that biologically significant types of exposure have not been established with regard to a possible health risk, calling into question the biological usefulness of any attempt to reduce exposures solely to avoid a health risk. However, while such a hazard has not been established by the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate to at least maintain project-related EMF exposure within levels achieved in the past before the present concern about health. Further reductions could be made so long as they do not affect safety, efficiency, reliability and maintainability. Staff concludes that only modest measures are justified in reducing field strengths beyond levels achievable before the present health-based concern.

Before this concern arose, measures to reduce the field effects of power line operations were mostly aimed at the electric field component, whose effects could manifest as radio noise, audible noise and nuisance shocks. The present health-based focus, however, is on the magnetic field, which, unlike the companion electric field, can penetrate most objects, causing individuals to be exposed for long periods of time. The possible consequence of such long-term exposure is at the root of the present day concern about EMF. Although such concern is mostly focused on the relatively strong fields from the readily visible power lines, staff notes that the individual in a home could be exposed for short periods to much stronger fields in using some common household appliances (National Institute of Environmental Health Services and the U.S Department of Energy 1995). Scientists have not established whether the high-level, but short-term appliance-related exposures would be more biologically meaningful than the low-level, but long-term power line-related exposures. Such differences in exposure show that high-level magnetic field exposures regularly occur in areas other than the power line environment.

Based on the available evidence, most regulatory agencies believe that specific limits on electric or magnetic fields from power lines and other common sources are inappropriate. The few states (Florida, Minnesota, Montana, New Jersey, New York and Oregon) with specific limits for power line electric fields established these limits as a guard against electric shocks from strong electric fields. The two states (Florida and New York) with limits for magnetic fields established these limits to keep exposures from new lines within levels associated with existing lines. None of these limits are based on any established health effects nor are they intended for the retrofit of existing lines.

Given the lack of evidence suggesting a health hazard to exposed humans, most agencies who support field reductions above past levels believe that only low-cost or no-cost measures would be justified in any given case. As noted in the information from the applicant (HDPP 1997, AFC p 4.2-8), the CPUC (which regulates the installation and operation of high-voltage lines in California) requires at present that California's investor-owned utilities incorporate low-cost or no-cost measures in the design for new transmission or other power lines in the state. The utilities not under CPUC's jurisdiction have also agreed to comply with these requirements, as has the applicant. This no-cost, no-cost policy is intended by the

CPUC to govern the cost of line redesign or route changes to reduce exposure. The field reduction measures suitable for the proposed line are found in the 1994 design guideline document of the Southern California Edison Company, to whose existing system the proposed line would be connected. The rationale for the specific field-reducing designs and measures chosen for this project was also discussed by the applicant in their submittal (HDPP 1997 p 4.2-11 through 4.2-14).

The strength of the electric or magnetic field from a proposed line can be estimated using specific procedures. These field strength values are specified in units of kilovolts per meter (kV/m) for electric fields and milligauss (mG) for the companion magnetic field. As discussed above, staff will find the design acceptable if (a) the applicant proposes to appropriately apply the field reduction measures specified in the guideline document applicable to the service area in question at costs falling within the limits presently considered appropriate by the CPUC for such purposes. All measures should be applied to avoid affecting line safety, efficiency, reliability and maintainability. As previously noted, reduction beyound certain limits could affect these line features. Pre-project field strength estimates can be used in any given case to assess the effectiveness of the reduction measures or to compare the fields in question to those from lines of similar voltage and current-carrying capacity.

TRANSMISSION LINE SAFETY AND NUISANCE Table 1 presents, by line segment, the electric field strengths projected by the applicant for the edge of the 100- ft right-of-way. Studies and experience have shown the nuisance shocks problem to be largely associated with fields of 1.6 kV/m or higher. This accounts, in part, for staff's recommendation that a limit of 1.6 kV be specified for the right-of-way for some of the transmission lines certified in the past by the Energy Commission. Staff no longer specifies this guideline limit in light of improved understanding of the electric and magnetic field issue.

The estimated field strengths in **TRANSMISSION LINE SAFETY AND NUISANCE Table 1** do not indicate a potential for significant shock hazards in a right-of-way in which appropriate grounding measures are implemented, as intended for this line. Staff has specified conditions of certification (TLSN-3, TLSN-5, TLSN-6) to verify the field strengths involved and ensure that grounding measures are implemented in cases of chargeable objects located within line right-of-way.

TRANSMISSION LINE SAFETY AND NUISANCE Table 1
Strengths at Edges of Line Right-of-Way

HDPP Transmission Line Segment	Fields Strength (kV/m)	
	Left	Right
A	.53	.53
B	.51	.52
C	.53	.53
D	.53	.52

Source: HDPP 1997b

TRANSMISSION LINE SAFETY AND NUISANCE Table 2 presents, by line segment, the projected strengths of line magnetic fields for the current load expected for the proposed line. These field strength values were estimated for each segment to reflect the interactive effects of fields from nearby lines (HDPP 1997 AFC, pp 4.2-10 and 4.2-11). Staff is in agreement with the applicant's rationale for choosing the field reduction designs, whose related field strengths values are presented in **TRANSMISSION LINE SAFETY AND NUISANCE Table 2**. These magnetic fields are similar in intensity to those from lines of the same voltage class and current-carrying capacity. These are acceptable to staff because (a) they will result from a line design incorporating optimum field-reduction approaches and (b) the specific reduction measures will be applied to an extent considered appropriate by staff for lines in the Edison service. The extent of such application has been established by Edison as appropriate to ensure safety, efficiency, reliability and maintainability in the geographic area involved. Given the approximately 400-ft distance from the line to the nearest residential development and the rapid decrease of field strength with distance, any long-term exposures should be within normal background levels, and therefore acceptable.

TRANSMISSION LINE SAFETY AND NUISANCE Table 2
Fields at Edges of Line Right-of-Way

HDPP Transmission Line Segment	Field Strength (mG)	
	Left	Right
A	39.3	39.2
B	48.6	62.8
C	39.3	39.2
D	39.3	39.1

Source: HDPP 1997b

CONCLUSION AND RECOMMENDATIONS

Staff concludes that the proposed transmission line will be designed and operated to meet the safety-related specifications of the regulations applicable to such lines. Field-reducing measures will be incorporated to the extent required for lines in the Edison service area to ensure safety, reliability efficiency and maintainability. However, as health effects have been neither established nor ruled out for exposure to the fields from such lines, the public health significance of project-related exposures cannot be characterized with certainty. Staff believes, however, that any such risks would be small for the public. The nuisance hazards from the proposed line will be minimized through the grounding practices to be implemented by the applicant. Staff, therefore, recommends approval of the line if it is designed and operated as proposed. If such approval is granted, staff recommends that the Commission adopt the following conditions of certification to ensure compliance with the applicable LORS. These conditions should apply to the project whether the power is generated at 720 MW, or 678 MW.

CONDITIONS OF CERTIFICATION

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

Verification: Thirty days before start of transmission line construction, the project owner shall submit to the Commission's Compliance Project Manager (CPM) a letter from a California-registered electrical engineer affirming that the proposed transmission line will be constructed according to requirements of GO-95 and Title 8, section 2700 et seq. of the California Code of Regulations.

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

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

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

TLSN-3 The project owner shall engage a qualified consultant to measure the strengths of the line electric and magnetic fields before beginning construction and after the line is energized. Measurements should be made at representative points along the line, to verify the design assumptions relative to field strengths. The areas to be measured should include the facility substation and any residences near the right-of-way.

Verification: The project owner shall file a copy of the first set of pre-project measurements with the CPM at least 30 days before the start of construction. The post-project measurement shall be filed with the CPM within 30 days after the day the line is energized.

TLSN-4 The project owner shall ensure that the transmission line right-of-way is kept free of combustible waste material, as required under the provisions of Section 4292 of the Public Resources Code and Title 14, Section 1250 of the

California Code of Regulations, “Fire Prevention Standards for Electric Utilities.

Verification: The project owner shall provide a summary of inspection results and any fire prevention activities along the right-of way, in the Annual Compliance Report to the CPM.

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

Protocol: The letter shall include the following:

- A discussion of the nature and operation of a transmission line
- A discussion of the project owner’s responsibility for grounding existing fences, gates, and other large permanent objects located within the right-of-way regardless of ownership
- A discussion of the property owner’s responsibility to notify the project owner whenever the property owner adds or installs a metallic object which will require grounding, as noted above
- A statement recommending against adding fuel to motor vehicles or other mechanical equipment underneath the line.

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

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

In the event of a refusal by the property owner to permit such grounding, the Owner/operator shall so notify the CPM. Such notification shall include, when possible, the owner’s written objection. Upon receipt of such notice, the CPM may waive the requirement for grounding of the object involved.

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

REFERENCES

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

Electric Power Research Institute (EPRI). 1982. Transmission Line Handbook: 345 kV and above. 625p.

National Institute of Environmental Health Services and United States Department of Energy. 1995. Questions and Answers about EMF Associated with the Use of Electric Power.

HAZARDOUS MATERIAL MANAGEMENT

Testimony of Rick Tyler and Joseph M. Loyer

INTRODUCTION

The purpose of this analysis is to determine if the proposed High Desert Power Project (HDPP) will have a significant impact on the health and safety of the general public as a result of handling or storing hazardous materials at the facility. The scope of this analysis includes a determination of the project's ability to satisfy the applicable laws, ordinances, regulations and standards (LORS) after certification has been granted. This analysis goes beyond these reasonable assurances to comply with LORS in determining if there will likely be significant adverse impacts to the general public, pursuant to the Energy Commission responsibilities under the California Environmental Quality Act (CEQA). If significant adverse impacts are identified, the Energy Commission staff will evaluate the potential for facility design alternatives or mitigation measures to reduce impacts to the extent feasible. The closely related issues of hazardous waste removal and worker safety are addressed in the areas of Waste Management and Worker Safety.

The following hazardous materials, which are to be used at the facility, have a potential to impact the general public:

- sodium hypochlorite,
- sodium hydroxide,
- sulfuric acid,
- aqueous ammonia, and
- natural gas.

The accidental release or mixing of the substances listed above can result in the release of a toxic or explosive gas. Sodium hypochlorite and sulfuric acid react and can produce chlorine gas. Sodium hydroxide and sulfuric acid react with most metals to release hydrogen gas, which is explosive in air. The use of aqueous ammonia can result in the release of ammonia gas in the event of a spill, due to its relatively high vapor pressure. The use of natural gas can result in fires and/or explosions.

Other hazardous materials, such as scale inhibitors (phosphate), oxygen scavengers, neutralizing amine, biocides, settling aids, drainage aids, water softening and de-chlorinators, will be present at the proposed facility. However, these materials pose minimal potential for off-site impacts, as they will be stored in small quantities.

The typical methods used, in order of preference, to avoid or minimize impacts from the accidental releases of hazardous materials are as follows:

- use of non-hazardous or less hazardous materials,
- use of engineered controls,

- use of administrative controls, and
- emergency response planning.

APPLICABLE LAWS, ORDINANCES, REGULATIONS, STANDARDS AND POLICIES

FEDERAL

The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III and Clean Air Act of 1990 established a nationwide emergency planning and response program and imposed reporting requirements for businesses which store, handle, or produce significant quantities of hazardous or acutely hazardous substances. The Acts (implemented in 40 CFR э 68) require the states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of these Acts, as well as additional requirements for handling and storage of acutely hazardous substances, are reflected in the California Health and Safety Code section 25531 et seq.

STATE

California Health and Safety Code section 25500 requires companies that handle hazardous materials in sufficient quantities to develop a Business Plan. The Business Plan must include the basic information on the location, type, quantity, and the health risks of hazardous materials handled, used, stored, or disposed of in the state, which could be accidentally released into the environment. It must also include a plan for training new personnel and for annual training of all personnel in safety procedures to follow in the event of a release of hazardous materials. It must include an emergency response plan and identify the business representative able to assist emergency personnel in the event of a release.

The California Health and Safety Code section 25531 directs facilities handling hazardous materials in sufficient quantities to develop a risk management plan (RMP) and submit it to appropriate local authorities and the United States Environmental Protection Agency (EPA) for review and approval. The plan must identify the severity of an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any preexisting evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This new, recently developed program supersedes the California Risk Management and Prevention Plan (RMPP).

Government Code section 65850.2 restricts the permitting of any new facility involving the handling of hazardous materials within 1,000 feet of a school. This section also requires the completion of an RMP.

Title 8, California Code of Regulations, Chapter 4, in part, describes the design requirements for the various storage tanks proposed by the applicant. These regulations are primarily designed to protect the on-site workers, but protect the general public as well. While they are too volumous to describe in detail here, the regulations generally require the applicant to design to the American Society of Mechanical Engineers (ASME) coded standards.

LOCAL AND REGIONAL

The Uniform Fire Code (UFC) contains provisions regarding the storage and handling of hazardous materials. These provisions are contained in Articles 79 and 80. Article 80 was extensively revised in the latest edition. These articles contain requirements that are generally similar to those contained in Health & Safety Code section 25531 et seq. The UFC does, however, contain unique requirements for secondary containment, monitoring, and treatment of toxic gases emitted through emergency venting. These unique requirements are generally restricted to extremely hazardous materials.

The Uniform Building Code (UBC) contains requirements regarding the storage and handling of hazardous materials, in a Seismic Zone 4 area, which restrict the issuance of an occupancy permit until the applicant has demonstrated compliance with section 307.1.6 of the UBC. That section requires a Hazardous Materials Management Plan be completed, which is similar in some respects to the RMP.

ENVIRONMENTAL SETTING

SITE AND VICINITY DESCRIPTION

The HDPP will be located on a portion of the Southern California International Airport (SCIA), formerly the George Air Force Base, in the City of Victorville, California as shown in Figure 5.8-1 of the application (HDPP 1997b, AFC page 5.8-5).

Several factors associated with the location of the project affect its potential for causing public health impacts. These include:

- the local meteorology,
- terrain characteristics,
- special location considerations, and
- the location of population centers and sensitive receptors relative to the project.

Staff considered these factors in assessing the potential impacts to the public, which may occur in the event of an accidental release of hazardous material from the facility. The following sections describe the local conditions affecting public exposure in the area surrounding the proposed project.

Meteorological Conditions

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 impacts. When wind speeds are low and stable, dispersion is minimized and can lead to significant health impacts to those exposed.

Recorded wind speeds and ambient air temperatures are discussed in the air quality section of the HDPP AFC (HDPP 1997b, AFC section 5.12.4). This data indicates that low wind speeds of 1 to 3 knots and temperatures exceeding 100^{o}F, which create worst case circumstances for dispersion, are common for the project area, as seen in Tables 5.12-9 and -10 of the application (HDPP 1997b, AFC Page 5.12-26).

Terrain Characteristics

The location of elevated terrain (terrain above the stack height) is often an important factor to be considered in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. There is elevated terrain to the northwest and south within 10 miles and east within 3 miles of the project site. However, these elevated terrain areas are sparsely populated and are a significant distance from the project site, so they are not considered in the impacts modeling analysis.

Special Location Considerations

The project is located on property just east of the SCIA. In the event of an accidental hazardous material release, aircraft taking off, landing or taxiing may be exposed, see Figure 5.8-3 (HDPP 1997b, AFC Page 5.8-26). Equally, aircraft attempting to take off or land may pose a hazard to the facility if the aircraft crashes. The SCIA taxiway is located approximately 1,000 feet (305 meters) from the project site fence line.

The site is located in a UBC Seismic Zone 4 area, the zone of greatest potential shaking. The project will be designed to the Zone 4 requirements or greater.

Location of Exposed Populations and Sensitive Receptors

The general public includes many sensitive subgroups that may be at greater risk from exposure to hazardous materials. These sensitive subgroups include the very young, the elderly, and those with existing illnesses (Calabrese 1978). Also, the location of the general public in the area surrounding a project site may have a large bearing on exposure risk. Figure 5.8-3 (HDPP 1997b, AFC Page 5.8-26) shows the locations of both the general public and sensitive subgroups in the project vicinity.

IMPACTS

Staff has identified three major types of hazards associated with the proposed project:

- accidental release of ammonia gas,
- chlorine and hydrogen gas release, and

- fire and explosion from the use of natural gas

As discussed below, the release of ammonia is, in staff's opinion, the most likely accident to occur at the facility with the potential for off-site impacts that should be modeled. It is staff's opinion that the release of chlorine gas or explosion from natural gas are extremely unlikely events, and that modeling them would not provide additional useful information.

ACCIDENTAL RELEASE OF AMMONIA GAS

Delivery and Storage of Aqueous Ammonia

The applicant has proposed the use of aqueous ammonia as a substitute for the much more hazardous anhydrous ammonia. The use of aqueous ammonia results in a substantial risk reduction in that anhydrous ammonia is a gas at ambient conditions and has a greater potential to impact public health and safety. However, the accidental release of aqueous ammonia can result in the emission of ammonia gas from the liquid upon loss of containment. This is the result of the relatively high vapor pressure of aqueous ammonia under ambient conditions, which can exist at the time of release. Under certain circumstances, an aqueous ammonia spill can cause significant public health impacts.

The aqueous ammonia storage tank being proposed will comply with UBC Seismic Zone 4 requirements, in addition to hazardous material storage requirements. The applicant has proposed to build a diked area around the aqueous ammonia storage tank capable of containing (with a reasonable margin for error) the entire 100,000 gallons of aqueous ammonia stored on site, and to install a sump in the diked area that will be capable of containing an entire delivery of aqueous ammonia (approximately 8,000 gallons). The applicant further proposes to construct a catchment basin between the delivery truck and the storage tank that will drain into the diked area (mentioned above). Finally, the applicant proposes to restrict aqueous ammonia deliveries to daylight hours only, which will be included in their business plan, risk management plan and safety audit program.

The applicant will develop an emergency response plan in conjunction with the Victorville Fire Department (VFD) that will incorporate appropriate actions in the case of an aqueous ammonia spill of any kind.

Aqueous Ammonia Release Scenarios

Several release scenarios are analyzed to identify and mitigate to the extent feasible any significant risks to public health and safety. These scenarios are not intended to be inclusive of all possible accidents, but instead represent those accidents that are reasonably foreseeable. Each scenario is evaluated for its probable event and significance of impact. If a scenario is a probable event and will result in a significant impact, then those impacts will be mitigated to the extent feasible.

Aqueous Ammonia Transfer Release Scenario

Staff believes that the most likely scenario resulting in a significant impact to public health and safety would involve human errors during the process of transferring aqueous ammonia from the delivery truck to the storage tank. These errors could result in the loss of all of the delivered material (approximately 8,000 gallons). To evaluate the potential impacts on the public health and safety, the applicant has performed an appropriate modeling analysis (HDPP 1998u).

The applicant modeled the accidental release of aqueous ammonia during delivery (a loss of 8,000 gallons) with the following assumptions (HDPP 1998u). The temperature of the aqueous ammonia is assumed to be 83^{o}F, consistent with a truck traveling from a non-desert area at highway speeds and includes heat transfer from the hot cement catchment basin. The ambient air was modeled at D stability and 3 m/s wind speed to simulate a daylight-delivery-only restriction. The aqueous ammonia spill is assumed to drain into the diked area and into the 8,000-gallon sump within. The results of this modeling show that there are no off-site impacts from a spill of this nature.

Staff recommends the use of four bench-mark, short-term (30 minutes) exposure levels for the modeling of an accidental release of aqueous ammonia: 1) lethality (2,000 parts per million (ppm)), 2) immediately dangerous to life and health (500 ppm), 3) the RMP endpoint required by EPA (200 ppm), and 4) a level considered to be without serious adverse effects on the public (75 ppm). The exposure levels considered by staff and their applicability for modeling the accidental release of ammonia can be found in Appendix A.

Staff further recommends that the nearest public receptor (a member of the general public) be assumed to be at the fence line, not the taxiway of the SCIA as suggested by the applicant. This is a difference of approximately 300 meters. Our reasoning is that the property next to the proposed site is currently planned for development in the near future and a developer is actively being sought. Therefore, it is not unreasonable to expect a member of the public to be near the fence line of the proposed facility. Eliminating these 300 meters of buffer space increases the likelihood of finding a significant impact on public health and safety. However, this does not significantly change the outcome of the modeling results.

Aqueous Ammonia Storage Tank Release Scenario

The aqueous ammonia storage tank is 100,000 gallons in capacity; a loss of that magnitude would result in a significant impact on public health and safety. The probability of a spontaneous catastrophic failure of the aqueous ammonia storage tank is difficult to calculate precisely. However, it can be estimated based on the failure of high-pressure pressure vessels, noting that the aqueous ammonia storage tank is a low-pressure system. The frequency of spontaneous catastrophic failure of pressure vessels used for anhydrous ammonia storage (a high-pressure system) is approximately 1/100,000 (Lees 1983). This estimate pre-dates several changes in the ASME pressure vessel code, does not include seismic zone 4 standards and does not take into account the lower failure rate of low-pressure pressure vessels.

Also, there is no record of any aqueous ammonia storage tank having had a catastrophic failure in recent history.

The changes in the ASME code include stress relieving weld repairs, and prohibiting the use of cold-formed ends. Weld repairs on any steel tend to embrittle the steel around the welded area, making it susceptible to corrosion stress cracking. Relieving the stresses of those welds significantly reduces cracking and crack propagation. Restricting the use of cold-formed ends was a direct result of an anhydrous ammonia tank failure that used them. The accident was a result of a weld repair done on a cold-formed end that subsequently cracked and failed catastrophically, causing multiple deaths. Using stress-relieved ends instead of cold-formed ends reduces cracking and crack propagation in pressure vessels.

Seismic zone 4 requirements are the most stringent pressure vessel requirements anywhere in the world, specifying the wall thickness and anchorage design. Increased wall thickness improves the pressure vessel strength, but also aids in crack detection. With thicker walls, a larger crack is required to cause a catastrophic failure; larger cracks are easier to detect during regular inspections.

The aqueous ammonia storage tank would be considered a low-pressure system as compared to the high pressures of an anhydrous ammonia storage tanks. The internal pressure of the pressure vessel largely drives cracking and crack propagation. Therefore reducing the internal pressure of the pressure vessel effectively reduces cracking and crack propagation.

The Environmental Protection Agency's Accidental Release Information Program has no records of any accidental ammonia releases as a result of an aqueous ammonia storage tank failure (the program currently has available accident reports from 1986 to 1997). A description of the EPA-ARI Program can be found in Appendix B.

It is the opinion of staff that these elements significantly reduce the probability of catastrophic failure of the aqueous ammonia storage tank to well below 1 in 1,000,000, and it is therefore not a significant risk to public health and safety. However, the EPA RMP program will require the applicant to model the potential off-site impacts of a catastrophic failure of the aqueous ammonia storage tank. Therefore, staff will provide supplemental testimony concerning this modeling.

Aircraft Collision with Aqueous Ammonia Storage Tank Scenario

Due to the proximity of the proposed facility to the South Coast International Airport (SCIA), staff has investigated the possibility of an aircraft impacting the aqueous ammonia storage tank. If such an impact were to occur, it could result in the total loss of the stored material (100,000 gallons of aqueous ammonia). As discussed above, a release of this nature can present a significant risk to the public health and safety.

Staff has estimated the most conservative probability that a collision between aircraft arriving or departing SCIA and the aqueous ammonia storage tank would occur as 1.2 in 1,000,000. Staff bases this estimate on several assumptions. First, the aqueous ammonia tank is an 800 square foot target in a 5-acre zone (the sideline safety zone) that has a record of attracting 11% of all aviation accidents (DOT 1993). Second, that there are no more than 40,000 flights per year at SCIA (Blomendale 1998, pers. comm.). Third, approximately 0.35 flights out of 100,000 flights at SCIA will crash at the airport (NTSB 1998). Staff used the following calculation: (800 square feet/ 5 acres) * 11% * 0.35 * (40,000/100,000) = 1.2/1,000,000.

This estimate is very conservative and does not take into account the fact that the aqueous ammonia storage tank is located interior to the power plant site, away from the fence line. This would make it significantly more difficult for an out-of-control aircraft to impact the tank. Departing aircraft would have to clear the cooling towers and a combustion turbine to impact the tank, which is very unlikely, in staff's opinion. The more likely scenario is for the arriving aircraft to veer off-course, clear or partially impact the water treatment facilities, and then impact the aqueous ammonia storage tank. The estimate also assumes that all the flights arriving at or departing from SCIA do so on the closest (secondary) runway. Staff estimates the actual maximum number of arrivals per year on the secondary runway to be approximately 6,000 (Blomendale 1998, pers. comm.). With these refinements, the estimated probability of an aircraft collision with the aqueous ammonia storage tank drops to approximately 1.8 in 10,000,000.

Even this estimate is conservative because it does not consider the pilot's ability to control the aircraft, at least partially, during a crash. In most situations of this nature, the pilot will retain some control over the aircraft and make every effort avoid any stationary objects in order to increase the pilot's and the passengers' odds of survival. Also, under daylight conditions, a pilot is more likely to avoid a stationary object, because it can be seen from a distance. Given these considerations and the fact that the facility would be lit at night, staff considers this to be an extremely low probability event and therefore not a significant risk to public health and safety.

CHLORINE AND HYDROGEN GAS RELEASE

Sodium hypochlorite, sulfuric acid and sodium hydroxide will be used to treat the cooling tower water for biological agents, water neutralization and pH level control. The mixture of sodium hypochlorite and sulfuric acid can result in the release of chlorine gas, which is extremely hazardous. Sulfuric acid and sodium hydroxide react with metals to form hydrogen gas, which is explosive in air.

Sodium hypochlorite will be used to treat water to control the growth of algae and other biological agents and to control pH. Staff supports the use of this material in that it poses much less risk than use of anhydrous chlorine, which is more commonly used for this purpose. This material will be stored in a fiber-reinforced tank within a diked area sufficient to contain the entire volume of stored material. A pump will be used to transfer this material through the water treatment system. The pump controls will be designed to automatically adjust the pump stroke and will be equipped with an on/off selector switch for manual tripping that can override any interlocks. The tank will also be equipped with outdoor and remote alarms to indicate tank level. All unloading and liquid transfer operations will be supervised and dry-disconnect transfer hoses and piping connections will be used. Neutralizers and/or absorbers will be kept on-site in case a spill occurs around a containment area.

Sulfuric acid will be used to control pH levels in the cooling tower and feedwater. This material will be stored on-site in reportable quantities in a lined metal tank with a diked area around it sufficient to contain the entire volume of the material stored. A pump will be used to transfer this material through the water treatment system. The pump controls will be designed to automatically adjust the pump stroke and will be equipped with an on/off selector switch for manual tripping that can override any interlocks. The tank will also be equipped with outdoor and remote alarms to indicate tank level. All unloading and liquid transfer operations will be supervised and dry-disconnect transfer hoses and piping connections will be used. Neutralizers and/or absorbers will be kept on-site in case a spill occurs around a containment area.

Sodium hydroxide will be used to control pH levels and for neutralization of the cooling tower water. This material will be stored on-site in reportable quantities in a lined metal tank with a diked area around it sufficient to contain the entire volume of the material stored.   A pump will be used to transfer this material through the water treatment system. The pump controls will be designed to automatically adjust the pump stroke and will be equipped with an on/off selector switch for manual tripping that can override any interlocks. The tank will also be equipped with outdoor and remote alarms to indicate tank level. All unloading and liquid transfer operations will be supervised and dry-disconnect transfer hoses and piping connections will be used. Neutralizers and/or absorbers will be kept on-site in case a spill occurs around a containment area.

Under these conditions staff feel that the potential of chlorine or hydrogen gas formation and thus their related off-site impacts are very remote and not a significant threat to public health and safety.

FIRE AND EXPLOSION FROM THE USE OF NATURAL GAS

Natural gas, which will be used as a fuel for the facility, poses a fire and/or explosion risk as a result of its flammability. While natural gas will be used in significant quantities, it will not be stored on-site. The risk of a fire and/or explosion will be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. National Fire Protection Association 85A requires: 1) the use of double block and bleed valves for gas shut-off, 2) automated combustion controls, and 3) burner management systems. These measures will significantly reduce the likelihood of an explosion in the heat recovery steam generators. Additionally, start-up procedures will require air purging of gas turbines and fireboxes prior to start-up to preclude the presence of an explosive mixture.

MITIGATION

ACCIDENTAL RELEASE OF AMMONIA GAS

Given the proposed design and controls for the aqueous ammonia delivered and stored on site, staff recommends no further mitigation.

CHLORINE AND HYDROGEN GAS RELEASE

Given the proposed controls for the sodium hypochlorite, sodium hydroxide and sulfuric acid delivered and stored on site, staff recommends no further mitigation.

FIRE AND EXPLOSION FROM THE USE OF NATURAL GAS

Given the proposed controls for the use of natural gas, staff recommends no further mitigation.

COMPLIANCE WITH LORS

The applicant will comply with all LORS requirements by developing a Business Plan, a Risk Management Plan and a Safety Management Plan (described below), as well as designing and constructing the proposed power plant to Seismic Zone 4 specifications and applicable ASME codes.

The Business Plan (Health & Safety Code э 25500 et seq.) must include the basic information on the location, type, quantity, and the health risks of hazardous materials handled, used, stored, or disposed of in the state, which could be accidentally released into the environment. It must also include a plan for training new personnel and for annual training of all personnel in safety procedures to follow in the event of a release of hazardous materials. It must include an emergency response plan and identify the business representative able to assist emergency personnel in the event of a release.

The Risk Management Plan (Health & Safety Code э 25531 et seq.) must identify the severity of an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any preexisting evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material.

The Safety Management Plan (Code of California Regulations, Title 8), which focuses on the delivery and handling of the identified hazardous materials, should identify management personnel (by job title) who are responsible for developing and implementing the identified safety procedures, and the safety procedures themselves. The plan should include how HDPP will motivate its employees to accomplish safety objectives and detailed procedures used to address the hazards associated with human error during storage and transfer of hazardous materials.

FACILITY CLOSURE

The project will eventually be closed. A power plant is typically intended to serve for twenty, thirty or forty years. At the end of that lifespan, a planned closure typically occurs, under which the facility is decommissioned in an orderly manner. Natural disasters, such as an earthquake or severe storm, and economic emergencies, such as loss of a fuel supply contract or power sales contract, can cause an unexpected temporary shutdown of the project. If damage to the project is too great, or if the economic problems cannot be solved, the unexpected shutdown may become permanent.

In each of these shutdown scenarios, it is imperative that hazardous materials stored onsite be managed safely. In the Facility Closure portion of the **General Conditions** section of this document, requirements are delineated that will require the project owner to submit to the CPM a Facility Closure Plan in the event of a planned closure of the facility. In addition, the General Conditions section requires the project owner to submit to the CPM, before commercial operation commences, On-site Contingency Plans that address how the hazardous materials will be managed in the event of an unexpected temporary or permanent closure. In order to ensure that hazardous materials are managed safely, the following provisions should be included in the Facility Closure Plan and the On-site Contingency Plan:

- In the case of a planned closure or an unexpected permanent closure, any hazardous materials present shall be removed from the site in accordance with all applicable LORS. One way of accomplishing this may be for the project owner to include, in its contracts with hazardous materials suppliers, a requirement that the supplier remove the materials if requested to do so by the project owner or any competent authority.
- In the case of an unexpected temporary closure, the On-site Contingency Plan shall address how the site and the hazardous materials will be managed safely for the period of closure. Should the temporary closure be declared permanent by the CPM, any hazardous materials present shall be removed from the site in accordance with all applicable LORS.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. To ensure that these measures are included in the Facility Closure Plan and the On-site Contingency Plan, a Condition of Certification (HAZ-6) is proposed, below.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Staff concludes that the proposed handling of hazardous materials at the project site will comply with applicable LORS and will not result in a significant risk to public health. Staff proposes the following conditions of certification to ensure that the applicant performs all mitigation measures as proposed in the AFC.

The design and operation of the proposed project with adoption of staff's proposed conditions of certification will comply with all applicable LORS. The applicant will be required to submit a Business Plan and a Risk Management Plan to the Victorville Fire Department (VFD). The VFD will evaluate the proposed hazardous materials storage and handling systems and the risk assessment provided by the applicant and indicate whether they are satisfied with the proposed facilities. To insure adequacy of the Business Plan and Risk Management Plan, Energy Commission staff recommends that these plans be submitted to the Energy Commission Compliance Project Manager (CPM) for review, and to the VFD for review and approval, prior to the delivery of any hazardous materials to the facility.

RECOMMENDATIONS

Energy Commission staff recommends that the proposed conditions of certification presented herein be adopted by the Energy Commission to ensure that the project is designed, constructed and operated to protect public health and safety and to comply with applicable LORS.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous material in reportable quantities that is not listed in Appendix C, unless approved by the CPM.

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

HAZ-2 The project owner shall accept deliveries of aqueous ammonia no earlier than sunrise and no later than one hour prior to sunset.

Verification: The project owner shall provide in the Annual Compliance Report a list of all deliveries of aqueous ammonia, which is to include at a minimum; amount delivered, time of delivery, time of sunrise and time of sunset.

HAZ-3 The project owner shall submit the both the Business Plan and Risk Management Plan to the CPM for review and comment, and shall also submit these plans and/or procedures to the Victorville Fire Department for approval.

Verification: At least sixty (60) days prior to the initial delivery of any hazardous materials in reportable quantities to the facility, the project owner shall submit the Business Plan and Risk Management Plan to the CPM for review and comment. At the same time, the project owner shall submit these plans to the Victorville Fire Department for approval. The project owner shall also submit evidence to the CPM of the Victorville Fire Department approvals of these plans when available.

HAZ-4 The project owner shall provide a detailed Safety Management Plan (SMP) to the CPM.

Protocol: The Safety Management Plan shall include the following: 1) a description of how each element of the SMP applies to the proposed facility, 2) an explicit chain of command (by job title on final organization chart) for each specific objective identified in the plan (for example, under "Accountability", list who will be responsible for the preparation of the specific statement of expectations, objectives and goals by senior management, daily shift logs and reports of abnormal conditions), 3) a description of how corporate management will ensure proper implementation of the SMP and ensure that production and safety are properly balanced, 4) methods that will be used to motivate employees to accomplish safety objectives, and 5) detailed procedures to address the hazards associated with human error during storage and transfer of hazardous materials.

Verification: At least sixty (60) days prior to the initial delivery of any hazardous materials in reportable quantities to the facility, the project owner shall provide a detailed Safety Management Plan as described in the Protocol section of this Condition of Certification to the CPM for review and comment.

HAZ-5 The project owner shall design the aqueous ammonia storage facility such that in the event of an accidental release of aqueous ammonia, the down wind concentration of ammonia at the facility fence line will not exceed 75 ppm.

Protocol: The project owner shall submit designs for approval to the CPM for the aqueous ammonia storage tank, diked-area, catchment basin and related 8,000 gallon-sump. These designs shall incorporate two goals. 1) In the event of an accidental release of aqueous ammonia in the amount of 8,000 gallons or less in either the catchment basin or diked-area, down wind concentration of ammonia shall not exceed 75 ppm at the fence line. The project owners are required to provide adequate modeling, or reference to such modeling, to prove that their facility design will not exceed the limits described. 2) In the event of a storage tank rupture, the released aqueous will be completely contained within the diked area and have no opportunity to drain to the catchment basin.

Verification: At least sixty (60) days prior to the initial delivery of aqueous ammonia, the project owner shall provide designs for the aqueous ammonia storage facility as described in the Protocol section of this Condition of Certification to the CPM for approval.

HAZ-6 Prior to commencement of commercial operation, the project owner shall submit to the CPM for review and approval hazardous materials management plans as described below. These plans may be incorporated into the Facility Closure Plan and the On-site Contingency Plans (which are required under General Conditions).

Protocol: For the event of a planned closure or an unexpected permanent closure of the facility, the On-site Contingency Plan (and the Facility Closure Plan, should one be submitted) shall address how all hazardous materials will be removed from the site in accordance with all applicable LORS.

For the event of an unexpected temporary closure of the facility, the On-site Contingency Plan shall address how the site and the hazardous materials will be secured and maintained safely for the period of closure. For the event in which the temporary closure is declared permanent by the CPM, the On-site Contingency Plan shall address how all hazardous materials will be removed from the site in accordance with all applicable LORS.

Verification: At least 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation, the project owner shall submit the above plans to the CPM for review and approval.

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APPENDIX A

BASIS FOR USE OF 75 PPM AMMONIA EXPOSURE CRITERIA

Staff uses a criterion of 75 ppm to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this criterion is not consistent with the 200 ppm criterion used by EPA and Cal EPA in evaluating such releases pursuant the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's CEQA analysis. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices are implemented and actions are taken in response to accidental releases. However, the regulations implementing these programs do not provide clear design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines (ERPGs) states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to adult healthy individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations) they are not appropriate and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. CEQA requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through changes to the proposed project.

Staff has chosen to use the National Research Council's 30 minute Short Term Public Emergency Limits (STPELs) to determine the potential for significant impact. These limits are designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at these levels should not result in "serious sequelae" but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures of the general public to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events, and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75 ppm STPEL.

ACUTE AMMONIA EXPOSURE GUIDELINES

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH[2]	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 min.	Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible injury or impairment of the ability to escape.
IDLH/10[1]	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 min.	Protects nearly all segments of general population from irreversible effects
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 min. 4 times per 8 hr day	No toxicity, including avoidance of irritation
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 min.	Significant irritation but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one time exposure
STPEL[4]	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 min. 30 min. 10 min.	Significant irritation but protect nearly all segments of general population from irreversible acute or latent effects. One time accidental exposure
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. work shifts
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 min.	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin)

1.(EPA 1987) **2.**(NIOSH 1994) **3.**(NRC 1985) **4.** (NRC 1972) **5.** (AIHA 1989)

- The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.

** The (NRC 1979) describes a study involving young animals which suggests greater sensitivity to acute exposure in young animals. The (WHO 1986) warns that the young, elderly, asthmatics, those with bronchitis and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

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Abbreviations

ACGIH, American Conference of Governmental and Industrial Hygienists
AIHA, American Industrial Hygienists Association
EEGL, Emergency Exposure Guidance Level
EPA, Environmental Protection Agency
ERPG, Emergency Response Planning Guidlines
IDLH, Immediately Dangerous to Life and Health Level
NIOSH, National Institute of Occupational Health and Safety
NRC, National Research Council
STEL, Short Term Exposure Limit
STPEL, Short Term Public Emergency Limit
TLV, Threshold Limit Value
WHO, World Health Organization

APPENDIX B

United States Office of Solid Waste 550-F-98-018

Environmental Protection and Emergency Response JULY 1998

Agency (5104)
www.epa.gov/swercepp/

Accidental Release Information Program (ARIP) Fact Sheet

BACKGROUND

The Chemical Emergency Preparedness and Prevention Office (CEPPO) within the Office of Solid Waste and Emergency Response (OSWER) leads the Environmental Protection Agency's (EPA) effort to prepare for and prevent chemical accidents. The Agency began its chemical accident prevention program in 1986. To identify the steps that could be taken by industrial facilities to prevent releases, the Agency needed information on the causes of accidents and industry prevention practices. At that time, the only data available focused on the quantities released rather than causes.

To develop new information on accident causes, EPA initiated the Accidental Release Information Program (ARIP). The program involves collecting questionnaire information from facilities that have had significant releases of hazardous substances, developing a national accidental release database, analyzing the collected information, and disseminating the results of the analysis to those involved in chemical accident prevention activities. ARIP also helps to focus industry's attention on the causes of accidental releases and the means to prevent them.

ELEMENTS OF ARIP

Authority

EPA is authorized to collect information on accidental releases under: section 3007(a) of the Resource Conservation and Recovery Act (RCRA); section 104(b)(1) and (e) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA); section 308(a) of the Clean Water Act; and section 114 of the amended Clean Air Act. These statutes require that the information be furnished either to develop regulations, conduct enforcement, or determine the need to respond to or prevent accidental chemical releases.

Selection of Facilities to Survey

U.S. facilities are required by law to report non-routine releases of certain substances when those releases exceed a reportable quantity (RQ). These reports are called into the National Response Center, the U.S. Coast Guard, and EPA regional offices. EPA compiles the reports into the Emergency Response Notification System (ERNS) database. EPA then uses ERNS data to select releases for the ARIP questionnaire.

The ERNS database includes a wide range of releases from both fixed facilities and transportation. Since the Department of Transportation is responsible for transportation accidents and OSHA is responsible for accidents affecting workers, ARIP targets those accidental releases at fixed facilities that resulted in off-site consequence or environmental damage. Off-site consequence includes any casualty, evacuation, shelter-in-place, or any other necessary precaution taken by individuals off-site as a result of the release. Environmental damage includes wildlife kills, significant vegetation damage, soil contamination, and ground and surface water contamination. Not all non-routine releases reported in ERNS result from accidents. To focus on significant accidents, an ARIP questionnaire is sent to all releases that resulted in death or injury. If the release also resulted in off-site consequence or environmental damage, then the facility is required to complete the questionnaire.

ARIP Questionnaires

The ARIP questionnaire consists of 23 questions about the facility, the circumstances and causes of the incident, and the accidental release prevention practices and technologies in place prior to, and added or changed as a result of, the event. The questionnaire focuses on several areas of accident prevention including hazard assessments, training, emergency response, public notification procedures, mitigation techniques, and prevention equipment and controls.

ARIP Database

When EPA headquarters receives the questionnaire, the responses are entered into a database. EPA also files copies of the questionnaire for future reference.

USES OF ARIP DATA

The ARIP information has been collected into a national database that provides data on the causes of accidental releases and the ways to prevent them from recurring. EPA has used the database to define areas where further information is needed, to disseminate information about accident causes, and to help develop program and regulatory initiatives. ARIP data help to focus attention on accidents and prevention methods and technologies.

ARIP also builds understanding of accident prevention issues in EPA regions and verifies the information in the ERNS database for use in other EPA efforts. For example, EPA regions use ARIP data as background material to assist in Chemical Safety Audits and investigations.

The EPA regions send each selected facility a package that contains a cover letter explaining the ARIP program, the criteria for completing the questionnaire, and directions for completing the ARIP questionnaire. Part A of the questionnaire contains the available EPA information about the event from the ERNS database. Part B of the questionnaire contains questions concerning the facility, substance released, and prevention practices. The facility is asked to verify and correct the ERNS information in Part A, to complete Part B of the questionnaire, and to return both parts to the regional office. The regional office then forwards a copy of the completed questionnaire to EPA headquarters.
Currently, ARIP data and findings are being used by EPA in support of the development of the regulations guidances for chemical accident prevention as mandated by section 112(r) of the amended Clean Air Act.

(Please note: This is NOT an emergency number.)
or visit the CEPPO Home Page on the World Wide Web at:
http://www.epa.gov/swercepp/

For more information, contact the Emergency Planning and Community Right-to-Know Information Hotline at (800) 424-9346, Monday through Friday, 9:00 am to 6:00 pm, Eastern Time,

DEVELOPMENT AND STATUS OF ARIP

EPA conducted a pilot test of the ARIP survey in early 1987 and instituted the program nation-wide later that year. The facility selection was based on casualty, quantity of material, type of chemical, and frequency of releases. During late fall of 1988, EPA refined and expanded the survey questions to emphasize prevention concepts, and the selection criteria were modified to target facilities better.

In July 1991, changes in the information collection effort were instituted to streamline the data-gathering process and verify accidental release information in the ERNS database. In July 1993, the criteria for selecting incidents was changed from a quantity of material released to off-site impact and environmental damages to focus the survey on more significant accidents.

Since September 30, 1997, ARIP has been scaled back to collect information on only up to nine incidents per year. (This is the number permitted without OMB approval under the Paper Work Reduction Act.) Although the size of the ARIP database is not growing at the rate it has in the past, it remains as a valuable tool for gaining insight on the kinds of accidents that are taking place

APPENDIX C

HAZARDOUS MATERIALS TO BE USED AND STORED ON-SITE AT THE HIGH DESERT POWER PROJECT

Chemical	Application	Storage Location	Storage Quantity (gallons)	
			Average	Maximum
Sulfuric Acid 93%[1]	pH control of cooling tower water and feed water	Water treatment plant area	5,000 300	10,000 500
		Cooling tower area	55	300
Sodium Hydroxide 50%[2]	pH control Regeneration and water neutralization	Water treatment area	500	500
Volatile oxygen scavenger 30%	Chemical removal of dissolved oxygen	Water treatment area	250	500
Neutralizing amine 20%	Chemical removal of dissolved carbon	Water treatment area	250	500
Phosphate 20%	Removal of dissolved hardness ions (scale deposit control)	Water treatment area	250	500
	Corrosion and scale inhibitor	Water treatment cooling tower area	250	500
Scale control (polymer)	Prevention of hardness forming scales	Water treatment cooling tower area	55	110
Polymeric dispersant	Deposit control and dispersion of suspended mater	Water treatment cooling tower area	250	1,000
Settling aid (polymer)	Suspended mater removal for water clarity	Water treatment cooling tower area	500	1,000
Biocide	Microbiological control to reduce biological growth	Water treatment cooling tower area	250	500
Primary coagulant (polymer)	Suspended mater removal for water clarity	Raw water treatment clarifier area	1,000	5,000
Coagulant aid (polymer)	Suspended mater removal for water clarity	Raw water treatment clarifier area	500	1,000
Settling aid (polymer)	Suspended mater removal for water clarity	Raw water treatment clarifier area	500	1,000
		Cooling tower area	500	1,000
Drainage aid (polymer)	Suspended mater removal for water clarity	Raw water treatment clarifier area	500	1,000
Sodium Hypochlorite 12% to 15% solution	Primary biological control to reduce organic growth	Raw water treatment clarifier area	500	1,000

Chemical	Application	Storage Location	Storage Quantity (gallons)	
			Average	Maximum
Soda ash	Water Softening	Cooling tower blowdown treatment clarifier	1200	2,000
Hydrated lime	Water Softening	Cooling tower blowdown treatment clarifier	1200	2,000
Sodium bisulfite	De chlorinator chlorine residual removal	Water treatment cooling tower area	100	300
Natural gas	Fuel for power plant	Piped into plant on as-needed basis	NA	NA
Aqueous ammonia (25% solution)[1]	Air pollution control system (emission control) to control nitrogen oxides	SCR system	75	100,000[3]
Hydraulic fluid	Equipment	Throughout plant	Initial fill	Initial fill
Insulating oil (heat transfer)	Electric equipment	--	Initial fill	Initial fill
Lubricating oil	Rotating equipment	Throughout plant	Initial fill (<5 gpd)	Initial fill
Battery acid	Batteries	--	Initial fill	Initial fill
Carbon dioxide	Fire protection, generator purging	--	8,000 lbs Initial fill	--
Hydrogen	Generator cooling	--	Initial fill	--

1 California acutely hazardous material
2 Material would be transported to the site using 5,000 to 6,000 gallon tanker trucks.
3 Material would be transported to the site using 8,000 gallon tanker trucks.

Source: HDPP 1997b, AFC Tables 5.8-4 and 5.8-5

WASTE MANAGEMENT

Testimony of Ellen Townsend-Smith

INTRODUCTION

This section presents staff's evaluation of potential impacts from the storage and disposal of non-hazardous and hazardous waste material from the construction and operation of the proposed High Desert Power Project (HDPP). The analysis assess whether the applicant's proposed waste management plans adequately reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and non-hazardous wastes, and presents conclusions about the compliance of the proposed project with applicable laws, ordinances, regulations and standards (LORS).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

- The Resource Conservation and Recovery Act (RCRA) sets forth standards for the management of hazardous wastes from the time of generation to the point of ultimate treatment or disposal (42 U.S.C. э 6901 et seq.). The provisions of RCRA may be administered in each state by the U. S. Environmental Protection Agency (EPA). However, the law also allows EPA to delegate the administration of the RCRA program to the various states when a state program is shown to meet federal requirements. When a state receives final EPA authorization of its program, its regulations have the force and effect of federal law. California received final authorization of its program on August 1, 1992.

Under the provisions of RCRA, EPA has promulgated regulations identifying hazardous wastes subject to the management standards either by listing them or describing characteristics that qualify the wastes as hazardous. In addition, generators of hazardous waste must comply with requirements regarding:

- recordkeeping practices that identify quantities of hazardous wastes generated and their disposition,
- labeling practices and use of appropriate containers,
- use of a manifest system for transportation, and
- submission of periodic reports to the EPA or authorized state agency.

RCRA also establishes requirements applicable to hazardous waste transporters, including record keeping, compliance with the manifest system, obtaining EPA identification numbers, and transporting only to permitted facilities.

Amendments to RCRA passed in 1984 broadened regulatory control and banned land disposal of untreated hazardous wastes.

- Title 40, Code of Federal Regulations, section 260 et seq. contains regulations promulgated by the U.S. EPA to carry out the requirements of the RCRA as described above. The regulations describe characteristics of hazardous waste in terms of ignitability, corrosivity, reactivity and toxicity, and list specific types of wastes.

STATE

- California Health and Safety Code section 25100 et seq. (Hazardous Waste Control Act of 1972, as amended.) creates the framework under which hazardous wastes are managed in California. It mandates the Department of Toxic Substances Control (DTSC) 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. Additionally, transporters of hazardous wastes must hold valid registrations with the Cal EPA DTSC Transportation unit.
-
- California Code of Regulations, title 22, section 66001 et seq., adopted by DTSC, sets forth the State's minimum standards for the management of hazardous and extremely hazardous wastes. California Code of Regulations, title 22, section 66262.10 et seq., establishes requirements for generators of hazardous wastes. Under these sections, waste generators must determine if their wastes are hazardous according to either specified characteristics or lists of wastes. As in the Federal program, hazardous waste generators must obtain EPA identification numbers, prepare manifests before transporting the waste off-site, and use only permitted treatment, storage, and disposal facilities. Additionally, hazardous wastewater must be handled by registered hazardous waste transporters. Generator requirements for record keeping, reporting, packaging, and labeling are also established.

LOCAL

- Pursuant to Senate Bill 1082 (Stats. 1993, ch. 418), the Secretary for Environmental Protection established requirements under which every county must apply to the Secretary for approval of a unified hazardous waste and hazardous materials management regulatory program. (Health and Safety Code ϶϶ 25404 and 25404.6)

There are three Certified Unified Program Agencies (CUPA) in San Bernardino County that consolidate, coordinate, and make consistent the administrative requirements, permits, inspection activities, enforcement activities, and hazardous waste and hazardous materials fees (Koon 1998). They include San Bernardino County, San Bernardino County Environmental Health Department, Hesperia City Fire Department, and the Victorville City Fire Department. Victorville and Hesperia are responsible for all activities in their cities and report directly to EPA. The San Bernardino Environmental Health Department is the CUPA for the rest of the county. The appllicant will obtain a hazardous waste generator permit from the Victorville City Fire Department. Refer to Waste-2.

SETTING

SITE AND VICINITY DESCRIPTION

The Phase II ESA was conducted to confirm which of the areas are contaminated, and the level of contamination. The AFB site was divided into three operable units (OU). An operable unit is a federal administration tool used by site managers at CERCLA sites to manage their sites.

The HDPP site, which is located on the site known as Fire Training (FT)-20, is within OU3. Waste oils were burned on FT-20 for training exercises. A Record of Decision (ROD) was written for the FT-20 soils, which is a final action decision involving the USEPA, Cal EPA, the United States Air Force (USAF), Lahontan Regional Water Quality Control Board (RWQCB) and the DTSC (HDPP 1997b page 5.8-8). The ROD dated October 1998 determined that no further cleanup action is needed for the soil at the FT-20 site (Cass 1998).

Since there is groundwater contamination at the OU3 site (refer to the HDPP Soil and Water Preliminary Site Assessment for further discussion) the ROD, which has not yet been issued, may require further actions to remediate that problem. Although FT-20 groundwater is located in OU3 the administrative designation for remedial action will be determined under actions taken in OU2, on which the ROD will actually be issued.

IMPACTS

CONSTRUCTION

Constructing the proposed project will generate various non-hazardous and hazardous wastes under normal conditions. Waste Management Table 1 describes the waste streams, classification, amounts and management methods to be used by HDPP.

OPERATION

During operation of the proposed project, hazardous and non-hazardous waste will be generated. Waste Management Table 2 describes the waste streams, classification, amounts and management methods to be used by HDPP during operation.

WASTE MANAGEMENT Table 1
Construction Waste Streams and Management Methods

Summary of Construction Waste Streams and Management Methods			
Waste Stream	Classification	Amount	Off-site Treatment
Scrap wood, steel, glass, plastic, paper	Non-hazardous	40 yd^3/ wk	Landfill
Empty hazardous containers	Hazardous	1 yd^3/wk	Hazardous waste disposal facility
Solvents, used oil, paint, adhesives, oily rags	Hazardous	165 gallons	Hazardous waste disposal facility or recycle
HRSG cleaning waste (chelate type solution)	Hazardous	60, 000 gallons	Hazardous waste disposal or recycle
Spent batteries	Hazardous	20 in 2 years	Recycle
Sanitary waste (chemical toilets)	Non-hazardous	200 gallons/day	Sanitary water treatment plant

Source: HDPP 1998b, Data Response 61.

WASTE MANAGEMENT Table 2
Operating Waste Streams and Management Methods

Summary of Operation Waste Streams and Management Methods			
Waste Stream	Classification	Amount	Off-Site Treatment
Used hydraulic fluid, oils, grease, oily filters	Hazardous	<5 gallons/day	Recycle
Spent batteries	Hazardous	20 every 2 years	Recycle
Spent SCR catalyst (heavy metals)	Hazardous	20,000 ft^3 (once every 3 to 5 yr.)	Recycle
Spent demineralizer resin	Non-hazardous	10 ft^3 (Once every 3 yr.)	Recycle
Anthracite and sand, filter, media	Non-hazardous	100 ft^3 (once every 3 yrs)	Recycle
Cooling tower basin sludge	Non-hazardous	2 tons/yr.	Hazardous waste disposal facility
Effluent from oily water separation system	Hazardous	3000 gal/yr.	Hazardous waste disposal facility
Spent softener resin	Non-hazardous	100 ft^3 (Once every 3 yrs.)	Recycle
oily rags, oil absorbent	Hazardous	55 gallons/month	Hazardous waste disposal facility
Crystallizer solid material	Non-hazardous or hazardous waste disposal facility	5.4 tons/day	Hazardous waste disposal facility
Sanitary waste water	Non-hazardous	1400 gallons/day	Sewage treatment plan
Clarifier blowdown sludge	Non-hazardous	2.5 tons/day	Non-hazardous disposal facility
CTG used air filters	Non-hazardous	2100 filters (once every 5 yrs)	Recycle

Source: HDPP 1998b, Data Response 61.

Impact on Existing Waste Disposal Facilities

Non-Hazardous Waste

Non-hazardous waste from the project that is not being recycled will ultimately be transported to the landfill, which has available capacity, the least expensive tipping fee, and the lowest cost of transportation. In the AFC, the applicant listed the Victorville Class III Landfill (HDPP 1997a, AFC page 5.8-23) as the primary disposal site. The landfill is operated by NORCAL for the county of San Bernardino. The permitted capacity is 660 tons per day and has a remaining life through 1999 (Gallagher 1998). The Integrated Waste Management Board approved the landfill's solid waste facility permit application, which will increase the permitted capacity to 1,600 tons per day and extend the remaining life of the facility to the year 2005. The decision on the permit was issued August 1998 (Gallagher 1998a). Although the applicant has not proposed it, the Barstow Landfill would also be available for non-hazardous waste disposal. The permitted capacity is 400 tons per day, with an expected remaining life until 2007 (Gallagher 1998).

Hazardous Waste

Much of the hazardous waste generated during facility construction and operation will be recycled, such as used oil and spent catalysts. Even without recycling, the generation of hazardous waste from this facility would not significantly impact the capacity of any of the Class I landfills in California. Therefore, this project will have an inconsequential effect on either the daily capacity or remaining life of the Class I landfill.

When recycling is not a practical alternative, the applicant can use the Barstow or the Victorville Landfills for Class III or non-hazardous waste (HDPP 1997a, AFC 5.8-6), and the Buttonwillow Class I Landfill for hazardous waste disposal (HDPP 1997a, AFC 5.8-23).

Three Class I landfills in California are permitted to accept hazardous waste:

- Chemical Waste Management's Kettleman Hills facility (Kings County). The facility has approximately eight million tons of remaining capacity, which is operational, and an additional four million tons of capacity, which has been, permitted but not yet constructed (Yarborough 1998). The expected remaining life is 48 years.

- Laidlaw Environmental Service's Lokern facility in Buttonwillow (Kern County). Remaining capacity is approximately 17 million tons, with a remaining lifetime of about 30 years (Nielson 1998).

- Laidlaw Environmental Service's facility in Westmoreland (Imperial County). The estimated remaining capacity is four million tons, with a remaining life expectancy of about 50 years (Yadvish 1998).

HDPP's process wastewater stream consists of blowdown from the cooling tower, wash water, safety showers and neutralizing regeneration wastewaters. The process wastewater stream contains dissolved minerals and leftover water treatment chemicals. The naturally occurring minerals in the source water at detectable levels or higher are cadmium, lead, mercury, arsenic and selenium. The process wastewater is passed through various processes, including the crystallizer where solid waste is separated out prior to disposal. The effluent water from the wastewater treatment process would be reclaimed and reused at the facility. The crystallizer will produce 5.4 tons of solid waste that will be dumped into a hopper for feed into a discharge container for truck transport to an off-site waste disposal facility (HDPP 1997b, AFC page 5.8-20).

The California Unions for Reliable Energy (CURE) suggested that HDPP obtain a DTSC hazardous waste treatment permit, because the influent wastewater going into the crystallizer would exceed state and federal hazardous waste thresholds (CURE 1998d). However, the HDPP wastewater treatment system is designed to be a zero-discharge water reclamation process. The effluent water from the wastewater treatment process will be reclaimed and reused at the facility. The wastewater treatment system will consist of a brine concentrator, and a Calandria vapor compression or a forced circulation crystallizer. This was discussed at an August 12, 1998 tele-conference with Energy Commission staff, DTSC, CURE, and HDPP's staff and consultants.

Staff, CURE and HDPP provided DTSC with the information it needed to determine whether a hazardous waste treatment permit would be required for the wastewater treatment system. DTSC, Energy Commission staff, and HDPP also discussed the wastewater treatment system, during the August 12, 1998 workshop/conference call. DTSC concluded that a permit exemption under California Hazardous Waste Control Law, Chapter 6.5, Division 20 of Health and Safety Code section 25143.2(c)(2) would apply if the following conditions were met.

4. The wastewater must be recycled at the same facility at which it was generated.

5. The wastewater must be recycled within 90 days of its generation.

6. The wastewater must be managed in accordance with all applicable requirements for generators of hazardous wastes under HSC Chapter 6.5 and regulations adopted by DTSC.

Representatives of CURE raised concerns regarding whether the water reclaimed from the cooling tower blowdown would be useful, which they believe is also a requirement for an exemption. CURE was concerned about the temperature of the water being returned to the cooling tower, and whether it would provide cooling for the power plant (CURE 1998f, Data Requests 200-205). The applicant clarified that it is proposing a forced circulation crystallizer, which would include various heat exchangers that would reduce the temperature of the water returned to the cooling tower. To assure this occurs, staff is recommending Condition of Certification

WASTE-4, which requires the owner to design and install the wastewater treatment facility using a forced circulation crystallizer.

CUMULATIVE IMPACTS

Due to the availability of multiple landfills within the region, cumulative impacts from this and other projects will be insignificant for both hazardous and non-hazardous wastes.

FACILITY CLOSURE

Closure activities within the scope of waste management may include demolition and removal of all aboveground equipment and structures at the power plant. Wastes from closure activities should be managed, recycled, and disposed of according to all applicable waste-related laws, ordinances, regulations and standards in affect at the time of closure. At this time, staff does not believe that there are any major waste disposal issues related to closure of the facility.

MITIGATION

The applicant intends to implement the following mitigation measures during construction and operation of the proposed project:

- The facility will obtain an EPA hazardous waste generator identification number according to the provisions of California Code of Regulations, title 22, section 66262.12 (HDPP 1997b).

- Non-hazardous wastes will be recycled to the extent practical using a licensed contractor. The applicant will use the Directory of Industrial Recyclers and the DTSC Listing of Hazardous Wastes Available for Recycling to identify and select specific recycling methods. The applicant will also use the California Integrated Waste Management Board CalMax program. The CalMax program identifies a recycler’s classification for the minimization of construction waste stream. (HDPP 1997a, AFC page 5.8-23).

COMPLIANCE WITH LORS

Energy Commission staff concludes that HDPP will be able to comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during project construction and operation. Because hazardous wastes will be produced during project construction and operation, HDPP must acquire and maintain an EPA identification number as a hazardous waste generator. Accordingly, HDPP will be required to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, and keep detailed records. HDPP may also be required, pursuant to California Code of Regulations, title 22, section 67100.1 et seq., to undertake a hazardous waste source reduction and management review, depending on the amounts of hazardous waste ultimately generated. The applicant will obtain a hazardous waste generator permit from the Kern County Environmental Health Department.

CONCLUSION AND RECOMMENDATIONS

CONCLUSIONS

Staff concludes that the wastes generated during construction and operation of the proposed project will not result in any significant adverse impacts if the applicant implements the mitigation measures proposed above and complies with the Conditions of Certification proposed below.

RECOMMENDATIONS

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 project's hazardous and non-hazardous wastes will not cause any significant impacts, and that the proposed procedures for management of hazardous and non-hazardous wastes will be reviewed by the appropriate agencies before they are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 Prior to the start of construction, the project owner shall prepare and submit to the CPM a finalized Waste Management Plan for all wastes generated during construction and operation of the project. The plan shall contain at least the following:

A. A description of all waste streams including their origin, estimates of amounts, frequency of generation, and hazardous or non-hazardous classification and reasons therefore.

B. Methods of managing each waste, including treatment methods and treatment contractors, methods of testing wastes to assure correct classification, modes of transportation, disposal requirements and sites, and recycling and waste minimization plans.

Verification: At least 90 days prior to start of rough grading; the project owner shall submit a Waste Management Plan to the CPM for review and approval. Within 15 days of receipt of the plan, the CPM will indicate approval/disapproval, changes or additional information needed. In the Annual Compliance Report, the project owner shall summarize planned versus actual waste management activities.

NOTE: At the project owner's discretion, management plans for construction and operation wastes may be prepared separately. If so, the operational waste plan shall be submitted at least 60 days prior to the start of operation.

1

WASTE-2 The project owner shall obtain a hazardous waste generator identification number from the Department of Toxic Substances Control. The project owner shall also obtain a hazardous waste generator permit from the City of Victorville's Fire Department, which is a Certified Unified Program Agency (CUPA) agency.

Verification: At least 30 days prior to start of rough grading, the project owner shall submit to the CPM, copies of the hazardous waste generator identification number and of the Victorville City Fire Department hazardous waste generator permit.

WASTE-3 The project operator shall notify the CPM of any waste management-related known enforcement action that has either been taken or is known to be pending against it or against any waste hauler or treatment, storage, or disposal facility with which it contracts.

Verification: The project owner shall notify the CPM in writing within 10 working days of becoming aware of any such enforcement action.

WASTE-4 The project owner will design and install the process wastewater treatment facility using a Forced Circulation crystallizer as described in the application. If the project owner chooses to use any other type of crystallizer the process wastewater treatment system must be reevaluated by Department of Toxic Substances Control (DTSC).

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM a copy of a flow diagram that depicts how the process wastewater would be routed to the brine concentrator and Forced Circulation crystallizer. The diagram shall include all auxiliary equipment associated with the process wastewater treatment system.

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LAND USE

Testimony of David Flores and Kathryn M. Matthews

INTRODUCTION

This assessment of land use impacts for the High Desert Power Project (HDPP) focuses on two main issues: 1) the conformity of the project with local land use plans, ordinances and policies, and 2) the potential of the proposed project to have direct, indirect, and cumulative land use impacts which staff identifies as conflicts with existing and planned uses. In general, an electric generation project and its related facilities can be incompatible with existing or planned land uses when it creates unmitigated noise, odor, dust, public health hazard or nuisance, traffic, or visual impacts or when it restricts existing or future uses. However, the potential for impact to aeronautical navigation is addressed in the **Traffic and Transportation** section of this Preliminary Staff Assessment. Some conclusions in the land use section draw upon that work.

LAWS, ORDINANCES, REGULATIONS, STANDARDS, PLANS AND POLICIES

The AFC provides an extensive listing of many different land use planning documents and guidelines that were reviewed during preparation of the land use analysis. Staff also reviewed these documents, as well as others, and met or spoke with several local agency officials to determine which of the many documents were most directly applicable to the proposed project and in what order of jurisdiction or application.

FEDERAL

- The United States Department of the Air Force, Lease for Airfield Property on George Air Force Base, California; dated April 1994.

- The Federal Aviation Administration (FAA) requirements and restrictions on development adjacent to an airport are addressed in the Traffic and Transportation section of this Preliminary Staff Assessment.

- The United States Bureau of Land Management, California Desert Conservation Area (CDCA) Plan; dated 1980, with revisions through 1998; applies to extensive areas of land in the Mojave Desert.

- The United States Bureau of Land Management, Western Mojave Land Tenure Adjustment, Project Record of Decision (LTA): dated January 1991; applies to a parcel of land located along a portion of the northern boundary of the former George Air Force Base (now Southern California International Airport [SCIA]).

LOCAL

Although the Energy Commission has pre-emptive authority over local laws, it typically requires compliance with local laws, ordinances, regulations, standards, plans, and policies. San Bernardino County and each of its cities have developed specific requirements and guidelines for the development and use of lands within their jurisdiction. Associated with the HDPP, the power plant site and many of the proposed linear facilities are located entirely within the corporate boundaries of the City of Victorville. However, recently proposed new linear facilities to serve the HDPP site may be located along or outside of the Victorville boundaries and other local, as well as federal, agency requirements may be applicable, and are listed herein.

San Bernardino County

As shown in the Application for Certification (AFC), the northern-most portion of the route proposed for the water supply pipeline crosses through land administered by San Bernardino County, for a distance of 0.6 to 1.4 miles. Land use and zoning designations for this portion of the proposed water supply pipeline include rural residential and open space and conservation (San Bernardino County General Plan 1998). Construction of the pipeline in this corridor would normally be subject to a Conditional Use Permit (CUP) from the county. However, Title 8 of the San Bernardino County Code, Chapter 4 Additional Uses, Section 84.0405: Alternate Review Procedure allows for alternative review processes such as the Energy Commission's.

In addition, the San Bernardino General Plan recognizes the need for utility rights-of-way within the County and makes the following recommendation in its Energy/Telecommunications Element: "Consolidate pipeline and transmission line corridors by requiring proposed new facilities to locate in existing corridors to the maximum feasible...(San Bernardino, 1998)."

City of Victorville

City of Victorville General Plan

The General Plan provides a comprehensive, long-term plan for the physical development of the community and lands located outside its boundary which, in the planning agency's judgement, will effect its planning effort. Zoning ordinances, subdivision ordinances, specific plans, redevelopment plans, city council, planning commission and departmental policies, as well as individual project plan proposals which implement the general plan must be consistent with its goals, policies, and standards.

The planning time horizon for the City of Victorville General Plan is 2015. Four elements of the general plan are directly applicable to the proposed HDPP project. These are the Land Use Element, the Noise Element, the Safety Element, and the Southern California International Airport Community Plan Element (Victorville 1997).

Land Use Element

The land use element of a general plan outlines a city's long-range plans for development within its incorporated boundaries and sphere of influence and it is a policy document used to guide the city's land use decisions to ensure the orderly growth. This general plan element designates the general distribution, location, and extent of various land uses within the city's boundaries and sphere and it includes a statement of population density and building density for the various land use districts (Victorville 1997).

Specific goals identified in the City of Victorville=s Land Use Element of the General Plan, and specifically pertinent to the HDPP are:

GOAL 1 Policy 1.1: Industrial development that does not conflict with or adversely affect other existing or potential developments will continue to be encouraged.

Policy 1.5: The City will manage development in a manner that does not conflict with the operations of the Southern California International Airport.

Policy 1.6: Victorville will make efforts to ensure that the integrity of each land use district is maintained.

Policy 1.7: Victorville will ensure that new developments are compatible with existing developments and public infrastructure.

GOAL 3 Policy 3.1: Development will be permitted in areas where such uses are appropriate and provide for adequate roadways, infrastructure, and public services.

Noise Element

This element of the General Plan helps control unwanted sounds at the local level through land use regulations. Compliance with the noise element goals is discussed in the **Noise** section of this draft staff assessment. The element quantifies the community noise environment in terms of noise exposure contours which serve as guidelines for development outlined in the land use element. Specific components of the City of Victorville Noise Element relevant to the proposed project are:

GOAL 1 Policy 1.2: The City will continue implementation of its land use policies and recommendations to ensure that there is no conflict or inconsistency between the operation of the Southern California International Airport and future land uses within the City of Victorville. (For more discussion see the Southern California International Airport Community Plan Element.)

Safety Element

The Safety Element of the General Plan is concerned with identifying and, whenever possible, reducing the impact of natural and man-made hazards which may threaten the health, safety, and property of the residents living and working in the Victorville Planning Area. It emphasizes hazards reduction and accident prevention for man-made hazards (Victorville 1997). Specific elements of the City of Victorville=s Safety Element which are relevant to the proposed project are:

GOAL 1 Policy 1.5: The City will continue to apply appropriate safety regulations to land use and development decisions in those portions of the City that are affected by the aviation operations of Southern California International Airport (SCIA).

GOAL 2 Policy 2.2: The City will apply appropriate regulations to land use and development decisions in those portions of the City that are affected by the aviation operations of SCIA.

GOAL 3 Policy 3.1: The City will continue to co-operate with and support, where appropriate, state, county, and local agencies responsible for the enforcement of health, safety, and environmental laws.

Southern California International Airport Community Plan Element

This element of the General Plan addresses the issues related to the operation of the airport. It is intended to promote the development of compatible land uses in the area influenced by airport operations and safeguard the general welfare of the inhabitants within the vicinity of the airport. Specific aspects of the City of Victorville=s element are:

GOAL 1 Policy 1.1: The City will promote the development of compatible land uses in the area affected by airport operations to ensure that there is no conflict or inconsistency between the operation of SCIA as a civilian airport and future land uses within the City and surrounding area.

GOAL 3 Policy 3.1: The City will make efforts to safeguard the general welfare of the inhabitants within the vicinity of the airport by minimizing exposure to crash hazards associated with aircraft operations.

Policy 3.2: The City will make efforts to safeguard the general welfare of the inhabitants within the vicinity of the airport by minimizing the average noise levels deemed to be excessive.

Southern California International Airport Land Use Plan

The Comprehensive Airport Land Use Plan (CALUP) was prepared pursuant to Public Utilities Code, section 21670, et seq. This type of plan is necessary because airports present unique public health and safety issues that require special land use planning efforts to ensure protection of the public welfare. The intent of this plan is to utilize land use control mechanisms such as zoning and subdivision ordinances to reduce the potential for or effects of an accident, and if an accident does occur, these mechanisms would minimize the number of fatalities on the ground.

Southern California International Airport Specific Plan

The SCIA Specific Plan applies to all lands located within the former George Air Force Base and to an area located northeast of the former base. As described in the plan itself, the specific plan bears the following relationship to other planning documents:

- It is the regulatory land use document that implements the VVEDA Activation Plan, to ensure that the goals, policies and objectives of that plan are adhered to.
- The specific plan is a land use regulatory document that must conform with an overall advisory plan, the CALUP, for developments surrounding civilian aviation facilities.
- The specific plan augments the development regulations and standards of the City of Victorville Zoning Ordinance. In the event that provisions of the specific plan are in conflict with the zoning ordinance, the specific plan is to prevail.
- The Director of Planning for the City of Victorville, or his designee, has the responsibility to interpret the provisions of the specific plan and has the duty to enforce the plan (SCIA 1998).

The proposed HDPP project site is zoned "I" (heavy industrial), per the Southern California International Airport Specific Plan (SCIA 1998). Please refer to Land Use Map, Figure 5.5-4 in the AFC for the location and boundaries of the various use designations within the Specific Plan area.

As set forth in the SCIA Specific Plan, the entire SCIA site may be sub-divided into parcels suitable for industrial or commercial uses. This can provide for separate ownership of different land uses within the Specific Plan, provided the ownership and/or subdivision does not conflict with the intent of the plan (SCIA 1998). The macro-parcels immediately adjacent to the HDPP site are identified as "ASF - Airport & Support Facility", "SCLI - Service Commercial and Limited Industrial", and "BP - Business Park". Within the macro-parcel designated "I - Industrial", the HDPP project will occupy a vacant sub-parcel of approximately 25 acres. Other sub-parcels located within the macro-parcel designated "I" and immediately adjacent to the north of the HDPP site are vacant. The SCIA Development Plan indicates that the immediately adjacent sub-parcels to the south are to be used for unspecified facilities support (SCIA 1997).

City of Victorville Municipal Code

Chapter 18.44: M-2 - Heavy Industrial District: this includes subsections pertaining to conditional uses, building site area, building height, fences, walls and hedges, electric transmission lines, off-street parking, and landscaping requirements.

City of Adelanto

In late April 1998, the applicant submitted an amendment to the AFC for a proposed new water supply well field and associated pipelines to serve the HDPP project site. The proposed well field appears to be located within the boundaries of Victorville. However, portions of the new well field and most of the associated north/south pipeline route are located on or along the roads that form the corporate boundary between the cities of Victorville and Adelanto and could therefore be affected by both cities' plans, policies, and ordinances.

SETTING

REGIONAL DESCRIPTION

The High Desert Power Project (HDPP) is proposed for construction and operation at a site in the western Mojave Desert, in the southwestern part of San Bernardino County, approximately forty miles north of the City of San Bernardino. With the cities of Hesperia, Adelanto, Victorville, and the town of Apple Valley, plus the unincorporated communities of Silver Lakes, Oro Grande, Baldy Mesa, and Pinon Hills, this portion of San Bernardino County has become increasingly urbanized. Please refer to Project Description for a regional map of the project development area.

SITE AND VICINITY DESCRIPTION

The proposed HDPP site is located within the corporate limits of the City of Victorville. Currently, as much as seventy percent of the land within the city boundaries remains undeveloped. Of the developed lands, about sixty percent is in residential use, about ten percent in commercial use and nearly fifteen percent in industrial use. Other land uses in the Victorville area include transportation, government, recreation, military facilities, and agriculture (Victorville 1997).

The project site is located within the boundaries of the former George Air Force Base. Access restrictions due to the military presence and the location of the runways shaped the pattern of land uses and development around the base boundaries. Most of the development within the City of Victorville was located to the south and east of the military facility. The City of Adelanto developed along the western and southwestern boundaries of the base.

While the base was in operation there were a wide range of land uses within its boundaries, including; military and airport-related industrial, commercial, residential, educational and religious, recreational, utilities and services. After closure, the lands within the base boundaries became the new Southern California International Airport (SCIA). The SCIA occupies approximately 5,350 acres (about 8.36 square miles). The entire SCIA property is subject to the SCIA Element of the City of Victorville General Plan for Land Use, and it is further covered by the SCIA Specific Plan. In the federal lease agreement with the Victor Valley Economic Development Authority (VVEDA), the former base property has been sub-divided into several “macro” parcels, each containing many more sub-parcels that will be available for development of airport-related uses (HDPP 1997). Please refer to Land Use Figure LU-6 in the AFC for the location of these sub-parcels within the SCIA planning boundaries.

With base closure and lack of use, some of the commercial and residential areas within the SCIA are exhibiting a considerable degree of structural deterioration. Under the redevelopment plan, base-related residential areas and housing units are scheduled to be razed and new development at SCIA will be focused on airport-related uses. Within the former base residential area are several community uses that remain active and are proposed to continue operation under the adopted redevelopment plan. The Adelanto School District continues to operate the Harold H. George School and the Sheppard School within the former base, about 1.4 miles to the south of the HDPP site. There is also a community and medical services center and a religious and community meeting center located about 1.5 miles south of the HDPP site.

The nearest occupied residences are located 1.6 miles to the northeast and to the southeast, within the Victorville sphere of influence, but just outside the city’s boundaries. Two new federal prison facilities are currently under construction on a parcel located about two miles south of the project site. These uses are consistent with the SCIA Specific Plan and the Redevelopment Plan for the Victor Valley Economic Development Authority (VVEDA) adopted by VVEDA in December 1993.

PROJECT SUMMARY PERTINENT TO LAND USE

The site proposed for the HDPP is available for lease and has been identified on the SCIA development planning map as “power generation” (SCIA 1997). The land is still owned by the federal government, but undergoing transfer to the City of Victorville.

The HDPP project facility and switchyard will be located on a 25-acre portion of a larger parcel, identified by the county tax assessor as parcel number 0468-231-01. The parcel is located near the northeast end of the existing southwest to northeast runway of the SCIA. The site was formerly used for military and airport storage. Please refer to the **Site and Vicinity Description** section of this report for a more detailed description of the project and related facilities, including conceptual drawings of the layout for the project on the proposed site.

IMPACTS

In general, an electric generation project and its related facilities can create land use impacts if they are incompatible with existing or planned land uses. Incompatibility occurs when the project causes unmitigated noise, odor, dust, a public health or safety hazard or nuisance, traffic congestion, visual impacts, or by restricting existing or future uses. Project construction activities resulting in temporary impacts to visual resources, noise levels, air quality, and traffic may affect land use in the project area. Impacts resulting from project construction would last through the construction period only, and staff does not consider construction impacts to be significant. Please refer to the various sections on **Visual Resources, Air Quality, Noise,** and **Transportation** for a discussion of impacts in those areas.

POWER PLANT

The proposed HDPP project site is designated "I" (heavy industrial), per the Southern California International Airport Specific Plan (SCIA 1998). The site is also zoned AM-2" for heavy industrial uses. Under section 18.44 of the City of Victorville's municipal code, an electric generating plant that sells energy or any by-product to a public utility and or properties off site is an allowable use in this zone, with a city-approved Conditional Use Permit (CUP). Therefore, the proposed project is consistent with the primary land use designations.

Section 18.44 of the city's municipal code sets forth various categories and requirements to be met in the CUP and the various requirements for building site area, building height, fences, walls and hedges, electric transmission lines, off-street parking, and landscaping requirements. As final consideration of these project aspects occurs under final design, Conditions of Certification are specified which ensures they will be met.

TRANSMISSION LINE

The proposed 7.2-mile route for the electric transmission line is located within the corporate boundaries of the City of Victorville (West City and Turner Heights Planning Areas) and the first 1.5 miles of the route lie within the SCIA Specific Plan area. The land use map in the AFC indicates that the transmission corridor passes through a variety of designated land uses and zones, including various densities of residential, business and professional, commercial, industrial, public, and open space. Construction of an electrical transmission line to carry greater than 100,000 volts would normally be subject to a Conditional Use permit from the City of Victorville.

There are approximately five residential areas located within one-quarter mile of the transmission line. There are no other residential structures located within the transmission corridor. A bike trail also exists along Air Base Road and connects with U.S. 395 on the west and to the National Trails Highway on the east. The transmission line will pass over the bike trail where Air Base Road and the transmission line intersect. Also, the nine-hole SCIA golf course is located approximately one mile to the west of the transmission line. There are no other recreational or scenic structures located within the transmission line corridor. As indicated earlier in this report, the Federal Bureau of Prisons currently is constructing a maximum-security prison to the west of the transmission line and on the northern side of Rancho Road. Construction of the prison should be completed prior to construction of the power plant. There are no other industrial or commercial structures located within one-quarter mile of the proposed transmission line.

Current development trends within the City of Victorville include city-wide infill, and residential and commercial development primarily in the southwest and western portions of the city, which is south and west (outside of) the transmission corridor (AFC 5.5-26). No additional development trends or local planning efforts have been identified within one-quarter mile of the transmission line. The City of Victorville General Plan, which addresses the transmission line and its corridor was recently updated. No additional specific, community or special topic plan updates are excepted within the revisions. There are no specialized ordinances which have been adopted pertaining to the transmission line corridor.

No significant land use or zoning related impacts associated with the project's transmission line are anticipated, as the project is consistent with the City of Victorville's General Plan and Zoning regulations.

NATURAL GAS PIPELINE

The AFC indicates that the largest diameter pipeline needed to supply natural gas to the HDPP would be 16 inches. The ground surface along the 2.75-mile gas pipeline route is described as considerably disturbed and much of the alignment is paved or otherwise covered by development. A portion of the proposed corridor is crossed by existing high voltage transmission facilities and access roads. The route shown in the AFC appears to follow the streets that form the boundary between the cities of Victorville and Adelanto, but the final center lines for this gas pipeline route have not yet been identified (HDPP 1997).

The designated land uses and zoning along the AFC gas pipeline route include various densities of rural residential, family residential, business, commercial, industrial, desert living and open space. Construction of the HDPP natural gas supply pipeline along the proposed route would cause some degree of short-term disruption, but once completed, would be compatible with local general plan and zoning requirements for development of utility services and infrastructure.

SECOND NATURAL GAS PIPELINE

On June 15, 1998, the applicant amended its application to include an alternate natural gas pipeline. The 30-inch gas pipeline would extend approximately 32 miles with a depth of 3-1/2 feet from the HDPP site north and tap into the Kern River and Pacific Gas and Electric pipelines approximately one quarter mile south of State Highway Route 58 and one mile east of the intersection of highways 395 and 58 (Kramer Junction). The new pipeline route crosses through lands under the jurisdiction of the City of Adelanto, San Bernardino County, and the U.S. Bureau of Land Management.

The BLM manages lands for mixed uses within this region through the California Desert Conservation Area Plan (CDCA). Since the completion of the plan in 1980, a number of amendments have been prepared which altered certain management objectives and land uses. Additionally, the BLM has defined a designated utility corridor. The proposed alternate pipeline alignment is located within this designated corridor and would therefore be consistent with BLM land use planning.

In addition, land use designations along the pipeline route include: commercial, single family residential, manufacturing/industrial, desert living, and open space designations in the City of Adelanto, and the County's jurisdiction. The pipeline will be compatible with each of the land use designations pertaining to lands on which it would be located, and would not conflict with current zoning, land uses, or anticipated land use planning. Scattered residences located adjacent to the proposed pipeline alignment could potentially experience temporary construction noise and visual impacts, but staff considers these impacts to be short-term and less than significant.

WATER SUPPLY PIPELINES

The AFC described the largest diameter of pipeline needed to supply water to the HDPP, as 24 inches. The AFC indicated the pipeline would be about 2.5 miles long, running from the point of inter-connection with the State Water Project aqueduct southward to the HDPP site. The designated land uses and zoning along the AFC pipeline route includes low density or rural residential, industrial, public, and open space (HDPP 1997b). Construction of the HDPP water supply pipeline along the proposed route would cause some degree of short-term disruption but once completed, would be compatible with local general plan and zoning requirements for development of utility services and infrastructure.

After the AFC was filed, the applicant indicated it was rescinding use of treated effluent from the regional wastewater treatment plant and was proposing to develop new water supply wells and a new pipeline. In late April 1998, the applicant provided maps indicating the location of six new water supply wells and the proposed routes for pipelines to carry the water to the HDPP site. The new pipeline is also proposed to tap in to an existing 16-inch waterline owned by the Victor Valley Water District (VVWD) so additional water could be supplied from the agency's existing well system. As proposed, the pipelines from the proposed new wells would run under or alongside existing paved streets that also serve as the corporate boundary line between the cities of Victorville and Adelanto. Anticipated land use impacts will likely be short-term during construction. This includes nuisance impacts such as noise, dust, and redirection of traffic. In addition, the pipeline will encroach within the jurisdictions of a number of local regulatory agencies. Balancing the various requirements will require close coordination so that the project complies with all LORS.

UTILITY CONNECTIONS

As described in the AFC, the project's proposed potable water connection line will be about six inches in diameter and will run for about 500 feet along local streets within the SCIA Specific Plan area. Information provided in the AFC indicates that the pipeline will be buried in a trench that is approximately 2.5 feet wide (HDPP 1997). Since the potable water line lies within the corridors proposed for the gas pipeline and the electric transmission line, please refer to these discussions for further information on land use and zoning designations.

As described in the AFC, the proposed HDPP sanitary sewer line will be connected to the existing sewer facility located just to the east of the project site (HDPP

1997b). Since the existing sewer connection is in the same area as the transmission line and gas pipeline corridors, please refer to these discussions for further information on land use and zoning designations.

Project linear corridors (water, gas, and wastewater pipelines) will be constructed underground and/or along existing roadway rights-of-way. Staff's conclusion is that no significant land use or zoning impacts will result from the operation of the project's underground linear facilities.

CUMULATIVE IMPACTS

A cumulative impact on the environment results from the incremental impact of a project when added to other past, present, and reasonably foreseeable future projects.

The City of Victorville has indicated that nearly a dozen tentative maps for single family residential subdivisions were filed in 1997. Plans for multi-family residential developments, as well as commercial and industrial projects (federal prison, wastewater treatment plant) were also filed in 1997. These and other potential future land use developments are generally addressed in the goals and policies in the city's general plan. The plan and policies are aimed at providing a balance of land uses in the city, ensuring orderly growth, and sustaining economic development and community viability. The HDPP and others in the plan and map review process are considered to be part of this expected growth process.

Based on an analysis of the HDPP, in conjunction with potential development within the foreseeable future, staff does not expect the project to contribute to a cumulative impact on land use. This project is consistent with the City of Victorville Comprehensive General Plan, the Southern California International Airport (SCIA) Community Plan Element, the SCIA Specific Plan, the City of Victorville Zoning Ordinances and Municipal Code, the US Air Force lease, the Victor Valley Development Authority's Redevelopment Plan, and the Comprehensive Airport Land Use Plan (CALUP).

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.

The HDPP power plant is expected to be in operation in excess of thirty years. The applicant will prepare a Decommissioning Plan for submittal to the Energy Commission for review and approval, at least twelve months prior to the proposed decommissioning. At the time of closure, all then-applicable LORS will be identified and the closure plan will address how these LORS will be complied with.

There are at least two other circumstances under which a facility closure can occur; unexpected temporary closure and abandonment. Provisions must be made to address these specific situations. From the perspective of land use issues, in either instance, facility closure would have to comply with all applicable policies contained in the City of Victorville Municipal Code and Zoning Ordinance, specifically, Chapter 18.06, Section 18.06.080. Under this section, any building or structures found to be a public nuisance or unlawful, the city attorney can immediately commence legal action for removal of buildings and structures. Under this section, the city attorney can interpret these provisions. In addition, the Federal Uniform Building Codes establish requirements for demolition permits and securing of the site.

MITIGATION

Based upon a review of the project, staff recommends the following mitigation measures, which are applicable with the City of Victorville Municipal Code and Zoning Ordinances:

- City of Victorville Municipal Code Section 18-44 relating to required landscaping can be mitigated by applicant preparing a landscaping plan that complies with Section 18.60.140.

- City of Victorville Municipal Code Section 18-60 relating to parking space provisions. Compliance may be achieved by the Applicant preparing a parking provision plan that complies with Section 18.60.070.

CONCLUSIONS AND RECOMMENDATION

CONCLUSIONS

The power plant as proposed at this location:

- will be consistent with all existing laws, ordinances, regulations, standards, plans, and policies;

- will introduce a use that is consistent with the zoning assigned to the parcel comprising the site;

- will provide an approved use that is consistent with existing laws, ordinances, regulations, and standards and compatible with land uses in the immediate vicinity;

- will be compatible with the proposed George Air Force Reuse Plan;

Linear Facilities:

The proposed natural gas, waste water, water, and electric transmission lines:

- will be consistent with all existing laws, ordinances, regulations, standards, plans and policies;

- will be compatible with existing and approved land uses in the vicinity;
- will be compatible with land use plans within the City of Victorville and the SCIA Specific Plans .

RECOMMENDATIONS

If the Energy Commission certifies the project, staff recommends that it adopt the following proposed condition of certification.

CONDITIONS OF CERTIFICATION

LAND USE-1 The project owner shall insure compliance with Section 18.44 of the City of Victorville's municipal code which sets forth various categories and requirements to be met in the Conditional Use Permit and the various requirements for building site area, building height, fences, walls and hedges, electric transmission lines, off-street parking, and landscaping requirements.

Protocol: Protocol: The applicant shall submit the proposed design criteria to the CPM and the City of Victorville for review and comment before implementing the work.

Verification: The project owner shall provide to the CPM, in a Monthly Compliance Report, evidence of Compliance with Section 18.44 of the city's municipal code as described above.

REFERENCES

HDPP (High Desert Power Project, LLC) 1997a-Application for Certification, High Desert Power Project (97-AFC-1). Submitted to the California Energy Commission, June 30, 1997.

HDPP (High Desert Power Project, LLC) 1977b-Revised Application for Certification, High Desert Power Project. Submitted to the California Energy Commission, November 17, 1997.

High Desert - Analysis of Proposed Natural Gas Pipeline, 1998

City of Adelanto - City of Adelanto General Plan Update, 1994

City of Victorville - City of Victorville General Plan, 1994

City of Victorville - City of Victorville Zoning Ordinances, 1997

County of San Bernardino - San Bernardino County General Plan, 1991

Southern California International Airport Specific Plan, 1996

Southern California International Airport - Comprehensive Airport Land Use Plan, 1996

Victor Valley Economic Development Authority Redevelopment Plan, 1993

TRAFFIC AND TRANSPORTATION

Testimony of Keith Golden and Gregory M. Newhouse

INTRODUCTION

The Traffic and Transportation Section of the Staff Assessment addresses the extent to which the project may impact the transportation system within the vicinity of its proposed location. There are a number of roadways addressed in this analysis. The influx of large numbers of construction workers can, over the course of the construction phase, increase roadway congestion and also affect traffic flow. Some of the undergrounded linear facilities, such as gas, water, and sewer lines, proposed as part of this project, are located within street right-of-ways requiring trenching and other activities disruptive to traffic flows. In addition, the transportation of large pieces of equipment can require rail use and the alteration of traffic flows and roadway use. Finally due to its proximity to the airport, the analysis will assess the extent of direct or indirect impacts to air operations and navigation.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

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

- Title 49, Code of Federal Regulations, Sections 171-177, 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 350-399, 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, Chapter 1, Subchapter E, includes regulations for the analysis of objects that affect navigable airspace.

- Title 14, Code of Federal Regulations, Sections 77.13(2)(i) - An applicant shall notify the Administrator of any construction of structures with a height greater than an imaginary surface extending outward and upward at a slope of 100 to 1 from the nearest point of the nearest runway of an airport with at least one runway more than 3200 feet in length.

- Title 14, Code of Federal Regulations, Sections 77.17 - This section requires that an applicant submit a notification (a Form 7460-1) to the Federal Aviation Administration (FAA). The Form 7460-1 includes the information requirements about the project for the FAA to reach a conclusion about air navigation impacts.

- Title 14, Code of Federal Regulations, Sections 77.21, 77.23 & 77.25 - These sections cover the obstruction standards which the FAA uses to determine whether an air navigation conflict exists.

- Title 14, Code of Federal Regulations, Sections 77.31, 77.33 and 77.:5 require the FAA to perform an analysis, solicit comments, and convene to resolve issues. Under Section 77.35 the FAA issues a determination as to whether the proposed construction would be a hazard to air navigation.

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. In addition the California Health and Safety Code addresses the transportation of hazardous materials. Specifically, these codes include:

- California Vehicle Code, section 353 defines hazardous materials. California Vehicle Code, sections 31303-31309, regulates the highway transportation of hazardous materials, the routes used, and restrictions thereon.

- California Vehicle Code, sections 31600-31620, regulates the transportation of explosive materials.

- California Vehicle Code, sections 32000-32053, regulates the licensing of carriers of hazardous materials and includes noticing requirements.

- California Vehicle Code, sections 32100-32109, establishes special requirements for the transportation of inhalation hazards and poisonous gases.

- California Vehicle Code, sections 34000-34121, establishes 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, regulates the safe operation of vehicles, including those which are used for the transportation of hazardous materials.

- California Health and Safety Code, sections 25160 et seq., addresses the safe transport of hazardous materials.

- California Vehicle Code, sections 2500-2505 authorizes 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 660-72, and California Vehicle Code sections 35780 et seq., require permits for the transportation of oversized loads on county roads.

- California Street and Highways Code, sections 660, 670, 1450, 1460 et seq., 1470, and 1480 regulates right-of-way encroachment and the granting of permits for encroachments on state and county roads.

- California Public Utilities Code, Section 21655 et. seq. addresses the state's role in the permitting of projects in close proximity to airports within California.

- Section 21659(a) requires that the Department of Transportation (Caltrans) Aeronautics Program perform an analysis and issue a permit, if possible, to the applicant if the FAA finds a hazard to air navigation from the project in their analysis. The project cannot be constructed unless Caltrans Aeronautics issues their permit and finds that the construction of the project does not constitute a hazard to air navigation.

- Section 21659(b) exempts the permit requirements above [Section 21659(a)] if the FAA has determined that the construction will not constitute a hazard to air navigation or create an unsafe condition for air navigation (per the requirements of Title 14, Code of Federal Regulations, Section 77.35).

- Section 21660 allows for Caltrans to refuse a permit to construct if it finds that construction of the project would constitute a hazard to air navigation or create an unsafe condition for air navigation.

LOCAL

City of Victorville

Southern California International Airport Specific Plan

None. Land use compatibility issues are addressed in the Land Use section of this Preliminary Staff Assessment.

Victorville General Plan

Circulation Element: adopted in October 1988, establishes objectives, policies, and implementation programs through which a local community manages its transportation system. It includes the following policies:

- Victorville-1:Policy 1.6: "Preserve roadway capacity to minimize the number of travel lanes needed to provide acceptable levels of service.";

- Victorville-2: Policy 3.3: "Link funding and construction of circulation improvements to development, and regulate development by intensity, type and location to ensure the provision of Level of Service (LOS) 'C' operation.";

- Victorville-5: Policy 3.9: "Provide for and encourage the use of alternatives to single occupancy through the following techniques...".

City of Adelanto

The Circulation Element of the General Plan, policy - Rights-of-Way H-1 establishes all major rights-of-way according to the requirements of the buildout projections of the General Plan.

County of San Bernardino

The Circulation Element of the General Plan provides for the approval of development proposals only when they are consistent with the County's objective of maintaining a Level of Service (LOS) C on highways and intersections affected by the development.

San Bernardino Associated Governments

Congestion Management Program: Proposition 111, enacted in 1990, mandated that each county with an urbanized area of greater than 50,000 people, prepare, adopt, and implement a Congestion Management Program (CMP) to facilitate the movement of people and goods on roadways designated as being of regional significance. The Program, adopted in 1992, and revised in 1993 and 1995, has designated State Highway 18, Interstate 15, and U.S. Highway 395 as roadways of regional significance. Where a segment or intersection level of service (LOS) on any of the designated roadways falls below the established standard, a plan to address and correct identified deficiencies, is to be adopted and implemented by the Congestion Management Agency (CMA). The San Bernardino Associated Governments (SANBAG) has been designated as the CMA.

- SANBAG-1: Policy 2.3.1: "Establish level of service E or the current level, whichever is farthest from LOS A, as the LOS standard for intersections or segments on the CMP system of roadways.

  If the current LOS is F, then a 10 percent or more degradation in the quantitative measure used to determine the LOS (such as delay, V/C ratio, or travel speed) will comprise a deficiency, which must be addressed by a deficiency plan."

- SANBAG-2: Policy 4.1.1: “Identify and quantify the direct and cumulative impacts of proposed land use decisions on the regional transportation system.”;

- SANBAG-3: Policy 4.1.3: “Develop and implement a program which apportions fairly the responsibility for mitigation of deficiencies on the CMP system among local jurisdictions and State agencies.”;

- SANBAG-4: Policy 4.4.1: “Identify the transportation impacts of significant land use changes, regardless of jurisdictional location or political boundaries.”;

- SANBAG-5: Policy 5.1.2: “Facilitate and provide incentives for non-auto travel.”;

- SANBAG-6: Policy 5.2.1: “Provide incentives for reducing vehicle trips.”.

SETTING

The proposed site is a 25 acre portion in the northeast corner of the Southern California International Airport (SCIA) facility in Victorville, California. Previously, the land was a part of George Air Force Base, closed by the Department of Defense and leased to the Victor Valley Economic Development Agency on May 12, 1994. Victorville is located within the High Desert Subregion of California approximately 41 miles north of San Bernardino. Barstow is located 36 miles to the north; Lancaster and Palmdale, 45 and 50, miles to the east, respectively. The site is linked to the local and regional markets through a number of highways and major local roadways. Air and rail transportation are also available in the area.

REGIONAL DESCRIPTION

Freeways and Highways

Interstate 15 (or the Mojave Freeway) is a north-south interstate freeway that runs east of the site through Victorville connecting the communities of Adelanto, Victorville, Hesperia and Apple Valley to Barstow and in turn to Las Vegas. It also provides access to San Bernardino, San Diego and the Southern California roadway network.

US Highway 395 is a north-south highway that joins Interstate 15 in the City of Hesperia, 4 miles south of Victorville and 5 miles south of the proposed site. US 395 is primarily a two-way, two-lane facility and is connected to the project site by Air Base Road.

State Route 18, is an east-west state highway connecting the Victorville area to Palmdale and Lancaster to the west and Lucerne Valley and Big Bear Lake to the southeast. It is essentially a two-way, two-lane facility. Its intersection with US 395 has been improved by Caltrans and now is controlled with traffic signals.

All three regional roadways have been designated by the San Bernardino Associated Government (SANBAG) as roadways of regional significance and, therefore, subject to regulatory mechanisms of the San Bernardino County Congestion Management Program (CMP).

In addition, U. S. Highway 66, also known as Route 66, runs north-south through Victorville to Barstow approximately 1.0 to 1.5 miles east of the project site. It is a four lane roadway, known locally as the National Trails Highway. It is connected to the site via Air Base Road.

Airport

The project is proposed for a portion of the 5000 acres formerly known as George Air Force Base (AFB). The United States Air Force has, under the provisions of Base Closure Realignment Act, closed George AFB and leased the entire facility to the Victor Valley Economic Development Agency (VVEDA).

A sizable portion of the site is devoted to transforming the Air Base into an International Airport capable of accommodating 15 million air passengers per year. The City of Victorville adopted a specific plan focusing on this objective in 1995. The City is reconsidering this plan because of limited market support for a passenger based airport operation in the High Desert Subregion. Local officials are contemplating revising their specific plan to promote air cargo operations rather than passenger operations at this facility.

When George Air Force Base closed, it became a general aviation airport known as SCIA. The volume of traffic at SCIA appears to be increasing. In 1997, there were 12,000 take-offs and landings, while in 1998, that figure is expected to grow to 22,000. The flight operations are expected to increase up to 40,000 per year. About 80 percent of the time, aircraft use the north/south runway (Runway 17/35), with the balance of flight operations using the runway (Runway 21/03) closest to the HDPP. (Blomendale 1998)

Because there is very limited use of the airport at this time, the FAA has deemed that the airport does not warrant air traffic controllers in the existing control tower. Occasionally, when the Marines are holding training exercises at Fort Irwin near Barstow, a number of large jet transport aircraft will land at SCIA carrying troops and material. The Department of Defense will put an air traffic controller in the tower to direct landing and departing traffic during these troop deployments. However, this is the currently only situation when air traffic is directed by air traffic controllers. (Dykas 1998)

Essentially, there is no air traffic control to direct aircraft operations in and around the airport. A pilot takes-off or lands based on a seen-and-be-seen principal. A pilot will indicate takeoff and landing intentions by using the plane’s radio, which is tuned to a common frequency for all users at the airport.

Railways

There is one rail line in the vicinity operated for Union Pacific and Southern Pacific Railroad Companies by the Atchison, Topeka and Santa Fe Transportation Ccompany. It runs on a southeast to northwest alignment through Victorville, where it provides for cargo off loading at D street, and at the cement manufacturing facility across the Mojave River and to the northeast of the project site.

SITE AND VICINITY DESCRIPTION

The project site is linked to the City of Victorville by a combination of Air Base Road, Phantom Street, Cory Boulevard, and Village Drive or National Trails Highway (Route 66). Air Base Road is an east/west arterial connecting Adelanto and Victorville. It varies between two and four lanes wide between Adelanto Road and Phantom Street, and National Trails Highway and El Evado Road. Between El Evado Road and Phantom Street, Air Base Road is predominately two lanes. The intersection of Air Base Road and US 395 is controlled with stop signs on all four approaches. In addition, Air Base Road is designated as a truck route in the Circulation Element of the City of Victorville.

El Evado Road is a north/south arterial that until recently, existed only as a segment south of Air Base Road. A four-lane extension of El Evado Road from Air Base Road to the two lane, east/west segment of Phantom Road, has been completed and provides an alternate access to the northeast portion of the SCIA, close to the location for the proposed project.

Phantom Street serves as the main access road to George AFB. It is four lanes where it crosses Pol Access Road, narrows to two lanes for approximately 1/2 mile, then jogs east/west for 1/4 mile where it connects to an unnamed road providing access to the helicopter landing area and the project site located to the north. The north/south portion is a four lane roadway with narrow lanes and rights of way. The east/west portion is two lane, narrow width. This roadway currently does not comply with City standards. However, improvements are planned as noted below. (McGlade, 1998.)

A number of small roadways exist in the vicinity that were associated with the operation of the former George AFB. Most of these, including Cory Road, a secondary entrance into George AFB, served the military residential area immediately south of the project site. None of these roadways meet city roadway standards. (McGlade, 1998)

Cory Road is a northwest/southeast two lane maintained road providing access to the military residential area, and the on-base golf course, located in the southeastern section of the SCIA. This entrance is currently closed but, discussions to reopen it to provide access to schools located along Cory Road are in process. The project site can be accessed via the Cory Road entrance by turning north on Nevada Street and then using Perimeter Road.

Perimeter Road is graveled, non-uniform width, poorly maintained, geometrically inadequate roadway approximately 3 mile long. It must be traveled to reach the project site regardless of which of the three possible routes is used to gain access to the SCIA.

Planned Roadway Improvements

The widening of Phantom Road and the provision for additional traffic flow controls will facilitate vehicular access to the new civilian airport facility and the proposed power plant. According to Sean McGlade, a transportation engineer with the City of Victorville, the Phantom Street improvements should be completed by the time the project is being constructed.

It should also be noted that Air Base Road was recently widened to four lanes between Village Drive and El Evado Road and long-term improvements for Air Base Road, within the City of Victorville, are included in the City of Victorville's Draft Circulation Element.

EXISTING CONDITIONS

Levels of Service

When evaluating a projects' potential impact on the local transportation system, staff uses levels of service (LOS) measurements as the foundation on which to base its analysis. Essentially LOS measurements represent the flow of traffic. In general levels of service range from A, free flowing traffic, to F, which is heavily congested with stoppage of the flow. LOS can be determined through two related measures: intersection capacity utilization (ICU) and roadway segment vehicle to capacity (V/C) ratios. Staff prefers to use both types of data. However, in many cases, only one of the two types of data are available. Intersection levels of service, though sometimes more revealing, have not been included for two reasons: (1) data availability is limited and, (2) that which was available was inconsistent and therefore, its reliability was suspect.

Staff, therefore, has had to rely on roadway segment V/C ratios for its analysis. Trans Table 1 summarizes the segment data available for roadways in the vicinity of the project likely to be affected.

For the most part, the LOS data provided in the Application for Certification is similar to that in TRANS Table 1. In some instances data provided by the Applicant shows slightly better traffic flow conditions. While in these instances such differences tend to be attributable to considering two-way versus one-way volumes and capacities, the closing of George AFB and resultant decrease in traffic flows also provides reason for better traffic flows than identified in TRANS Table 1. In fact, since much of the data in TRANS Table 1 is 1995 data and reflects traffic patterns existing prior to the closure of George AFB, staff believes that the roadway system is capable of accommodating a greater number of vehicles than the data would indicate.

TRANS Table 1
Roadway Segment Level of Service

Segment	Description	A.M. Peak		P.M. Peak		Average	
		V/C	LOS	V/C	LOS	V/C	LOS
SR-18	Amargosa Rd. and I-15 (SB)	N/A	N/A	N/A	B	N/A	N/A
US-395	El Mirage and Airbase Roads	N/A	N/A	N/A	B	N/A	N/A
US-395	Airbase Road and SR-18	N/A	N/A	N/A	A	N/A	N/A
US-395	SR-18 and I-15	N/A	N/A	N/A	A	N/A	N/A
I-15 (NB)	Jct. Rte. 18 WB and Mojave Dr.	N/A	B	N/A	C	N/A	N/A
I-15 (NB)	Mojave Dr. and SR-18 (D Street)	N/A	B	N/A	C	N/A	N/A
I-15 (SB)	Jct. Rt. 18 WB and Mojave Dr.	N/A	B	N/A	B	N/A	N/A
I-15 (SB)	Mojave Dr. and SR-18 (D St.)	N/A	C	N/A	B	N/A	N/A
SR-18	Amargosa Rd. and Jct. US 395	N/A	N/A	N/A	N/A	N/A	E
Sr-18	Jct. US 395 and L.A. Co. Line	N/A	N/A	N/A	N/A	N/A	D
US-395	I-15 and SR-18	N/A	N/A	N/A	N/A	N/A	E
US-395	SR-18 and Airbase Rd.	N/A	N/A	N/A	N/A	N/A	E
US-395	El Mirage Rd. and County Line	N/A	N/A	N/A	N/A	N/A	E
Airbase Rd.	US 395 to Adelanto Rd.	N/A	N/A	N/A	N/A	.67	B
Airbase Rd.	Adelanto Rd. to Phantom Rd.	N/A	N/A	N/A	N/A	.67	B
Airbase Rd.	Phantom Rd. to Village Dr.	N/A	N/A	N/A	N/A	.24	A
Airbase Rd.	Village Dr. to Rt. 66	N/A	N/A	N/A	N/A	.48	A

Source: San Bernardino Associated Governments, City of Victorville, City of Adelanto

IMPACTS

POWER PLANT

Construction Phase

Commute Traffic

All roadways within Victorville and Adelanto likely to be affected are operating at or above LOS “C”, the standard for traffic flow set by the cities of Victorville and Adelanto. This is true for most of the regional roadway segments. Some regional roadway segments are classified as operating at LOS "D" and "E". This is somewhat misleading. The measurements on which these classifications are based were taken prior to the closure of George AFB and are representative of a time when roadway demands were much higher. Until the base conversion process is complete (circa 2013), a return to pre-closure levels of roadway demand is unlikely.

To determine the potential for impact, staff assessed whether, if all construction related vehicles travel the same route, levels of congestion could result in decreases of LOS standards below the established threshold of LOS "C" for local urban roadways and LOS "E" for roadways of regional significance. The results of the analysis indicate that even if all construction workers were to use the same route, and that route included any of these roadways, the 370 vehicle trips generated would not affect vehicle to capacity (V/C) ratios substantially enough to produce a decline in the level of service past the threshold levels.

Staff also relied on the following in concluding that there are not likely to be significant construction traffic impacts:

1) It is likely that workers will come from all four urban areas within 50 miles of the project site: Barstow, San Bernardino, Palmdale/Lancaster, and Victorville/Adelanto/Apple Valley/Hesperia. In the Application for Certification, the Applicant presented a plausible representation of how construction traffic flows could be divided on local roadways (Section 5.4.5.1.) This assessment demonstrates that with such a dispersion, construction related traffic impacts are not likely to cause a degradation of peak hour levels of service, nor create a significant impact on existing roadway conditions.

2) The 370 round trips represents the peak impact. Ongoing impacts will be lessened as an average of 215 commute round trips is likely for a 15 month schedule.

3) Most roadways within the study area, particularly those likely to carry the greatest traffic load resulting from the project, are operating a level of service C or better. Since much of this data is 1995 data, and reflects traffic patterns existing prior to the closure of George AFB, staff believes that the roadway system is capable of accommodating much greater numbers of vehicles than the baseline data would indicate.

4) Since filing the AFC, staff has learned that the City of Victorville has expedited improvements to Phantom Street, thus, eliminating staff's initial concern about large volumes of traffic on substandard roadways.

Truck Traffic

The transportation and handling of hazardous substances associated with the project can increase roadway hazard potential. The handling and disposal of hazardous substances are addressed in the Waste Management Section, and the Hazardous Materials Section 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. Conditions of Certification that ensure this compliance are discussed under their respective subsection later in this analysis.

Transportation of equipment that will exceed the load size and limits of certain roadways will require special permits. The procedures and processes for obtaining such permits are fairly straightforward. Mitigation measures and Conditions of Certification that ensure this compliance are discussed later in this analysis.

Railways

Oversized equipment, such as combustion turbines, generators and the main transformers, will likely be transported to the region by rail and then transported by truck to the project site. Offloading can occur either at the Southwestern Portland Cement plant railroad spur or the transit center, which is nearest the project site. In either case such deliveries should not present significant transportation impacts.

Operational Phase

Commute Traffic

The operational phase of this project will generate a total of 56 vehicle trips daily; 15 during AM peak, 19 during PM peak, and the remainder during non-peak hours. This will be a major decline in commute traffic in comparison to the construction phase and will not present any major traffic problems.

Truck Traffic

The transportation and handling of hazardous substances associated with the project can increase roadway hazard potential. (See AFC 5.4.5.2 for a general discussion.) The handling and disposal of hazardous substances are also addressed in the Waste Management, the Workers Safety and Fire Protection, and the 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. Mitigation measures and Conditions of Certification that ensure this compliance are discussed under their respective subsection later in this analysis.

Airport

Imaginary Surfaces

The relation of the proposed HDPP to the runways at Southern California International Airport (SCIA) is displayed in the Project Description section of this Staff Assessment. Imaginary Airport Surfaces, as specified in Title 14, Code of Federal Regulations, Sections 77.21, 77.23 & 77.25 are shown in Figures 5 and 6 of the Southern California International Airport Land Use Plan. According to information provided by the FAA (FAA 1998a), the HDPP emission stacks would be located approximately 1700 feet from the centerline of Runway 21. There are two imaginary surface airspaces that the HDPP is subject to analysis: the horizontal and transitional imaginary surfaces.

Horizontal Surface

The floor of the horizontal imaginary surface is 150 feet above the established airport elevation. Any object or structure which is proposed to be built that will penetrate this 150 foot floor is considered to be a hazard to air navigation. In the case of the HDPP, the established airport elevation is 2875 feet, so the floor of the horizontal airspace is 3025 feet above sea level (2875 feet plus 150 feet). The HDPP site ranges in elevation between 2857 and 2859 feet. (AFC, p. 3.3, 4 & 5). Originally, the combustion turbine/heat recovery steam generator exhaust stacks for the combined cycle scenarios (3F or 2G) were proposed at 175 feet above grade. In that case, the total height of the stacks above sea level would be 3032 to 3034 feet, which would place the stacks approximately seven to nine feet into the horizontal airspace floor. The Applicant has since indicated (HDPP 1998b) that the tops of the stacks will be no greater than 3025 feet above sea level, so the actual physical heights of the stacks will be somewhat less than the previously indicated 175 feet above grade level. More recently (HDPP 1998c), the Applicant has indicated that they will now reduce the stack height to 130 feet. At this elevation, the stacks will not intrude into the horizontal imaginary surface.

Transitional Surface

Another imaginary surface airspace that the HDPP project is subject to analysis is the transitional surface airspace. This surface extends outward and upward at right angles at a slope of 7:1 to the runway direction beginning at the edge of the width of the primary surface of the runway. The width of the runway primary surface depends on the classification of the runway for use for either visual approaches or instrument approaches to land. The information that the FAA used for the transitional imaginary surface calculations assumed that Runway 21 is designated a Nonprecision -B1 classification. The classification means that visibility for instrument landing approaches must be a minimum of 3/4 of a mile. With this classification of runway, the primary surface runway width is considered at 500 feet. With that width, the 175 foot HDPP stacks would not intrude into the transitional imaginary airspace.

However, the April 1996 “Southern California International Airport comprehensive Airport Land Use Plan” has a designation for Runway 21 that is not consistent with the designation that the FAA used in their analysis. The Land Use Plan indicates that Runway 21 is classified as a Nonprecision-B2 category, which allows for instrument approach landings when visibility is less than 3/4 of a mile. With this classification of runway, the primary surface runway width is considered to be 1000 feet. With that width, the calculations for analysis of the transitional imaginary surface would show that the original 175 foot HDPP stacks would intrude into that imaginary surface by approximately 10 feet. Although the FAA has not found that the HDPP project stacks would constitute a “hazard to air navigation” under Part 77.35(c), it would appear that there is a conflict between the height of those stacks and the intended use of that runway as a Nonprecision-B2 runway.

However, the Applicant has reduced the stack heights from 175 feet to 130 feet (HDPP 1998c). By reducing the stack height by 45 feet, the stacks will now be 35 feet below the transitional surface airspace. Although the FAA has not performed their analysis at this new lower stack height, it would appear that the HDPP emission stacks would now comply with all applicable Part 77 imaginary airspace requirements.

Cooling Towers

The project cooling towers are also subject to analysis for the horizontal and transitional imaginary surfaces. The 50 foot height of the cooling towers would result in their height being well below the horizontal imaginary surface floor. For the transitional imaginary airspace, the 50 foot height is also below the transitional imaginary airspace regardless of whether Runway 21 is classified as Nonprecision-B1 or Nonprecision-B2.

Thermal Plumes

The flue gas exhaust plumes from the combustion turbine/HRSGs has the potential to rise many hundreds of feet into the air. Because of the proximity of the HDPP to the landing pattern for small aircraft for Runway 21, Staff believes that the issue of these exhaust plumes potentially impacting these aircraft needs to be explored. The issue is the possibility that a potential exists for small single-engine general aviation type aircraft to fly through or in close proximity to these exhaust plumes, which could create an aircraft instability and potentially hazardous air navigation condition.

Aircraft Flight Patterns

Since the airport is uncontrolled, the pilot can choose any runway to take-off or land. Usually, however, a pilot will want to take-off or land into the wind, which is determined by observing the wind socks located around the airport. The prevailing wind directions are shown as wind roses in the Air Quality section of this assessment. These wind roses show that the most frequently used runways would be Runway 17 (landing virtually due South) or Runway 21 (landing to the Southwest).

Staff's concern about the thermal plumes from the combustion turbine exhausts has to do with flight operations at Runway 21, specifically landing operations. A pilot choosing to land on Runway 21 will enter a left-hand airport traffic pattern. An aircraft typically enters the airport traffic pattern in the downwind leg, flying in the opposite direction in which the aircraft will land. Small, single-engine general aviation aircraft such as Cessna 152s or 172s, will enter the pattern at approximately 800 to 1000 feet above the airport. At the time the aircraft is "abeam-the-numbers" (the painted runway numbers directly perpendicular to the aircraft), the aircraft will be slowing down, with possibly some landing flaps extended, and at approximately 600 to 800 feet in elevation above the airport. It is in this area where the aircraft would likely be the closest to the HDPP. The aircraft would proceed downwind, descending in the opposite direction of the intended landing direction. The pilot then turns the aircraft to the left to the base leg of this pattern and makes another turn left to the final leg to line up on the runway and proceed to land. At an uncontrolled tower airport, this entire operation of turns and flight elevations is determined by the pilot in command of the aircraft.

Another flight operation commonly occurring at uncontrolled airports with small aircraft is the “touch-and-go” landing and take-off practice activity. Pilots will practice their take-offs and landings and stay in the airport traffic pattern. Usually, because the aircraft is in close proximity to the runway he is using, the airport traffic pattern is rather “tight” meaning that the pilot will fly closer to the runway in his downwind leg, and usually maintain a downwind elevation of no more than 800 feet above the airport.

The Plume Impact Concern

If an aircraft is flying the downwind leg at approximately 600 to 800 feet above the ground, there is the potential for the aircraft to fly in close proximity, if not through an invisible thermal plume that could be rising 1000 feet or more. Depending on the proximity of the aircraft to the thermal plume, and the “strength” of the plume, the aircraft may experience a mild turbulence, or worst-case, a significant turbulence which could cause the loss of control of the aircraft by the pilot.

The Applicant provided an analysis of the potential of the thermal plumes from the HDPP impacting air traffic at SCIA (HDPP 1998a). That analysis indicated that the vertical momentum from the exhaust plumes dissipates within a couple of seconds due to expansion and cooling of the plume. At that point, the plume is further dissipated by horizontal winds or upward thermal activity and is indistinguishable from ambient air movements. The vertical plume momentum occurs within 200 feet of the exhaust stack or less than 400 feet (200 feet plus the stack height of 175 feet) above the ground. This height is well below the normal pattern altitude (600 to 800 feet) a small aircraft would normally fly at that point in the pattern. If the aircraft were at this 400 foot altitude, the radius of the plume would be relatively small (less than 30 feet) so that an aircraft would experience any turbulence for less than one second.

In addition, upon visiting the site, and noting the relative distance of the HDPP site to the standard light aircraft pattern, we believe that typically, small aircraft would fly to the south and east of the project site during their landing approach and would not ordinarily fly directly over the HDPP.

A thermal plume will also occur from the cooling towers, however, their plume rise heights will be considerably less because of lower temperatures in the cooling tower plume and lower velocities. Also, the cooling towers will be closer to the airport runway, and thus farther away from aircraft in their downwind leg for landing. For the reasons stated above, staff believes that the thermal plumes from the exhaust stacks or the cooling towers of the HDPP will not impact typical air navigation around the SCIA. The FAA also concurs with this conclusion (FAA 1998b) in their no hazard determination.

LINEAR FACILITIES

Construction of the transmission lines can cause some disruption of traffic due to the transport of construction materials and transmission equipment and the actual construction near roadways. Either of these will at most have short-term and minimal impacts on the function of area roadways. However, as there is a safety issue as well during construction, traffic control in accordance with the requirements of the City of Victorville and the guidelines in Caltrans “Traffic Manual” Chapter 5 will ensure no significant impact. Transmission line operation will not have any impact on area roadways.

The construction of underground linear facilities, including the natural gas pipelines and project-related water and sewer connections, will impact levels of service and functions for all roadways in which trenching is required within the established right-of-way. However, such impacts will be short-term and not significant. Typically plating of roadways will be used to ensure emergency vehicle access and maintain some level of traffic flow. In addition, the Applicant has agreed to provide traffic control during construction of the gas pipeline extension at El Evado Road, Phantom Street, Nevada Avenue, Air Base Road, and Cobalt Road.

The operation of such facilities will not have an impact on area roadways except for short-term maintenance or unplanned difficulties. In either case the impacts create traffic flow difficulties which are typically limited in duration and not significant.

CUMULATIVE IMPACTS

The project, as part of an overall development of the air base, will add to cumulative traffic loads in the local area. However, its contribution will diminish significantly from the construction to the operation phase of the project. The overall buildout has been addressed by the traffic analysis prepared by the George Air Force Base Reuse Study (1990). This study evaluated the potential impacts of 4 land use alternatives, projected levels of service and necessary roadway improvements to facilitate civilian development of the George AFB property. While cumulative buildout could have considerable traffic flow impact upon Interstate 15 and State Route 18, the estimates in the Application for Certification, Tables 5.4-6 and 5.4-7 still indicate those impacts will be at or within acceptable LOS.

Within the Congestion Management Plan, trip reduction measures could be employed. But, since the maximum number of employees assigned to any one shift is 15, trips from this project will have an insignificant impact on congestion increases resulting from cumulative buildout of the air base.

In addition, the Conditions specified below will ensure that the transport of hazardous materials is undertaken in compliance with applicable federal and state laws.

FACILITY CLOSURE

The anticipated lifetime of the HDPP power plant is expected to be in excess of thirty years. The Applicant has proposed preparation of a Decommissioning Plan and submittal to the Energy Commission for review and action, at least twelve months prior to the proposed decommissioning. At the time of closure all then-applicable LORS will be identified and the closure plan will address how these LORS will be complied with. The effects of project closure on traffic and transportation will be similar to those discussed for the project itself. Closure will involve a peak work period with commute traffic. The removal of waste and other materials will produce impacts from truck traffic. At this time no conclusions can be drawn on the effects of project closure on traffic and transportation.

COMPLIANCE WITH TRANSPORTATION LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

Roadway and Rail Traffic

Applicant has stated its intention to comply with all federal LORS. A condition to ensure compliance is included below. Therefore, the project is considered consistent with identified Federal LORS.

AIR TRANSPORTATION

With the proximity of the HDPP to the SCIA, the applicant has filed a notification with the FAA per the requirements of Title 14, Code of Federal Regulations Sections 77.13(2)(i) and 77.17.

The FAA, and if necessary CalTrans Aeronautics have the statutory responsibility to determine if the project's construction and operation will constitute a hazard to air navigation or create an unsafe condition for air navigation. If the FAA determines that the construction and operation of the project will constitute a hazard to air navigation, then CalTrans Aeronautics will analyze the issue and either agree or disagree with the FAA.

STATE

Road and Railway

Applicant has stated its intention to comply with all state LORS. A condition to ensure compliance is included below. Therefore, the project is considered consistent with identified state LORS.

AIR TRANSPORTATION

Public Utilities Code Section 21659(a) requires that Caltrans Aeronautics perform an analysis and issue a permit, if possible, to the applicant if the FAA finds a hazard to air navigation from the project in their analysis. If Caltrans Aeronautics finds that the construction of the project does constitute a hazard to air navigation, a permit cannot be issued, and the project could not be built at that site.

In a letter from the FAA to the SCIA Authority (FAA 1998a), they concluded that the project stacks would not create a hazard to flight navigation. The FAA has complied with Title 14, Code of Federal Regulations, Section 77.35. However, because of issues raised about the Runway 21 designation and the resultant implications to imaginary airspace calculations discussed earlier, the Applicant has reduced the stack height by 45 feet. Although the FAA has not performed their analysis with the new lower stack heights, there should be no intrusion of the stacks or the cooling tower into the horizontal and transitional surface airspaces. Therefore the HDPP project should comply with the applicable Part 77 requirements.

Concerning the thermal plume issue, the FAA issued a letter (FAA 1998b) where they addressed this issue and concluded that they "concur with our (FAA) original no hazard determination."

LOCAL

City of Victorville

Victorville General Plan

Circulation Element:

- V-1: This policy is intended to address actions of local government or other legislative authority rather than any one individual developer. Staff's analysis, intended to preserve roadway levels of service, complies on behalf of the local legislative authorities with the intent of this policy.

- V-2: As with V-1, this policy is directed toward the actions of local government or other legislative authority. Required mitigation measures and Conditions of Certification, if necessary in this case, will result in compliance with the intent of the policy.

- V-5: As discussed previously, since there will not be a significant impact during the construction phase, staff does not believe it is warranted to require construction workers to use alternative means and modes of transportation.

For operational employees, trip reduction measures could be employed. But, since the maximum number of employees assigned to any one shift is 15, trip reduction measures for this project will have an insignificant impact on congestion increases resulting from operation of the power plant. However, operational traffic could be considered for such a program depending upon the eventual cumulative impacts from full build out of the air base property.

Municipal Code

Chapter 18, establishes a number of development standards (landscaping, lighting, internal circulation, etc.) with which the Applicant has indicated in the AFC that it will comply. Compliance with these development standards is specified under the Conditions of Certification.

San Bernardino Associated Governments

- SANBAG-1: Policy 2.3.1: Since the project will not significantly impact levels of service, it will be in compliance with SANBAG-1.

- SANBAG-2: Policy 4.1.1: This policy is applicable to discretionary authorities and not individual applicants. Since the Energy Commission, under the authority of the Warren-Alquist Act, is acting on behalf of local legislative authorities, this analysis fulfills the intent of the policy.

- SANBAG-3: Policy 4.1.3: This policy is applicable to discretionary authorities, not an individual applicant.

- SANBAG-4: Policy 4.4.1: This policy is applicable to discretionary authorities and not individual applicants. Since the Energy Commission, under the authority of the Warren-Alquist Act, is acting on behalf of local legislative authorities, this analysis fulfills the intent of the policy.

- SANBAG-5: Policy 5.1.2: As discussed previously, since there will not be a significant impact during the construction phase, staff does not believe it is warranted to require construction workers to use alternative means and modes of transportation.

For operational employees, trip reduction measures could be employed. But, since the maximum number of employees assigned to any one shift is 15, trip reduction measures for this project will have an insignificant impact on congestion increases resulting from operation of the power plant. However, operational traffic could be considered for such a program depending upon the eventual cumulative impacts from full build out of the air base property.

- SANBAG-6: Policy 5.2.1: See Policy 5.1.2 conclusion above.

MITIGATION

Applicant has indicated its intention to comply with all LORS relating to: 1) the transport of oversized loads, 2) the transport of hazardous materials, 3) traffic control for construction of linear facilities, and 4) the design of the facility to comply with Title 18 of the Victorville Municipal Code. Staff is requiring no additional mitigation for roadway and rail impacts.

CONCLUSIONS AND RECOMMENDATIONS

POWER PLANT

1. The power plant construction and operation will have minimal impacts on roadway congestion and rail use. During the construction phase, increased roadway demand resulting from the daily movement of workers and

materials, while noticeable, will not increase beyond thresholds established by local and regional authorities. During the operational phase, increased roadway demand resulting from the daily movement of workers and materials will be minimal.

2. The project does not present a significant air navigation hazard to flight operations in the environment around the Southern California International Airport. The project should comply with all applicable Part 77 requirements. However, to assure that the project does comply with the Part 77 requirements, the staff recommends a condition of certification that will require that the Applicant submit the FAA analysis of the project's impacts on the imaginary airspaces with the revised lower stack heights. In addition, the staff will recommend that the Applicant submit the as-built drawings of the emission stacks.

LINEAR FACILITIES

3. The transmission lines will have minimal impacts on the function of area roadways, but where construction crosses roadways appropriate safety measures are necessary. Such measures have been agreed to by the Applicant and are to be specifically developed the Condition for Certification TRANS-6.

4. Because their construction requires trenching within public road rights-of-way, the underground facilities (gas line, water line, sewer line) will impact both roadway function and levels of service. However, these impacts are expected to be short-term and not result in significant traffic and transportation impacts. The Applicant has agreed to appropriate traffic control measures and these are to be specifically developed under the Condition for Certification TRANS-6.

CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall comply with California Department of Transportation (Caltrans) Cities of Victorville and Adelanto, and San Bernardino County limitation on vehicle sizes and weights. In addition, the project owner or its contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for both rail and roadway use.

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

TRANS-2 The project owner or its contractor shall comply with California Department of Transportation (Caltrans), cities of Victorville, Adelanto and San Bernardino County limitations for encroachment into public rights-of-way and shall obtain necessary encroachment permits from Caltrans and all relevant jurisdictions.

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

TRANS-3 The project owner shall ensure that all federal and state regulations for the transport of hazardous materials are observed.

Verification: The project owner shall include in its monthly compliance reports copies of all permits and licenses acquired by the project owner and/or subcontractors concerning the transport of hazardous substances.

TRANS-4 The project owner shall submit a copy of the letter from the Federal Aviation Administration verifying compliance of the project with Part 77 requirements.

Verification: Prior to commencing construction, the project owner shall submit to the CPM the required FAA letter.

TRANS-5 The project owner shall submit a copy of the final "as-built" construction drawings of the HRSG emission stacks, indicating the stack height.

Verification: Prior to commencing construction, the project owner shall submit to the CPM the required drawings described above.

TRANS-6 Prior to the start of construction, the project owner shall consult with the appropriate agencies and prepare a construction traffic control plan and implementation program which includes addressing the timing of heavy equipment and building materials deliveries; and signing, lighting and traffic control device placement for natural gas pipeline and transmission line construction.

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

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NOISE

Testimony of Steve Baker

INTRODUCTION

PURPOSE OF THE ANALYSIS

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 during which it is produced, and the proximity of the facility to any sensitive receptors combine to determine whether the project will meet applicable noise control laws and ordinances, and whether it will create significant adverse environmental impacts.

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

FINDINGS REQUIRED

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

- the project will likely be built and operated in compliance with all applicable noise laws, ordinances, regulations and standards; and
- the project will create no significant adverse noise impacts that have not been mitigated to the extent feasible.

SCOPE OF THE ANALYSIS

This analysis will determine:

- whether the facility can be constructed and operated in compliance with all applicable federal, state and local noise laws, ordinances, regulations and standards;
- whether any potentially significant noise impacts may result from the construction and operation of the facility; and if so,
- whether feasible mitigation measures can be employed to minimize or eliminate any significant noise impacts resulting from construction and operation of the facility.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C.A. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration has adopted regulations (29 C.F.R. § 1910 et seq.) that establish maximum noise levels to which workers at a facility may be exposed. These OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed. OSHA regulations also dictate hearing conservation program requirements and workplace noise monitoring requirements.

There are no federal laws governing offsite noise.

STATE

Similarly, there are no state regulations governing off-site (community) noise. Rather, state planning law (Gov. Code, § 65302) requires that local authorities such as counties or cities prepare and adopt a general plan. Government Code section 65302(g) requires that a noise element be included to establish acceptable noise limits.

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. CEQA Guidelines (Cal. Code Regs., tit. 14, Appendix G, item (p)) define a significant effect on the environment as one that will "[i]ncrease substantially the ambient noise levels for adjoining areas...." CEQA Guidelines further require that the impacts of the project be considered cumulatively in conjunction with those of other projects planned for the area (Cal. Code Regs., tit. 14, § 15065(c)).

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

LOCAL

The High Desert Power Project will be located within the city limits of Victorville.[6] Three local ordinances apply to the project (Priester 1997, pers. comm.):

- City of Victorville General Plan Noise Element, July 1997;
- City of Victorville Municipal Code, Chapter 13.02, Nuisances, October 1996; and
- Southern California International Airport (SCIA) Comprehensive Airport Land Use Plan (CALUP), April 1996.

Although the City of Adelanto General Plan contains a noise element that imposes requirements and restrictions, the project is so distant from Adelanto city limits that noise impacts there should be nonexistent.

6 Portions of the water line will lie in San Bernardino County outside the Victorville city limits. Those portions of these lines within the airport boundary will be within the Noise Hazard Overlay District identified in Article 5 of the San Bernardino County Development Code.

City of Victorville General Plan Noise Element

A general plan noise element typically addresses noise impacts created by new development and commonly limits the amount of noise that a new project may create. The City of Victorville General Plan, however, places no limits on noise emanating from new development. Rather, it places limitations on the siting of new projects within already noisy areas, with the purpose of protecting the occupants of the new project from high existing noise levels. The noise element requires, for example, that new residential developments be located in areas with an ambient noise level no greater that 65 dBA CNEL (see NOISE: Appendix A following this section for definitions of terms used). Such a development may be sited in a noisy area only if mitigation is enacted to reduce exterior noise levels to 65 dBA, and interior noise levels to 45 dBA CNEL.[7]

As such, the General Plan places no quantitative limit on noise that can be produced by new development. Note that one policy of the noise element (Policy 2.6) is to "...continue to consider development and adoption of a comprehensive noise ordinance based upon quantitative rather than qualitative noise standards." Until such quantitative standards are adopted, however, the City of Victorville General Plan imposes no restrictions on noise produced by the project.

City of Victorville Municipal Code

Chapter 13.02 of the Municipal Code, entitled "Nuisances," includes several sections regarding noise; this portion of the Code serves as what is typically referred to as a Noise Ordinance. Chapter 13.02 establishes no quantitative standards for judging excessive noise. Its purpose is to allow law enforcement officials to stop the creation of noise that constitutes a nuisance. Examples are loud parties or the keeping of animals where their noise disturbs people. Due to its lack of quantitative measures, the Noise Ordinance is of little use in establishing permissible noise levels that emanate from a source such as the High Desert Power Project.

SCIA Comprehensive Airport Land Use Plan (CALUP)

This document serves as a general plan for the redevelopment of the former George Air Force Base (AFB) into the SCIA. Its chief thrust is controlling development in the vicinity of the airport so as to minimize impacts caused by the airport upon the new development. Regarding noise, the CALUP identifies a 65 dBA noise contour around the airport, and restricts what may be built within that contour. For example, residential construction within the 65 dBA contour is discouraged, but commercial and industrial uses are permissible. Like the City of Victorville General Plan, the CALUP sets no limits on noise emanating from new development such as the High Desert Power Project.

7 The reduction of 20 dB from exterior to interior noise levels is typically accomplished by the weatherization and insulation required for new construction under the General Plan.

Staff Significance Criteria

Any new power plant will add some noise to the environment. If the noise added is sufficiently loud, it will be noticed by nearby observers. It is generally accepted in the noise control industry (Kryter 1970) that a noise source that produces an increase in noise level, at the observer, of 3 dB will be barely noticeable. It is, again, generally accepted that a noise source that produces an increase in noise level of 3 dB to 5 dB, while noticeable, will generally be unobjectionable. If the noise is still louder, it will annoy these observers. Therefore, staff utilizes this 5 dB criterion,[8] in the absence of more specific LORS, as the maximum level of added noise that produces no significant adverse impacts, and is therefore acceptable.

SETTING

The project site is located in the northwestern outskirts of Victorville, near the western boundary of San Bernardino County. The power plant will be located adjacent to the southwest-northeast-bearing runway of the SCIA. The terrain is chiefly flat desert with a range of low hills to the east. New natural gas and water pipelines and a new electric transmission line will connect the project with the requisite utilities.

The City of Adelanto lies two miles to the west. Two schools, the Harold H. George School and the Shepard School, lie approximately 1 1/4 miles to the south, and the SCIA Golf Course is approximately 1 1/4 miles to the south-southeast. The former military residential community to the immediate south of the project site is now vacant (HDPP 1997b, AFC § 5.1.4.2.1). Future development may include residences or other noise-sensitive uses (Victorville 1996b, Table 7).

Several single-family dwellings and residential subdivisions lie near the proposed routes of the gas pipeline, water pipelines and electric transmission line. The applicant has identified these residences as Residential Receptors R1 through R8, and identified their locations as ranging between 400 feet and 2,600 feet of the respective linear facilities (HDPP 1997b, AFC Figure 5.1-1).

In order to predict the likely noise effects of the project on the surrounding community, the applicant first examined the existing noise environment, as described in the pertinent general plans and planning documents (High Desert 1997b, § 5.1.3), then performed a noise survey of the area near the residential subdivision identified as R4 (HDPP 1997b, AFC Figure 5.1-1). The noise survey was performed by a qualified consultant using appropriate monitoring and analysis equipment and methods. The results of the survey were presented in a data response (HDPP 1997b, AFC § 5.1.4.2.2; HDPP 1997d).

Since the nearest sensitive receptors are 1 1/4 miles from the project site, it is unlikely that construction noise will be a nuisance to them. The R4 residences,

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8 Measured at the nearest property line of the nearest sensitive receptor. Sensitive receptors are locations or activities for which quiet is important, such as residences, hospitals, schools, libraries, and places of worship.

400 feet away from the transmission line route, were chosen for the round-the-clock monitoring because they lie the closest to any project facilities, and are the most likely to be affected by construction noise. Other residences that may be exposed to construction noise are at R2 and R6, both approximately 500 feet from the transmission line route. (The remaining residences, R1, R3, R5, R7 and R8, are at least 1,000 feet from any project linear facility routes (HDPP 1997b, AFC Table 5.1-2), and will be less likely to be exposed to annoying levels of noise.) The noise environment at the R4 residences was dominated by vehicular traffic on Village Drive. Noise levels there were measured at 44.4 dBA CNEL (HDPP 1997b, AFC Table 5.1-4). (For definitions of these and other technical terms, refer to NOISE: Appendix A, immediately following this section.)

The City of Victorville General Plan (Victorville 1997) indicates that traffic noise is dominant at various points along the gas pipeline route. Traffic noise at the George and Shepard Schools, from traffic on Cory Boulevard, yields a level of approximately 60 to 70 dBA CNEL.

IMPACTS

Project noise impacts can be created by construction and by normal operation of the power plant.

CONSTRUCTION NOISE IMPACTS

Community Effects

Construction noise is a temporary phenomenon; the project construction period is scheduled to last 18 months (High Desert 1997b, § 1.3.1, § 3.8). 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 is commonly exempted from enforcement by local ordinances. Applicable standards for the project area (see LORS section, above), however, make no mention of construction noise.

Power Plant

The applicant has predicted the noise impacts of project construction on the nearest sensitive receptors (HDPP 1997b, AFC Table 5.1-6). This prediction is based on assumed noise levels produced by typical construction equipment; these assumed levels are taken from figures published by the U.S. Environmental Protection Agency (EPA) in 1971. Today's construction equipment, however, is somewhat quieter than that in use in 1971. The applicant's predicted construction noise levels are thus expected to be conservative, that is, higher than should be actually experienced. Further, in calculating noise levels at the receptors, the applicant has considered only distance in estimating noise level attenuation. In actuality, atmospheric conditions and intervening structures and terrain will yield actual noise levels slightly lower than predicted, lending more conservatism to the estimates.

Construction noise levels (other than steam blows) are predicted to reach 59 dBA at a distance of 1,600 feet (3/10 of a mile), falling to 48 dBA at the nearest receptors (the Harold H. George School at a distance of 1 1/4 mile), only about 4 dB higher than ambient noise levels. Construction noise is thus not expected to be noticeable at receptor locations away from major roads; and to be practically inaudible at receptors near major roads.

The loudest noise created during construction, operation and testing of the project is caused by the steam blows. After construction of the feedwater and steam systems, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale, and construction debris such as weld spatter and dropped welding rods. 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 connecting the steam system to the turbine, the steam line is temporarily routed to the atmosphere. Steam is then raised in the HRSG and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow, is quite effective at cleaning out the feedwater and steam system piping. A series of short steam blows, lasting two or three minutes each, is performed several times daily over a period of two or three weeks. At the end of this procedure, the steam line is connected to the steam turbine, which is then nearly ready for operation.

Steam blows are expected to produce noise levels at receptor locations as high as 76 dBA, even with a temporary muffler in place on the exhaust piping as proposed by staff (see proposed Condition of Certification Noise-4, below). This may be slightly disruptive to residents, even though the impact will be of short duration (two to three minutes, several times daily). Staff proposes the noise of steam blows be muffled, by installation of temporary silencers, to a level of 90 dBA measured at a distance of 1,000 feet. Staff further proposes that steam blows be performed only during normal construction hours, that is, between the hours of 7:00 a.m. and 8:00 p.m. weekdays, and 8:00 a.m. and 8:00 p.m. weekends (see proposed Condition of Certification Noise-4, below).

Linear Facilities

Construction of the gas, water and transmission lines will produce noise; the applicant has estimated these noise emissions in the 68 to 70 dBA range, measured at a distance of 400 feet (HDPP 1997b, AFC Table 5.1-8). These noise levels will be noticeable, and possibly annoying, to persons outside their homes at those residences nearest the construction (locations R2, R4 and R6 shown in the AFC (HDPP 1997b, AFC Figure 5.1-1), and R8 as shown in the proposal for the second natural gas line (HDPP 1998, Figure 2.1-2)). This work, however, is only a temporary phenomenon; no one residence should suffer impacts for more than a few days. In addition, such work is customarily performed during daytime, and would cause no impacts at night, when quiet is most important. While no LORS are in effect to assure daytime-only construction, staff has proposed a noise complaint process (see proposed Conditions of Certification Noise-1 and Noise-2, below) that will allow any person suffering annoyance to address the problem with the project owner. Due to the temporary nature of this noise, and to the noise complaint process that will allow any annoyed parties to address the problem with the project owner, staff believes no significant adverse noise impacts are likely to occur due to construction of the linear facilities.

Worker Effects

The applicant recognizes the need to protect construction personnel from noise hazards (HDPP 1997b, AFC § 5.1.5.1). Staff believes that compliance with Cal-OSHA regulations (Cal. Code Regs., tit. 8, § 5095 et seq.) will ensure that workers are adequately protected. To this end, staff has proposed a condition of certification (see proposed Condition of Certification Noise-3, below) to ensure compliance with these requirements.[9]

PLANT OPERATION NOISE IMPACTS

Community Effects

During its operating life, the project will represent essentially a steady, continuous noise source day and night (HDPP 1997b, AFC § 3.1, AFC § 3.4.1). Occasional short-term increases in noise level will occur as steam relief valves open to vent pressure, or during startup or shutdown as the plant transitions to and from steady-state operation. At other times, such as when the plant is shut down for lack of dispatch or for maintenance, noise levels will decrease.

Power Plant

As described above (see LORS section), there are no applicable LORS that establish quantitative limits to the noise emanating from project operation. In the absence of specific LORS, we turn to CEQA for guidance. Compliance with CEQA requires that significant noise impacts from the project be mitigated to a level of insignificance, if feasible.

The applicant predicts that noise levels at a distance of one mile from the site will range between 37 and 49 dBA (HDPP 1997b, AFC § 5.1.5.2); this would yield noise levels at the Harold H. George School, the nearest sensitive receptor, of approximately 35 to 47 dBA. This is considerably quieter than the 60 to 70 dBA at the school attributable to traffic noise. In fact, the power plant can be expected to be practically inaudible at the school.

One possible source of noise annoyance would be strong tonal noises, individual sounds that, while not louder than the permissible levels, stand out in sound quality. The applicant has identified the major noise generating sources within the project (HDPP 1997b, AFC Table 5.1-10). To avoid such tonal sound, the noise control design of the project can be balanced to bring as many noise sources as possible to the same relative sound level, causing them all to blend without any one source significantly standing out. Staff has proposed measures (see proposed Condition of

9 The applicant submitted comments on this condition in its June 29, 1998 submittal, and these comments were resolved at the October 27, 1998 workshop.

Certification Noise-6, below) to ensure that tonal noises are not allowed to cause a problem, and that overall noise levels do not cause significant adverse impacts.[10]

Linear Facilities

The linear facilities, once placed in operation, will likely produce no audible noise. The gas line and water pipelines will be silent from any distance; the natural gas compressor station that is part of the 32 mile-long gas line will be located on the project site (HDPP 1998, §§ 1.1.1, 2.1.5.2), and its noise emissions can be controlled, if necessary, along with those of the power plant. The electric transmission line will normally produce noise levels ranging from 5 to 30 dBA, measured directly beneath the line. The lower figure will be inaudible from any likely distance. The higher figure, a humming from corona effect, would occur only in rainy or highly humid conditions. A noise level of 30 dBA would be practically unnoticeable, easily masked by traffic sounds and other ambient noises.

Worker Effects

The applicant has listed those locations in the plant and those pieces of equipment likely to produce hazardous noise levels (HDPP 1997b, AFC Table 5.1-10), and has committed to complying with all applicable noise protection laws, regulations and requirements (HDPP 1997b, AFC § 5.1.5.2). Administrative procedures and hearing protection measures will be put in place to ensure workers' hearing is adequately protected. Since neither Cal-OSHA nor the City of Victorville is likely to expend the resources to actively monitor this compliance, staff has proposed measures (see proposed Condition of Certification Noise-7, below) to ensure compliance. Staff proposes no additional mitigation in this area.

CUMULATIVE IMPACTS

Further development of the SCIA will likely consist chiefly of commercial and light industrial businesses, although residential development is permissible (Victorville 1996b). The project will not be adversely impacted by the noise from adjacent development. It is to be sited outside the SCIA 65 dBA noise contour, obviating the need to provide sound attenuation to protect power plant workers.

The project is likewise unlikely to adversely impact adjacent development, which is most likely to consist of industrial and commercial uses. Its relatively low noise emissions (37 to 49 dBA at a distance of one mile (HDPP 1997b, AFC § 5.1.5.2)) should be practically inaudible at that distance. (The nearest sensitive receptors lie over a mile distant.) Project noise during the daytime will be partially masked by airport noise. Even at night, project noise should not stand out significantly from the ambient levels of 34 to 41 dBA (HDPP 1997b, AFC Table 5.1-4). Staff deems it unlikely that project noise will raise the ambient levels more than 5 dBA at any sensitive receptors, the significance criterion utilized for this analysis. Under the City of Victorville Noise Element, any new adjacent development must protect its own occupants from the existing (project) noise.

10 This condition was the subject of comments by the applicant in its June 29, 1998 submittal, which were resolved at the October 27, 1998 workshop.

Staff does not foresee any future developments in the vicinity of the project that would likely combine with the project to produce inacceptable noise levels at sensitive receptors. Any noisy development near enough the project to add to project noise levels would, like the project, be sufficiently distant from sensitive receptors to cause no significant noise impacts at those receptors.

FACILITY CLOSURE

Upon closure of the facility, all operational noise will cease; no further adverse impacts from operation will be possible. The remaining potential noise source will be that caused by dismantling of the structures and equipment, and any site restoration work that may be performed. Since this noise will be similar to that caused by the original construction of the project, it can be treated similarly. Any noise LORS then in existence would apply; applicable Conditions of Certification included in the Commission Decision would also apply unless properly modified.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Staff concludes that the project will likely be built and operated to comply with all applicable noise laws, ordinances, regulations and standards. Staff further concludes that, with the implementation of the proposed conditions of certification, the project will likely present no significant adverse noise impacts, individually or cumulatively. The project will likely represent an unobtrusive, nearly undetectable addition to existing sound levels at sensitive receptors.

RECOMMENDATIONS

Staff recommends that the following proposed Conditions of Certification be adopted to ensure compliance with all applicable noise LORS, and implementation of the applicant’s and staff’s proposed mitigation measures.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of rough grading, the project owner shall notify the principals of the Harold H. George and Shepard Schools, 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: The project owner shall transmit to the CPM in the first Monthly Construction Report following the start of rough grading a statement, signed by the project manager, attesting that the above notification has been performed, and describing the method of that notification. This statement shall also attest that the telephone number has been established and posted at the site.

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.

Protocol: *The project owner or authorized agent shall:*

- use the Noise Complaint Resolution Form (see next page for example), 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
- prepare 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 complainant's satisfaction.

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

NOISE-3 Prior to the start of project construction, the project owner shall submit to the CPM for review a noise control program. The noise control program shall be used to limit employee exposure to high noise levels during construction in compliance with applicable OSHA standards.

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

NOISE COMPLAINT RESOLUTION FORM

HIGH DESERT POWER PLANT PROJECT (97-AFC-1)
NOISE COMPLAINT LOG NUMBER ____________ Complainant's name and address: Phone number:
Date complaint received: Time complaint received:
Nature of noise complaint:
Definition of problem after investigation by plant personnel: Date complainant first contacted:
Initial noise levels at 3 feet: ______ dBA Date:_________ Initial noise levels at complainant's property: _____ dBA Date:_________ Final noise levels at 3 feet: ______ dBA Date:_________ Final noise levels at complainant's property: _____ dBA Date:_________
Description of corrective measures taken: Complainant's signature: ___________________ Date:_________
Approximate installed cost of corrective measures: $ Date installation completed: Date first letter sent to complainant: ____________(copy attached) Date final letter sent to complainant: ____________(copy attached)
This information is certified to be correct: Plant Manager's Signature: ____________________ Date:

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

NOISE-4 The project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to approximately 90 dBA measured at a distance of 1,000 feet. The project owner shall conduct steam blows only during the hours of 7:00 a.m. to 8:00 p.m. weekdays, and 8:00 a.m. to 8:00 p.m. weekends and holidays.

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 a description of the steam blow schedule.

NOISE-5 At least 15 days prior to the first steam blows, the project owner shall notify the principals of the Harold H. George and Shepard Schools, and the administrator of the SCIA Golf Course, of the planned steam blow activity, and shall make the notification available to area residents. The notification may be in the form of letters to the area residences, telephone calls, fliers or other effective means, and shall include a description of the purpose and nature of the steam blows, 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: Within five (5) days of notifying these entities, the project owner shall send a letter to the CPM confirming that they have been notified of the planned steam blow activities, including a description of the method(s) of that notification.

NOISE-6 Upon the project first achieving an output of 80 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey, utilizing the same monitoring site employed in the pre-project ambient noise survey, as well as an appropriate site near the project boundary, as a minimum. The survey shall also include the octave band pressure levels to ensure that no new pure-tone noise components have been introduced. If the results from the survey indicate that operation of the power plant causes noise increases in excess of 5 dBA (l_{eq}) at any sensitive receptor (residences, hospitals, schools, libraries or places of worship), additional mitigation measures shall be implemented to reduce noise to a level of compliance with this limit. No single piece of equipment shall be allowed to stand out as a dominant source of noise.

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

NOISE-7 The project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility. The survey shall be conducted within thirty (30) days after the facility is in full operation, and shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations sections 5095-5100 (Article 105) and Title 29, Code of Federal Regulations, Part 1910. The survey results shall be used to determine the magnitude of employee noise exposure. The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable 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 the federal Occupational Safety and Health Administration (OSHA) upon request.

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NOISE: APPENDIX A

FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

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

NOISE: Table A1
Definition of Some Technical Terms Related to Noise

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

Source: California Department of Health Services 1976.

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

NOISE: Table A2
Typical Environmental and Industry Sound Levels

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

Source: Peterson and Gross 1974

Subjective Response To Noise

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

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

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

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

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

- Except under special conditions, a change in sound level of 1 dB cannot be perceived.
- Outside of the laboratory, a 3 dB change is considered a barely noticeable difference.
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected.
- A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a 3 dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). The rules for decibel addition used in community noise prediction are:

NOISE: Table A3
Addition of Decibel Values

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

Source: Thumann, Table 2.3

Noise Propagation

Noise levels attenuate in logarithmic proportion to distance from the noise source. In approximate terms, noise level drops off 6 dB for every doubling in distance from the source, and 20 dB for every ten times increase in distance from the source.

Worker Noise Exposure

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

Noise: Table A4
OSHA Worker Noise Exposure Standards

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

Source: OSHA regulations

VISUAL RESOURCES

Testimony of Gary D. Walker

INTRODUCTION

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

This analysis focuses on whether the High Desert Power Project (HDPP) will cause significant adverse visual impacts and whether the project will conform with applicable laws, ordinances, regulations, and standards (LORS). The determination of the potential for significant impacts to visual resources resulting from the proposed project is required by the California Environmental Quality Act (CEQA) Public Resources Code section 21000 et seq. and Title 20, California Code of Regulations, section 1701 et seq.[11] The determination of the conformance of the proposed project with applicable LORS is required by Public Resources Code section 25525.

COMMISSION STAFF ANALYSIS METHODOLOGY

This analysis describes applicable laws, ordinances, regulations and standards; assesses the visual setting of the proposed project site and project linear facilities; evaluates the visual impacts of the proposed project on the existing setting; evaluates compliance of the project with applicable laws, ordinances, regulations, and standards; and recommends measures needed to mitigate any potential significant adverse impacts of the proposed project. For a more detailed explanation of staff's visual analysis methodology, see Visual Resources Appendix B.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

FEDERAL AND STATE

The proposed project, including the transmission rights-of-way, is located on both private and non-federal public lands and is thus not subject to federal land management requirements. Likewise, neither US Highway 395 nor any other roadway in the project vicinity is a designated or eligible State Scenic Highway (California Department of Transportation, 1992; AFC, p.5.9-1). Therefore, no federal or state regulations pertaining to scenic resources are applicable to the project.

LOCAL

The project viewshed (area from which the project may be seen) comprises portions of three jurisdictions: unincorporated portions of San Bernardino County to the east and north of the project site, including the town of Oro Grande and National Trails

11 The California Energy Commission's power plant siting regulations.

Highway (historic Route 66) to the east; portions of the City of Adelanto to the north and west; and portions of the City of Victorville, including the site itself and areas to the south and southeast.

County of San Bernardino

General Plan, Open Space/Recreation/Scenic Resources Element

The County of San Bernardino General Plan contains extensive policies regarding scenic resources, some of which could apply to the project. In broad terms, the County Open Space/Recreation/Scenic Element goals call for preservation and protection of outstanding scenic resources of the County (Goal 8.D.) through its policies. Policies applicable to the project area include:

Policy OR-50. This policy identifies the following features found in the general study area as potential scenic resources:

a) i) A roadway, vista point, or area which provides a vista of undisturbed natural areas; [fix format]

ii) Includes a unique or unusual feature which comprises an important or dominant portion of the viewshed...; and,

iii) Offers a distant vista which provides relief from less attractive views of nearby features (such as views of mountain backdrops from urban areas.)

b) Views of major mountain ranges, specifically including views of mountain ranges from urban or desert areas; historic or culturally significant structures; regional parks and their local access routes; any portion of the regional trail system.

Policy OR-58. Designated County Scenic Highways

The National Trails Highway located east of the project site is a designated County Scenic Highway. County Scenic Highway designation primarily entails controlling development within the 200-foot Scenic Corridor on each side of the designated route, such as restriction of signs or other roadside development. In addition, Policy OR-51 calls for a County review of projects to prevent obstruction of scenic views and to encourage compatibility with the surrounding landscape from scenic areas, trails, and highways.

City of Victorville

General Plan

The project site, located in the Southern California International Airport (SCIA) (formerly George Air Force Base), was recently annexed into the City of Victorville and is, therefore, covered under its General Plan. The City of Victorville is currently in the process of updating the City's General Plan. The update is currently in draft form and has not yet been adopted. The visual resources study makes reference to applicable land uses under the 1997 draft plan, which describes land uses at the SCIA in the SCIA Community Plan Element of the General Plan. There are no specific scenic resource policies in the SCIA Community Plan Element. The SCIA Element has, however, been used in this analysis as a source of future planned land uses at the SCIA in order to determine the location of potentially sensitive receptors.

SCIA Specific Plan

The SCIA Specific Plan was prepared by the City of Victorville and describes allowable land uses within the SCIA. The Specific Plan includes no specific scenic policies.

Municipal Code Zoning Ordinance

Chapter 18.44: M-2 - Heavy Industrial District of the Victorville Municipal Code Zoning Ordinance (City of Victorville, 1997) applies to electric generating plants such as the project. This chapter requires that a view obscuring wall or fence be erected and maintained at a height six feet above open spaces used for storage of materials abutting property used for public purposes or when it is in the opinion of the director of planning erection of said fence is necessary due to surrounding land uses (Section 18.44.080).

City of Adelanto

No visual resource policies of the City of Adelanto are applicable because the project is not in the City of Adelanto.

Victor Valley Economic Development Authority Redevelopment Plan (RDP)

Portions of the Victor Valley, including the SCIA site, were included within a regional redevelopment plan operating under a Joint Powers Authority (JPA). The JPA is comprised of the County of San Bernardino, the Cities of Victorville and Hesperia, and The Town of Apple Valley. Land uses permitted under the RDP are those permitted by the applicable General Plans of the respective JPA jurisdictions. In the case of the proposed project, the City of Victorville is the JPA jurisdiction. The Final Program Environmental Impact Report (FPEIR) for the Victor Valley Redevelopment Project, which evaluated potential environmental effects, found that light and glare from street lights, reflective building materials, and vehicle headlights resulting from implementation of the plan had the potential to cause significant adverse impacts in the study area. As a result of these findings, the FPEIR presented mitigation measures, to direct outdoor lighting from commercial and industrial uses away from existing and planned residential units, and various measures to reduce the amount and impact of outdoor night lighting, for consideration under subsequent project approvals. Though not binding, these mitigation measures indicated the level of local concern with possible glare and night lighting impacts that could come with development of the Victor Valley.

PROJECT DESCRIPTION

POWER PLANT

The most visually prominent elements of the power plant would be the cooling tower banks, HRSG and exhaust stack for the 3F and 2G configurations.

The 5F configuration would not include an HRSG or cooling tower banks. The stack would be approximately 80 feet tall and 22 feet in diameter. (HDPP 1997b, August 7). (See PROJECT DESCRIPTION Figure 3).

The 3F configuration would include three cooling tower banks, each approximately 50 feet wide, 50 feet tall, and 300 feet long. The HRSG unit (from the edge of the stack to the gas turbine inlet) would be approximately 150 feet long and 90 feet tall. Each of the three exhaust stacks would be approximately 175 feet tall and 18 feet in diameter. (See PROJECT DESCRIPTION Figure 4).

The 2G configuration would be similar in size to that of the 3F but would include two cooling banks instead of three. Each bank would be approximately 50 feet wide, 50 feet tall, and 360 feet long. The HRSG unit would be 170 feet long and approximately 100 feet tall. Each of the two exhaust stacks would be approximately 175 feet tall and 22 feet in diameter. (See PROJECT DESCRIPTION Figure 5).

TRANSMISSION LINE

The HDPP would include approximately 7 miles of new single-circuit 230 kV transmission lines. Tower types would consist of a combination of lattice and pole structures. (HDDP 1997a, p.5.9-23). Each structure would be approximately 130 feet tall (See PROJECT DESCRIPTION Figures 6 and 7).

WATER PIPELINE

See the project description section of the PSA.

NATURAL GAS PIPELINE

See the project description section of the PSA.

SETTING

REGIONAL SETTING

The High Desert Power Project (HDPP) is located within the Mojave Desert portion of the Sonoran Desert subdivision of Fenneman's Basin and Range physiographic province (Fenneman 1946). This landscape is characterized by vast tracts of largely level, arid lands with low scrub or no vegetation, punctuated by periodic abruptly rising, often unvegetated mountain ranges. Typical landcover in the region of the project is creosote scrub and Joshua tree woodland. The latter, highly distinctive vegetation type is unique to this portion of the Mojave Desert and is locally common.

The most prominent and scenic landscape feature in the region is the San Gabriel Mountain range, which marks the western boundary of the vast Basin and Range Province and the beginning of the Pacific Border Province with its characteristic high coastal mountain ranges. In the site vicinity, this range is seen in views to the southwest, rising dramatically at the horizon, often behind large tracts of sparsely developed level plain. However, the landscape in the portion of western San Bernardino County where the project is located is highly altered by existing infrastructure, particularly the numerous transmission lines that are common and highly evident throughout the project area, and increasingly, by extensive residential development.

PROJECT AREA SETTING

The HDPP site is located within the northeastern boundary of the Southern California International Airport (SCIA) (see VISUAL RESOURCES Figure 1, in Appendix A). The SCIA is highly developed and includes both large industrial and commercial structures, and large areas of vacant residences. The SCIA defines a portion of the eastern boundary of the City of Adelanto and a portion of the northwestern boundary of the City of Victorville. Much of the northern and eastern boundaries of the SCIA adjoin unincorporated lands of San Bernardino County.

The SCIA is located at the eastern edge of a level plateau that rises abruptly from the Mojave River and extends to the north, west, and southwest of the river valley. The proposed HDPP site is located on the eastern edge of this plateau, to the north of the main developed area of the SCIA. To the south and southeast of the SCIA, tributary washes of the Mojave River create a slightly rolling terrain through which the HDPP transmission line would pass. Landcover in undeveloped portions of the project area consists of creosote scrub or Joshua tree woodland.

SITE

The project site has been altered such that it is virtually flat and almost no vegetation exists.

VIEWSHED

VISUAL RESOURCES Figure 1 shows the approximate boundaries of the project viewshed. Various large structures within the SCIA restrict or strongly filter views to the project site from the south and southwest, although tall stacks could be visible above the existing structures. Views toward the site from other directions are largely unobstructed.

SCENIC FEATURES AND VIEW CORRIDORS

To the west of the SCIA, the most scenic views are those facing southwest to the San Gabriel Mountains. Views toward the site from the west include a backdrop of scenic mountains to the east. East of the site, the Mojave River Valley, against the background of Quartzite Mountain and associated hills, is the dominant landscape feature and an attractive and valuable scenic resource. The feature is characterized by tall, extensive cottonwood/willow riparian woodland, green agricultural fields, and largely undeveloped mountain peaks. These views were identified as being of high visual sensitivity in the Disposal and Reuse of George Air Force Base FEIS (USAF 1992, p.3-17). Views west toward the site from the east include scenic panoramas of the river valley with a backdrop of steep undeveloped slopes rising to the plateau west of the river. Areas to the north and northwest of the site contain few or no sensitive receptors. Views from south of the SCIA are dominated by former air force base development, as well as other residential, commercial, and industrial development and visually dominant existing electrical transmission lines.

SENSITIVE RECEPTORS

Potentially sensitive receptors include residents in Oro Grande and in the rural area along the eastern side of the Mojave River, and travelers on National Trails Highway (Route 66) to the east; residents in various locations within the City of Adelanto to the west; and residents in various locations within the City of Victorville to the south (see VISUAL RESOURCES Figure 1).

Potentially sensitive land uses within the SCIA were evaluated by field reconnaissance and were found to be largely outside the project viewshed due to intervening on-site buildings and trees, with the exception of portions of the existing golf course, the proposed El Evado Road alignment, and adjacent areas designated as Public Open Space (P/OS) under the SCIA Specific Plan. These areas could potentially have foreground views of the proposed electrical transmission line.

Views to the project site from Air Base Road would be largely obscured by foreground development at the SCIA, with the exception of the proposed transmission line crossing, which would be visible at the El Evado Road intersection/existing Intermountain Power Project (IPP) transmission corridor.

The nearest major roadways include US Highway 395, approximately three miles to the west of the project site, and National Trails Highway, approximately one and three-quarter miles east of the project site. The SCIA is crossed east to west by Air Base Road, south of the HDPP site and south of the major developed portion of the SCIA. Adelanto Road bounds the SCIA to the west. Portions of the proposed transmission line would be visible at crossings of Mojave Drive and State Route 18, major local roadways whose travelers constitute potential sensitive receptors south of the SCIA in the City of Victorville.

KEY OBSERVATION POINTS

Visual resource effects on each group of sensitive receptors were evaluated from representative Key Observation Points (KOPs) (see VISUAL RESOURCES Table 1 for a description of the locations of each KOP; see VISUAL RESOURCES Figure 1 in Appendix A for a map showing the location of the KOPs). A number of KOPs were eliminated from further consideration and simulations were not prepared for them because they either were deemed to have no potential for significant impacts or they were adequately represented by other KOPs. These included KOPs 1, 7, 9, 11 through 16, 18, and 19. Photographs of views from KOPs that were given further consideration are shown both before project construction and with the project simulated in the view in VISUAL RESOURCES Appendix A. Staff's assessment of the visual quality, viewer sensitivity, visibility, and viewer exposure for the views represented by each KOP is presented in VISUAL RESOURCES Appendix C.

IMPACTS

PROJECT SPECIFIC IMPACTS

Operation Impacts

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

Project Site and Transmission Line

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

VISUAL RESOURCES Table 3 shows the values for form, line, color, texture, and scale contrast; scale dominance; spatial dominance; and view blockage (discussed in VISUAL RESOURCES Appendix D) considered for each of the Key Observation oints analyzed, and the resultant value for impact severity for each Key Observation Point.

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

Key Observation Point 2: Adelanto Road at Crippen Avenue

Visual Impact Susceptibility

Key Observation Point 2 is located near the intersection of Adelanto Road and Crippen Avenue, on the eastern edge of Adelanto (see VISUAL RESOURCES Figure 1 in VISUAL RESOURCES Appendix A). This view was selected because it represented the closest residences on the west side of the project site (see VISUAL RESOURCES Figure 2 in VISUAL RESOURCES Appendix A).

For Key Observation Point 2 visual quality is moderate, viewer sensitivity is high, visibility is moderate, and viewer exposure is moderate, so visual impact susceptibility is moderate (see VISUAL RESOURCES Table 2 and Figure B-3).

VISUAL RESOURCES Table 1

Key Observation Points

KOP Number	Description
1	Taken from the corner of Air Base Road and Adelanto Road looking northeast at the project.
2	Taken from residences near the intersection of Adelanto Road and Crippen Avenue looking east to northeast across the runways at the project site.
3	Taken from residences near Highway 395 and Auburn Avenue looking east at the project site.
4	Taken from the Oro Grande area, east of the project site, looking west at the project site.
5	Taken from the Oro Grande area, east of the project site, looking southeast at the proposed transmission line.
6	Taken from the Oro Grande area, east of the project site, looking southeast at the proposed transmission line.
7	Looking east from near where the proposed transmission line would cross Air Base Road.
8	Looking west from near where the proposed transmission line would cross Air Base Road.
9	Looking east from the closest residences located near the intersection where the proposed transmission line would cross Mojave Drive.
10	Looking west from the closest residences located near the intersection where the proposed transmission line would cross Mojave Drive.
11	Looking east from the point where the proposed transmission line changes from going almost due south to where it begins going southwest.
12	Looking west from the residences closest to the eastern side of the proposed transmission line and near the point where it changes from going almost due south to where it begins going southwest.
13	Taken from the road perpendicular to Seneca Road from the residences looking toward Victor Substation.
14	Looking east from US Highway 395 (and including the last tower going into Victor Substation from the existing transmission line).
15	Looking east from Victor Substation looking at the substation.
16	Taken from the elementary school located within the SCIA boundaries looking in the direction of the project site.
17	Taken from the eastern edge of the SCIA golf course looking at the proposed transmission line.
18	Taken from Rancho and El Evado Roads looking at residences located in the Mojave Heights area.
19	Taken from the National Trails Highway looking west at the VVWRA pipeline route.
20	Taken from the northern section of El Evado Road looking east toward the Mojave River Valley and Quartzite Mountain.

VISUAL RESOURCES Table 2

Visual Impact Susceptibility - Key Observation Points

	VISUAL QUALITY	VIEWER SENSITIVITY	VISIBILITY	VIEWER EXPOSURE	VISUAL IMPACT SUSCEPTIBILITY
Key Observation Point 2	Moderate	High	Moderate	Moderate	Moderate
Key Observation Point 3	Moderate-to-High	High	High	Moderate	Moderate-to-High
Key Observation Points 4, 5, and 6	Moderate-to-High/High*	High	Moderate	High/ Moderate*	Moderate-to-High
Key Observation Point 8	Low	Moderate	Moderate	Moderate-to-High	Low
Key Observation Point 10	Low	High	High	Moderate-to-High	Low
Key Observation Point 17	High	High	High	High	High
Key Observation Point 20	High	High	High	Low	Low

- The first value refers to the majority of the area represented by Key Observation Points 4, 5, and 6 and the second value refers to the western portion of that area (see the foregoing text).

VISUAL RESOURCES Table 3

Visual Impact Severity - Key Observation Points

	FORM CONTRAST	LINE CONTRAST	COLOR CONTRAST	TEXTURE CONTRAST	SCALE CONTRAST	SCALE DOMINANCE	SPATIAL DOMINANCE	VIEW BLOCKAGE	VISUAL IMPACT SEVERITY
Key Observation Point 2	Structures: L* Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: M Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Negligible	Subordinate to Co-dominant	Weak	Moderate
Key Observation Point 3	Structures: N Vegetation: M Land: L-M	Structures: N Vegetation: M Land: L-M	Structures: N Vegetation: M Land: L-M	Structures: N Vegetation: L Land: L	Structures: N Vegetation: L Land: L	Subordinate	Subordinate to Co-dominant	Weak	Moderate
Key Observation Points 4, 5, and 6	Structures: L Vegetation: L Land: L~~-M~~	Structures: L Vegetation: L Land: L~~-M~~	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Subordinate	Co-dominant	Moderate	Moderate
Key Observation Point 8	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Co-dominant	Co-dominant	Weak	Strong
Key Observation Point 10	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Structures: L Vegetation: L Land: L	Co-dominant	Co-dominant	Weak	Strong
Key Observation Point 17	Structures: M Vegetation: H Land: H	Structures: L Vegetation: H Land: H	Structures: L Vegetation: M Land: M	Structures: M Vegetation: H Land: M	Structures: M Vegetation: L Land: H	Dominant	Dominant	Moderate	Very Strong
Key Observation Point 20	Structures: N Vegetation: H Land: H	Structures: N Vegetation: H Land: H	Structures: N Vegetation: M Land: M	Structures: N Vegetation: M Land: M	Structures: N Vegetation: H Land: H	Dominant	Dominant	Moderate	Very Strong

* L = Low; M = Moderate; H = High; N = None

VISUAL RESOURCES Table 4

Visual Impacts Before Mitigation - Key Observation Points

	VISUAL IMPACT SUSCEPTIBILITY	VISUAL IMPACT SEVERITY	VISUAL IMPACT
Key Observation Point 2	Moderate	Moderate	Less than significant
Key Observation Point 3	Moderate-to-High	Moderate	Less than significant
Key Observation Points 4, 5, and 6	Moderate-to-High	Moderate	Less than Significant
Key Observation Point 8	Low	Strong	Insignificant
Key Observation Point 10	Low	Strong	Insignificant
Key Observation Point 17	High	Very Strong	Significant
Key Observation Point 20	Low	Very Strong	Less than Significant

Visual Impact Severity

VISUAL RESOURCES Figure 3 shows the appearance of the project from Key Observation Point 2.

Visual Impact Severity -- Because a) the highest contrast rating would be moderate, b) scale dominance would be subordinate, c) the overall spatial dominance would be subordinate to co-dominant, and d) the severity of view blockage would be weak, the project's visual impact severity from Key Observation Point 2 would be moderate (see VISUAL RESOURCES Tables 3 and B-4).

Visual Impact Significance

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

Key Observation Point 3: Highway 395 at Auburn Avenue

Visual Impact Susceptibility

Key Observation Point 3 is located at residences near the intersection of Highway 395 and Auburn Avenue, looking east toward the project site (see VISUAL RESOURCES Figure 1 in VISUAL RESOURCES Appendix A). This view was chosen because it represents a residential area with a less obstructed view of the project site than Key Observation Point 2, although it is farther from the site (see VISUAL RESOURCES Figure 4 in VISUAL RESOURCES Appendix A).

For Key Observation Point 3 visual quality is moderate-to-high, viewer sensitivity is high, visibility is high, and viewer exposure is moderate, so visual impact susceptibility is moderate-to-high (see VISUAL RESOURCES Table 2 and Figure B-3).

Visual Impact Severity

VISUAL RESOURCES Figure 5 shows the appearance of the project from Key Observation Point 3 (Highway 395 at Auburn Avenue).

Visual Impact Severity -- Because a) the contrast rating with vegetation and land would be moderate in regard to form, line, and color, b) scale dominance would be subordinate, c) spatial dominance would be subordinate to co-dominant, and d) the severity of view blockage would be weak, the project's visual impact severity from Key Observation Point 3 would be moderate (see VISUAL RESOURCES Tables 3 and B-4).

Visual Impact Significance

Because for Key Observation Point 3 visual impact susceptibility is moderate-to-high and visual impact severity would be moderate, visual impact would be less than significant (see VISUAL RESOURCES Tables 4 and B-5).

Key Observation Points 4, 5, 6: Oro Grande Area

Visual Impact Susceptibility

Key Observation Points 4, 5, and 6 represent a panoramic view from the vicinity of the town of Oro Grande west toward the project site and the northern portion of the proposed transmission line (see VISUAL RESOURCES Figures 1, 6, and 8 in VISUAL RESOURCES Appendix A). This view was chosen because it represents the closest residential viewers and National Trails Highway.

For Key Observation Points 4, 5, and 6 visual quality is moderate-to-high for the majority of the area represented and high for the western portion of that area, viewer sensitivity is high, visibility is moderate, and viewer exposure is high for the majority of the area represented and moderate for the western portion of that area, so visual impact susceptibility is moderate-to-high (see VISUAL RESOURCES Table 2 and Figure B-3).

Visual Impact Severity

VISUAL RESOURCES Figures 7 and 9 in VISUAL RESOURCES Appendix A show the appearance of the project from Key Observation Points 4, 5, and 6 (in the community of Oro Grande).

Visual Impact Severity -- For Key Observation Points 4, 5, and 6, a) contrast would be low, b) scale dominance would be subordinate, c) spatial dominance would be co-dominant, and d) the severity of view blockage would be moderate for residences along the Mojave River and weak for the remainder of the area. The project's visual impact severity would therefore be moderate (see VISUAL RESOURCES Tables 3 and B-4).

Visual Impact Significance

Because visual impact susceptibility for Key Observation Points 4, 5, and 6 is moderate to high and visual impact severity would be moderate, visual impact would be less than significant (see VISUAL RESOURCES Tables 4 and B-5).

Key Observation Point 8: Air Base Road

Visual Impact Susceptibility

Key Observation Point 8 is located on Air Base Road, looking east toward where the proposed transmission line would cross the road (see VISUAL RESOURCES Figures 1 and 10 in VISUAL RESOURCES Appendix A). It was chosen because it represents the closest views for travelers on a road with relatively high usage.

For Key Observation Point 8 visual quality is low, viewer sensitivity is moderate, visibility is moderate, and viewer exposure is moderate-to-high, so visual impact susceptibility is low (see VISUAL RESOURCES Table 2 and Figure B-3).

Visual Impact Severity

VISUAL RESOURCES Figure 11 in VISUAL RESOURCES Appendix A shows the appearance of the project from Key Observation Point 8, showing the transmission line as it would look crossing Air Base Road.

Visual Impact Severity -- Because a) the highest contrast rating is low, b) scale dominance would be co-dominant, c) the overall spatial dominance would be co-dominant, and d) the severity of view blockage would be weak, the project's visual impact severity from Key Observation Point 10 would be strong (see VISUAL RESOURCES Tables 3 and B-4).

Visual Impact Significance

Because visual impact susceptibility for Key Observation Point 10 is low and visual impact severity would be strong, visual impact would be insignificant (see VISUAL RESOURCES Tables 4 and B-5).

Key Observation Point 10: Mojave Drive

Visual Impact Susceptibility

Key Observation Point 10 is located from near the closest residences to the point where the proposed transmission line route would cross Mojave Drive (see VISUAL RESOURCES Figure 1 in VISUAL RESOURCES Appendix A). The view was chosen because it represents the closest views of the transmission line from residences (see VISUAL RESOURCES Figure 12 in VISUAL RESOURCES Appendix A).

For Key Observation Point 10 visual quality is low, viewer sensitivity is high, visibility is high, and viewer exposure is moderate-to-high, so visual impact susceptibility is low (see VISUAL RESOURCES Table 2 and Figure B-3).

Visual Impact Severity

VISUAL RESOURCES Figure 13 shows the appearance of the project from Key Observation Point 10, showing the transmission line as it would look from a residential area near Mojave Drive. However, it is staff's understanding that along this portion of the route lattice towers rather than steel poles would be used, so staff's assessment will be based on lattice towers.

Because a) the highest contrast rating is low, b) scale dominance is co-dominant, c) the overall spatial dominance is co-dominant, and d) the severity of view blockage is weak, the project's visual impact severity from Key Observation Point 10 would be strong (see VISUAL RESOURCES Tables 3 and B-4).

Visual Impact Significance

Because visual impact susceptibility for Key Observation Point 8 is low and visual impact severity would be strong, visual impact would be insignificant (see VISUAL RESOURCES Tables 4 and B-5).

Key Observation Point 17: SCIA Golf Course

Visual Impact Susceptibility

Key Observation Point 17 is located on the existing SCIA golf course (see VISUAL RESOURCES Figure 1 in VISUAL RESOURCES Appendix A). This view was selected because it is a recreation area that would be affected by the proposed transmission line, and represents other visually sensitive portions of the SCIA including the undeveloped public/open space areas in the eastern-most part of the SCIA (see VISUAL RESOURCES Figure 14 in VISUAL RESOURCES Appendix A).

For Key Observation Point 17 visual quality is high, viewer sensitivity is high, visibility is high, and viewer exposure is high, so visual impact susceptibility is high (see VISUAL RESOURCES Table 2 and Figure B-3).

Visual Impact Severity

VISUAL RESOURCES Figure 15 shows the appearance of the project from Key Observation Point 17, showing the transmission line as it would look from near the eastern edge of the SCIA golf course.

Visual Impact Severity -- Because a) contrast with vegetation and with land would be high in regard to form and line, b) scale dominance would be dominant, c) the overall spatial dominance would be dominant, and d) the severity of view blockage would be moderate, the project's visual impact severity from Key Observation Point 17 would be very strong (see VISUAL RESOURCES Tables 3 and B-4).

Visual Impact Significance

Because visual impact susceptibility for Key Observation Point 17 is high and visual impact severity would be very strong, visual impacts would have the potential to be significant (see VISUAL RESOURCES Tables 4 and B-5). The applicant has proposed mitigation measures to reduce these impacts (see below).

Key Observation Point 20: Northern Section of El Evado Road

Visual Impact Susceptibility

Key Observation Point 20 is located on the northern section of El Evado Road, looking east (see VISUAL RESOURCES Figure 1 in VISUAL RESOURCES Appendix A). This view was selected because it represents the view that travelers using the SCIA Airport would have (see VISUAL RESOURCES Figure 16 in VISUAL RESOURCES Appendix A).

For Key Observation Point 20 visual quality is high, viewer sensitivity is high, visibility is high, and viewer exposure is low, so visual impact susceptibility is low (see VISUAL RESOURCES Table 2 and Figure B-3).

Visual Impact Severity

VISUAL RESOURCES Figure 17 in VISUAL RESOURCES Appendix A shows the appearance of the project from Key Observation Point 20, showing the transmission line as it would look from the northern section of El Evado Road looking east toward the mountains.

Because a) contrast with vegetation would be high in regard to form, line, and scale, b) contrast with land would be high in regard to form, line, and scale, c) scale dominance would be dominant, d) the overall spatial dominance would be dominant, and e) the severity of view blockage would be moderate, the project's visual impact severity from Key Observation Point 20 would be very strong (see VISUAL RESOURCES Tables 3 and B-4).

Visual Impact Significance

Because visual impact susceptibility for Key Observation Point 20 is low and visual impact severity would be very strong, visual impacts from Key Observation Point 20 would be less than significant (see VISUAL RESOURCES Tables 4 and B-5).

Lighting

From viewer locations such as Key Observation Point 2 substantial existing lighting from the SCIA is visible in the view toward the project site, so the potential for impacts due to project lighting is not significant. However, from Key Observation Points 3 (the residential area near Highway 395 and Auburn Avenue) and 4, 5, and 6 (in the Oro Grande area), views toward the project site now have almost no lights visible. Therefore, project lighting has the potential to cause significant impacts on these views. Substantial visible lighting could change the view from an essentially natural one to a view in which an industrial facility is prominent. The applicant has proposed measures to reduce lighting impacts, and staff has expanded on these measures (see below). At the time of the preparation of the Draft Preliminary Staff Assessment, the specific obstruction lighting for the project had not yet been determined. Staff therefore could not rule out the potential for the use of high visibility strobe lighting, which could cause significant visual impacts. However, the applicant has subsequently submitted a copy of a letter from the Director of the SCIA stating that based upon preliminary design SCIA would make the following recommendations to the Federal Aviation Administration (FAA) on the project (HDDP 1998_):**[update reference]**

- The 175 foot high stacks for a combined cycle plant will require three red flashing 620 or 700 watt beacons on top of end stacks and two on top of middle stack. Three red 116 watt lights are required half way down on end stacks and two on middle stack halfway down.

- The 129 foot high electric transmission line towers are lower than the stacks and further from the runway. SCIA will recommend that obstruction lighting not be required for the transmission line.

Based on this information, staff does not expect that obstruction lighting would cause any significant visual impacts. Red flashing beacons would be less obtrusive than the white strobe lighting used as the basis for analysis in the Draft Preliminary Staff Analysis, and no lighting is expected for the transmission towers.

Visible Plumes

Exhaust Stack Plumes

The applicant has stated that "visible plumes could occur and would be visible from viewpoints throughout the viewshed due to their great potential height (depending upon wind conditions, etc. (HDPP 1997b, p.5.9-21). When asked why these plumes would nevertheless be "visually subordinate and result in less than significant impacts in virtually all locations," the applicant responded that "even though the plumes could potentially be high under unusual, very infrequent conditions, they are expected to be narrow and not massive" (HDPP 1998b, Response to Staff Data Request 62). With regard to visible plumes from the exhaust stacks, the applicant stated that "on average, there are only 125 hours per year....on which relative humidity was above 80 percent during the daytime. Consequently, it is unlikely that there will be extended periods of visible plumes from the combustion turbine generator exhaust stacks or that visible plumes will exist for significant distances downwind from the plant site." (HDPP 1998b, Response to Staff Data Request 63). Staff concurs with this assessment.

Cooling Tower Plumes: 720 MW Combined Cycle and 678 MW Combined Cycle Options

In regard to cooling tower plumes, the applicant has stated that for the 2-tower configuration plume height will be 60m or greater for 15.6 percent of the time and 100m or greater for 7.73 percent of the time. The applicant also stated that for the same configuration plume radius will be 25m or greater 13.2 percent of the time and 35m or greater 7.23 percent of the time (HDPP 1998b, Response to Staff Data Request 64). The applicant also stated that for the same configuration plume radius will be 25m or greater 13.2 percent of the time and 35m or greater 7.23 percent of the time (HDPP 1998b, Response to Staff Data Request 64). In a memorandum commenting on the Draft Preliminary Staff Report, the consultant for the applicant acknowledged that co-dominant plume contrast is potentially significant in the viewshed of KOPs 4, 5, and 6. However, the consultant maintains that "the infrequency of these worst case conditions is a sufficient mitigation to reduce this impact to less than significant levels. The threshold here is one of duration or frequency." The consultant estimates that half of the time that a plume 60m or greater will occur will be during night-time, cloudy, or hazy conditions, so that "the plumes would be expected to exceed acceptable impact levels 7-8% of the time." 12

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12 The cover letter for the memorandum states that "The attached graphical information indicates that a visible plume would <u>not</u> exist during clear or lightly clouded daylight." Commission staff's position is that no conclusions regarding the frequency and duration of visible plumes can be drawn from the graphical information.

In the applicant's comments on the draft Preliminary Staff Report, the applicant suggested that staff "obtain information from the ACE Cogeneration Facility in Trona, California as a project with cooling

Staff acknowledge that a plume would not cause substantial contrast during night-time conditions, given the proposed mitigation of minimizing project lighting that otherwise could illuminate the plume. Staff also acknowledges that a cooling tower plume would create less visual contrast during cloudy conditions than under clear conditions. Therefore, staff now assumes that the cooling tower plume would cause substantial contrast approximately eight percent of the time. Staff does not consider this to be a significant impact.

Water Pipeline

Because the area that would be disturbed by the water pipeline would not be visible from any area with sensitive receptors, no significant operations impacts are expected.

Gas Pipeline

Because the gas pipeline route follows existing roads and is in areas with low scenic quality, and because the pipeline will not be visible after construction is completed, operation phase impacts from the gas pipeline are not expected to be significant.

Construction Impacts

Project Site

Project staging and material storage would take place on and adjacent to the project site in highly developed industrial areas with no sensitive receptors (HDPP 1997a, p.5.9-19). These activities would be visually subordinate because they do not include prominent visual elements and they would not occur near any sensitive receptors. Therefore, project staging and material storage are not expected to cause any significant impacts. Fugitive dust disturbances could be visually prominent (HDPP 1997a, p.5.9-19), but due to their short-term nature they are not considered as causing significant impacts. Tall stack construction would be seen from middleground distances and would be of short duration, so impacts are not expected to be significant.

Transmission Line

Key Observation Points 4, 5, and 6: Oro Grande Area

Because of the middleground distance and the short duration of construction, impacts due to the transmission line on sensitive receptors in the area of Key Observation Points 4, 5, and 6 are not expected to be significant.

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towers in the same meteorology" (HDPP 1998__). Commission staff has contacted ACE Cogeneration Facility staff (Walley 1998). ACE staff stated that no data regarding visible plumes has been gathered for the ACE project.

Key Observation Point 8: Air Base Road

Because of the low visual quality in the view from Key Observation Point 10 and the short duration of construction, impacts on travelers are not expected to be significant.

Key Observation Point 10: Mojave Drive

Despite the foreground view distance of the transmission line from Key Observation Point 10, impacts of construction are not expected to be significant because of the low visual quality, the presence of an existing transmission line closer to residences than the proposed line, and the short duration of construction in this area.

Key Observation Point 17: Golf Course

Because of the high visual susceptibility from Key Observation Point 17 and the large apparent size of the poles from this view, construction of the transmission line has the potential to cause significant visual impacts in the vicinity of the SCIA golf course. The applicant has proposed measures to mitigate these impacts (see below).

Key Observation Point 20: Northern Section of El Evado Road

Because the transmission line is expected to be completed before substantial development of the airport and consequent travel on El Evado Road by airport users, construction phase impacts are not expected to be significant.

Water Pipeline

Because construction activity for the water pipeline would not be visible from any area with sensitive receptors, no significant impacts are expected.

Natural Gas Pipeline

Because the gas pipeline route follows existing roads and is in areas with low scenic quality, construction phase impacts from the pipeline are not expected to be significant.

CUMULATIVE IMPACTS

Potential cumulative impacts in the overall project viewshed would include any future development at SCIA. Construction of additional large scale facilities near the powerplant could have a noticeable cumulative effect on sensitive receptors in the Mojave River/Oro Grande area by increasing the overall bulk of objects at the top of the plateau.

FACILITY CLOSURE

In the event that the facility becomes no longer viable, if one of the combined cycle configurations is built, the exhaust stacks should be removed to reduce visual impacts. The transmission poles on SCIA property should also be removed.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

LOCAL

County of San Bernardino

General Plan, Open Space/Recreation/Scenic Resources Element

Because the proposed project is not expected to cause any significant visual impacts to views from areas under the jurisdiction of the County of San Bernardino, the project would comply with the County General Plan.

City of Victorville

Municipal Code Zoning Ordinance

Chapter 18.44: M-2 - Heavy Industrial District of the Victorville Municipal Code Zoning Ordinance (City of Victorville, 1997) applies to electric generating plants such as the project. This chapter requires that a view obscuring wall or fence be erected and maintained at a height six feet above open spaces used for storage of materials abutting property used for public purposes or when it is in the opinion of the director of planning erection of said fence is necessary due to surrounding land uses (Section 18.44.080). Because no sensitive land uses are near the proposed project site, it is not expected that such a view obscuring wall or fence would be required.

MITIGATION

APPLICANT'S PROPOSED MITIGATION MEASURES

Construction Phase

Transmission Line

The applicant has stated that transmission line construction staging and material storage areas should be located outside of the immediate foreground (one-eighth mile or less) of sensitive receptors including residences and public roads, and particularly, of sensitive receptors in BLM Class II areas[13] such as the SCIA golf course (HDPP 1997a, p.5.9-26). Where transmission line construction staging and material storage areas are visible within one-quarter mile of sensitive receptors in BLM Class II areas, ground disturbance should be minimized, and topsoil stocked, respread, and revegetated with native vegetation after completion of construction.

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13 Class II is a category in the U.S. Bureau of Land Management's Visual Resource Management (VRM) methodology; see HDPP 1997a, p.5.9-3).

Staff agrees with these measures, and has incorporated them into a recommended condition of certification (See Condition VIS-4 below).

Operation Phase

Powerplant

The applicant has stated that contrast of visually prominent project features should be partially reduced by painting in a non-reflective moderately light blue color to blend with the background sky (HDPP 1997a, p.5.9-26). The applicant has also stated that the taller exhaust stacks cannot be painted in this way due to their very high operating temperatures, but would be painted in an appropriate cost-effective and heat-resistant color.

The applicant has stated that night lighting of the powerplant shall consist of highly directional, pole-mounted fixtures. Lights shall be shielded to direct light groundward, restrict lighting to within the project site, and to prevent backscatter of light into the night sky. The applicant has also stated that night lighting of tall project features should be avoided at times when it is not specifically needed.

Transmission Line

The applicant has stated that transmission towers [poles] should be carefully sited to minimize obstruction of principal view corridors eastward from the SCIA golf course (HDPP 1997a, p. 5.9-26). The applicant also originally stated that if feasible, the transmission line should be sited upslope (west) of what was then proposed El Evado Road in order to minimize obstruction of scenic views from the roadway, unless doing so would increase impacts to the golf course. Subsequently the City of Victorville completed its final alignment of El Evado Road, and the applicant determined that it was not feasible to place the transmission line on the uphill (west) side of El Evado Road. Therefore, the transmission line is proposed for the eastern side of El Evado Road (HDPP 1998h, Data Response 53).

ADDITIONAL MITIGATION

Operation Phase

Power Plant

Staff generally agrees with the applicant's proposed mitigation measures in regard to color and lighting for the power plant. However, staff's position is that these measures need to be more precisely developed in conditions of certification, which staff proposes below.

Transmission Line

Staff generally agrees with the applicant's proposed mitigation measure in regard to carefully siting transmission poles to minimize obstruction of principal view corridors eastward from the SCIA golf course. However, staff's position is that this measure needs to be more precisely developed in a conditions of certification, which staff proposes below.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The project as proposed has the potential to cause significant adverse visual impacts from one viewing area. Effective implementation of applicant's proposed mitigation measures, as modified and expanded by staff's recommendations, is expected to reduce visual impacts to less than significant levels. The project is expected to be in compliance with applicable laws, ordinances, regulations, and standards regarding visual resources.

RECOMMENDATIONS

The Energy Commission should adopt the following Conditions of Certification if it approves the project.

PROPOSED CONDITIONS OF CERTIFICATION

CONDITIONS FOR ALL PROJECT CONFIGURATIONS

VIS-1 Prior to the start of commercial operation, the project owner shall treat the project structures, buildings, and tanks visible to the public in a non-reflective moderately light blue color to blend with the background sky. The project owner shall treat the exhaust stacks with a heat-resistant color that minimizes contrast and harmonizes with the surrounding environment.

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

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

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

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

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

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

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

Verification: Not later than 30 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.

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

Not less than thirty days prior to 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-2 Any fencing for the project shall be non-reflective.

Protocol: At least 30 days prior to ordering the fencing the project owner shall submit to the CPM for review and approval the specifications for the fencing documenting that such fencing will be non-reflective.

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

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

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

Verification: At least 30 days prior to ordering the non-reflective fencing, the project owner shall submit the specifications to the CPM for review and approval.

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

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

VIS-3 Prior to the 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. To meet these requirements:

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

- Lighting is designed so that exterior light fixtures are hooded, with lights directed downward or toward the area to be illuminated and so that backscatter to the nighttime sky is minimized. The design of this outdoor lighting shall be such that the luminescence or light source is shielded to prevent light trespass outside the project boundary;
- High illumination areas not occupied on a continuous basis such as maintenance platforms or the main entrance are provided with switches or motion detectors to light the area only when occupied;
- A lighting complaint resolution form (following the general format of that in attachment 1) will be used by plant operations, to record all lighting complaints received and document the resolution of those complaints. All records of lighting complaints shall be kept in the on-site compliance file.

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

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

Verification: At least 90 days before ordering the exterior lighting, the project owner shall provide the lighting plan to the CPM for review and approval. The CPM will notify the project owner of approval or disapproval within 15 days of receipt of the lighting plan.

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

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

VIS-4 The project owner shall locate all transmission line construction staging and material storage areas outside of the immediate foreground (one-eighth mile or less) of sensitive receptors including residences and public roads, and particularly, of sensitive receptors in BLM Class II areas[14] such as the SCIA golf course. Where transmission line construction staging and material storage areas are visible within one-quarter mile of sensitive receptors in BLM Class II areas, the project owner shall minimize ground disturbance, and shall stock and respread topsoil, and revegetate with native vegetation after completion of construction.

Protocol: At least 90 days prior to the start of construction of the transmission line, the project owner shall submit a map to the CPM for review and approval. The map shall include:

- The location of the proposed transmission line route,
- The location of all transmission line construction staging and storage areas and sensitive receptors,
- The location of BLM Class II areas, and
- The location of sensitive receptors within one-quarter mile of transmission line construction staging and storage areas.

The project owner shall not begin construction of the transmission line until the map is approved by the CPM.

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

Verification: At least 90 days before the start of construction on the transmission line, the project owner shall provide the map to the CPM for review and approval.

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

VIS-5 The project owner shall locate the electrical transmission poles so as to minimize obstruction of principal view corridors eastward from the SCIA Golf Course.

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14 Class II is a category in the U.S. Bureau of Land Management's Visual Resource Management (VRM) methodology; see HDPP 1997a, p.5.9-3).

<u>Protocol:</u> At least 90 days prior to the start of construction of the transmission line, the project owner shall submit a map to the CPM for review and approval. The map shall include:

- The location of the proposed transmission poles in the area of the SCIA Golf Course.
- The location of the primary view corridors eastward from the SCIA Golf Course.
- The project owner shall not begin construction of the transmission line until the map is approved by the CPM.

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

The project owner shall not begin construction of the transmission line until the pole staking in the area of the SCIA Golf Course is approved by the CPM.

If the CPM notifies the project owner that revisions of the pole staking are needed before CPM approval, the project owner shall confer with the CPM to develop acceptable pole locations.

<u>**Verification:**</u> At least 90 days before the start of construction on the transmission line, the project owner shall provide the map to the CPM for review and approval.

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

The project owner shall notify the CPM within seven days of staking the pole locations east of the SCIA golf course that the staking is complete and is ready for inspection.

The project owner shall notify the CPM within seven days of the completion of transmission pole installation in the area east of the SCIA Golf Course that the poles are ready for inspection.

REFERENCES

HDPP (High Desert Power Project, LLC) 1997a. Application for Certification, High Desert Power Project (97-AFC-1). Submitted to the California Energy Commission, June 30, 1997.

HDPP (High Desert Power Project, LLC) 1997b. Revised Application for Certification, High Desert Power Project (97-AFC-1). Submitted to the California Energy Commission, November 17, 1997.

HDPP (High Desert Power Project, LLC) 1997c. Applicant's Response to Staff Data Requests of December 17, 1997 and High Desert Power Project LLC Request for Procedural Ruling. Submitted to the California Energy Commission, January 6, 1998.

HDPP (High Desert Power Project, LLC) 1998b. Data request responses for most of the 77 data requests and 11 discussion topics filed by the Commission staff on December 15, 1997. Submitted to the California Energy Commission, January 16, 1998.

HDPP (High Desert Power Project, LLC) 1998h. Responses to Data Requests 52 through 56. Submitted to the California Energy Commission, February 13, 1998.

Walley, Zenis 1998. Conversation between Zenis Walley of ACE Cogeneration Faciltiy and Gary D. Walker of Commission staff. July 13, 1998.

ATTACHMENT 1
LIGHTING COMPLAINT RESOLUTION FORM

LIGHTING COMPLAINT RESOLUTION FORM

HIGH DESERT POWER PROJECT **Victorville, California**
Complainant's name and address: Phone number:
Date complaint received: Time complaint received:
Nature of lighting complaint:
Definition of problem after investigation by plant personnel: Date complainant first contacted:
Description of corrective measures taken: Complainant's signature: ____________________ Date:
Approximate installed cost of corrective measures: $ Date installation completed: Date first letter sent to complainant: ____________(copy attached) Date final letter sent to complainant: ____________(copy attached)
This information is certified to be correct: Plant Manager's Signature:

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

VISUAL RESOURCES APPENDIX A

VISUAL RESOURCES FIGURE 1

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VISUAL RESOURCES FIGURE 2

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VISUAL RESOURCES FIGURE 3

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VISUAL RESOURCES FIGURE 16

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VISUAL RESOURCES FIGURE 17

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VISUAL RESOURCES APPENDIX B

Commission Staff's Visual Assessment Methodology

INTRODUCTION

This appendix explains staff's approach to the treatment of visual resources in siting cases. Staff has used this general approach in several siting cases, including the SCA Procter and Gamble project and the SPAC Campbell Soup project. Staff used this specific approach in analyzing the San Francisco Energy Company project. The applicants for these projects reviewed the staff analyses, and the Commission incorporated staff's recommendations into the decisions on the projects.

Visual resources are the visible natural and cultural components of the environment. Natural components consist of landforms, water features, and vegetation. Cultural components result from modification of the natural landscape, and include buildings, roads, and transmission lines.

VISUAL ANALYSIS PROCESS

Figure B-1 depicts the process that staff used in its visual resources analysis of the proposed project. The first step is to assess the visual setting.

METHODOLOGY FOR ASSESSING VISUAL SETTING

Visual Factors

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

Visual Quality

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

A basic premise in the evaluation of visual quality is whether a project will be compatible with the character of the landscape. In the case of predominantly natural settings, projects should be compatible with this character. It is possible for new structures to be compatible with predominantly natural settings if such settings already contain some structures that are considered compatible and the new structures are similar to the existing structures and do not appreciably change the

VISUAL RESOURCES FIGURE B-1:

STAFF'S VISUAL ANALYSIS PROCESS

DESCRIBE VISUAL SETTING

DESCRIBE PROJECT'S VISUAL CHARACTERISTICS

IDENTIFY APPLICABLE LAWS, ORDINANCES,
REGULATIONS, AND STANDARDS

SELECT KEY OBSERVATION POINTS

ASSESS SUSCEPTIBILITY TO VISUAL IMPACT

AND SEVERITY OF VISUAL IMPACT

DETERMINE VISUAL IMPACT

IMPACT ASSESSMENT PROCESS

(see Figure B-2)

EVALUATE COMPLIANCE WITH LAWS, ORDINANCES,
REGULATIONS, AND STANDARDS

IDENTIFY APPROPRIATE MITIGATION MEASURES
(IF ANY)

DRAW CONCLUSIONS AND
MAKE RECOMMENDATIONS

PROPOSE CONDITIONS OF CERTIFICATION

balance of natural and cultural elements. However, in areas that appear to be totally natural, any modification that appears to be human-made will change the character of the area.

Viewer Sensitivity

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

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

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

Viewer Attitudes (direct)

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

Viewer Activities (indirect)

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

Visibility

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

Viewer Exposure

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

Distance

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

Numbers of Viewers

Two measures of the number of viewers are important to consider in assessing the potential visual impact of a project. One is the absolute number of viewers. The other is the proportion of viewers in a viewshed who can see the project. If only one residence is affected, visual susceptibility is considered to be low.

Duration of View

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

DESCRIBE THE PROJECT'S VISUAL CHARACTERISTICS

The second step in staff's visual analysis process is to describe the proposed project's visual characteristics, based on the information provided by the applicant. These characteristics include the horizontal and vertical dimensions of the major project structures, the arrangement of the structures on the project site(s), the proposed color(s) of the structures, and lighting for the project.

IDENTIFY APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

DETERMINE THE PROJECT'S VISUAL IMPACTS

The third step in staff's visual analysis process is to determine visual impacts. This is accomplished by performing four tasks: 1) select key observation points (KOPs); 2) assess the susceptibility to visual impact of the view areas represented by each of the KOPs; 3) assess the severity of the project's impact on the view areas represented by each of the KOPs; and 4) consider visual susceptibility and visual severity to determine the visual impact on the view areas. Figure B-2 illustrates staff's visual impact assessment process.

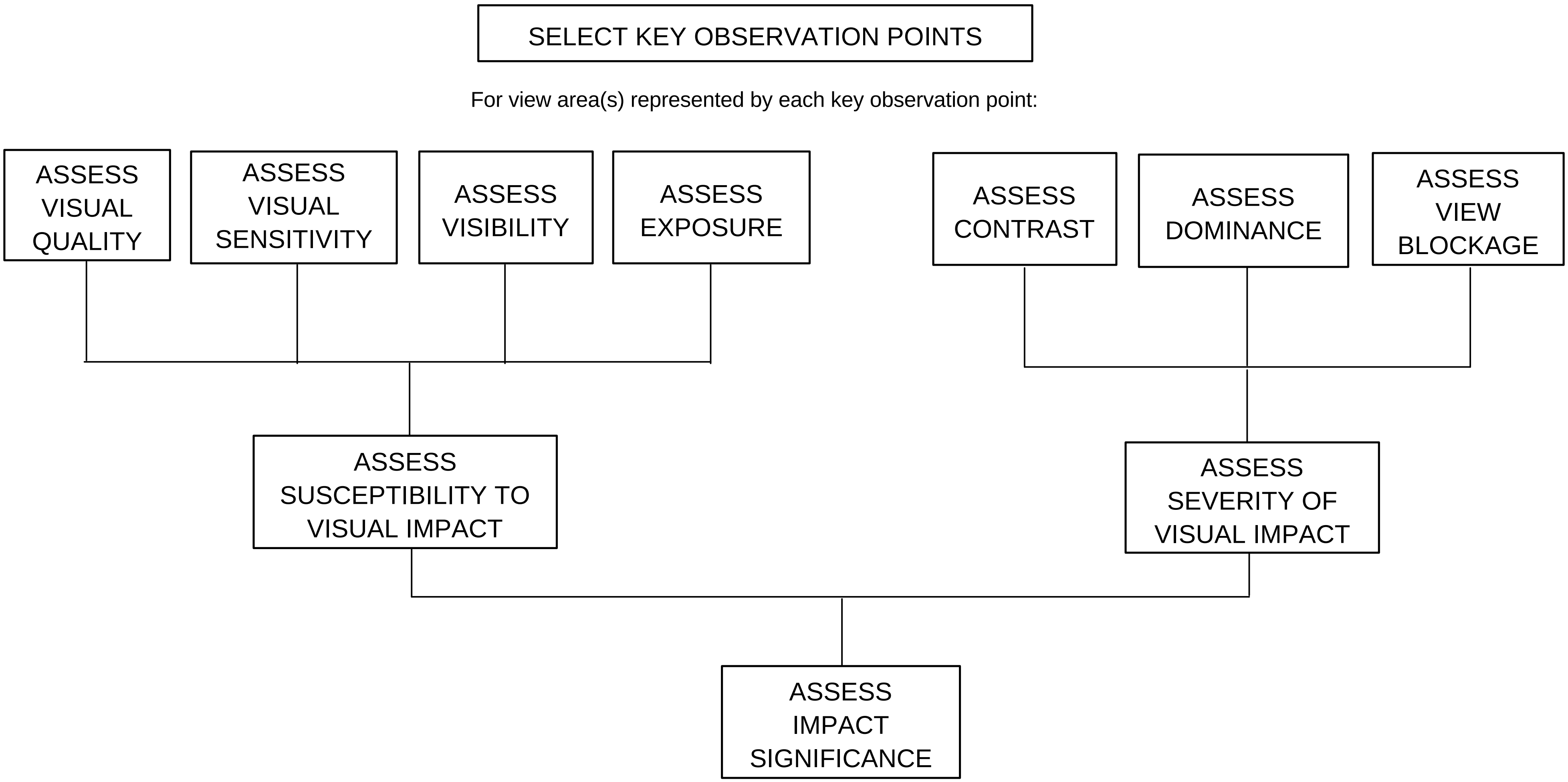
Select Key Observation Points

Key Observation Points are selected to provide the basis for evaluation of project impacts by comparing the appearance before and after project construction. Key Observation Points include locations which are chosen to be representative of the most critical locations from which the project will be seen. Additional Key Observation Points are selected that represent typical views encountered in different classes of views within the viewshed, if they are not covered by critical viewpoints. Variables that are considered in selecting Key Observation Points include relative project size, season, and light conditions. For linear projects such as power lines, additional Key Observation Points are selected that represent any special project or landscape features such as skyline crossings, river crossings, or substations.

Because each Key Observation Point represents a critical location, a typical view encountered in a class of view, and/or a special project or landscape feature, it also represents an important specific aspect of the viewshed that is susceptible to visual impacts. Therefore, the visual impact of a project is determined for each Key Observation Point, not from an "overall" perspective that masks the specific impacts. This approach has also been used by applicants for recent siting cases, including the SCA Procter and Gamble project, the SCA Campbell Soup project, the San Francisco Energy Company project, the High Desert Power Project, and the Sutter Power Plant project. The Visual Resource Management approach of the

VISUAL RESOURCES FIGURE B-2:

STAFF'S VISUAL IMPACT ASSESSMENT PROCESS



U.S. Bureau of Land Management, which is widely used, incorporates the concept of key observation points (BLM 1980b).

Major Impact Evaluation Factors

For each Key Observation Point Commission staff considers the susceptibility to visual impact and the severity of impact are considered together to determine the significance of impact. The following sections explain how these two major factors are assessed and considered. Other potential causes of significant visual impacts, such as night lighting, visible emission plumes, and noncompliance with laws, ordinances, regulations, and standards, are addressed separately.

Assess Susceptibility to Impact

To determine the susceptibility to impact from each Key Observation Point, the elements of the existing visual setting (discussed previously), including visual quality, viewer sensitivity, visibility, and viewer exposure are considered. Each of these factors is assessed as either high, moderate to high, moderate, low to moderate, or low. Staff combines these factors into a measure of the susceptibility of the view from a particular Key Observation Point to visual impact, as shown in Figure B-3. A low value for any of the four factors generally results in low susceptibility to impact.

Assess Impact Severity

As previously discussed, the degree of visual impact that a project will cause depends on the degree of change resulting from the project upon visual character or visual quality, here called the impact severity. Commission staff considers both the relationship of the project to the other components visible in the landscape, and blockage from view or elimination by the project of any previously visible components.

Relationship of the Project to Other Visible Components

Landscape Components

The three basic landscape components are land and water, vegetation, and structures.

Visual Elements

The basic elements of each physical component of a view include color, form, line, texture, scale, and spatial character. The impact of a project is assessed in terms of contrast in color, form, line, texture, and scale, as well as scale dominance and spatial dominance. Scale is the proportionate size relationship between an object and its surroundings. Absolute scale is the size of an object obtained by relating its size to a definitely defined standard (i.e., measurement). Relative scale is the relative size of objects; the apparent size relationship between landscape components. Sub-elements of scale include *scale dominance* (the scale of an object relative to the visible expanse of the landscape and to the total field of view of the human eye or camera) and *scale contrast* (the scale of an object relative to other distinct objects or areas in the landscape). *Spatial dominance* is the measure

Figure 3:

STAFF'S VISUAL IMPACT SUSCEPTIBILITY ASSESSMENT PROCESS

VISIBILITY	EXPOSURE	VISUAL QUALITY: HIGH SENSITIVITY: H	HIGH M	HIGH L	MEDIUM H	MEDIUM M	MEDIUM L	LOW H	LOW M	LOW L
HIGH	H	H	H	L	H	M-H	L	L	L	L
HIGH	M	H	M-H	L	M-H	M	L	L	L	L
HIGH	L	L	L	L	L	L	L	L	L	L
MED	H	H	M-H	L	M-H	M	L	L	L	L
MED	M	M-H	M	L	M	M	L	L	L	L
MED	L	L	L	L	L	L	L	L	L	L
LOW	H	L	L	L	L	L	L	L	L	L
LOW	M	L	L	L	L	L	L	L	L	L
LOW	L	L	L	L	L	L	L	L	L	L

H = High
M-H = Medium-High
M = Medium
L-M = Low-Medium
L = Low

of the dominance of an object due to its location in the landscape. Regarding these three factors, a change has the greatest potential to cause impacts in regard to scale dominance, and the least potential in regard to scale contrast.

Assessment of Contrast

Staff assesses contrast with existing structures, vegetation, and land/water in regard to color, form, line, texture, and scale. Regarding these factors, contrast in color, form, or line has greater potential to cause impacts than contrast in texture or scale.

The magnitude of the visual impact of a project is measured by the degree of change that it causes. In regard to contrast, the degree of change depends partly on the existing levels and types of contrast. For instance, if existing structures already contrast strongly with natural features, the addition of a similar structure tends to cause a smaller change than if no structures already existed. In addition, the degree of contrast depends on the proximity of the project to the landscape component to which it is compared. If a project is superimposed on a component (such as body of water), the potential for contrast is greater than if the project is near such a landscape component, and even greater than if the project is far from the landscape component.

Factors Affecting Contrast

Among the basic characteristics of the visual setting previously discussed, distance is a factor in determining the visual contrast that a project will create. Increasing distance can decrease perceived contrast both by reducing the apparent size of project structures and by reducing clarity of view due to atmospheric conditions.

Several additional factors can also influence the degree of contrast that a project may cause. These include atmospheric conditions, light conditions, motion, seasonal changes, and recovery time (BLM 1986).

Blockage or Elimination of Existing Elements

In regard to obstruction or elimination of previously visible components, the analysis evaluates any change between the visual quality of those components compared to the visual quality of the project. Blockage of higher quality visual elements by lower quality elements can cause impacts, potentially as great as those regarding scale dominance.

Assessment of Visual Impact Severity

VISUAL RESOURCES Figure B-4 shows how staff calculates impact severity from each Key Observation Point.

Determination of Significance

Commission staff considers the following factors in determining whether a visual impact will be significant. These factors are not a complete listing of all the considerations that staff uses in its analyses, because many such considerations are site-specific.

VISUAL RESOURCES TABLE B-4
Staff's Visual Impact Severity Assessment Process

	SEVERITY SCORE				
	Very Strong	**Strong**	**Moderate**	**Weak**	**Negligible**
SEVERITY FACTOR					
CONTRAST					
Color Contrast		High	Medium		Low
		or	or		or
Form Contrast		High	Medium		Low
		or	or		or
Line Contrast		High	Medium		Low
		or	or		or
Texture Contrast			High	Medium	Low
			or	or	or
Scale Contrast			High	Medium	Low
			or	or	or
DOMINANCE					
Scale	Dominant	Co-Dominant	Subordinate		Insignificant
		or	or		or
Spatial		Dominant	Co-Dominant	Subordinate	Insignificant
VIEW BLOCKAGE	Substantial blockage of high quality view	Moderate blockage of high quality view or substantial blockage of moderate to high quality view	Minor blockage of high quality view, moderate blockage of moderate to high quality view, or substantial blockage of moderate quality view	Minor blockage of moderate to high quality view, moderate blockage of moderate quality view, or substantial blockage of low to moderate qual. view	Minor blockage of moderate, low to moderate, or low quality view; moderate blockage of low or low to moderate quality view; or substantial blockage of low quality view
COMBINED FACTORS	Two or more of any of the above factors with a severity score of strong.				

State

The California Environmental Quality Act Guidelines make it clear that aesthetic impacts can be significant adverse impacts by defining “significant effect” on the environment to mean a “substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance. (Cal. Code Regs., tit.14, § 15382.) Appendix G, subdivision (b), of the Guidelines state that a project “will normally have a significant effect on the environment if will have a substantial, demonstrable negative aesthetic effect.”

Local

As discussed above, Commission staff considers any local goals, policies or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts.

Professional Standards

Professionals in visual impact analysis have developed a number of questions as a means of evaluating the potential significance of visual impacts (see, e.g., Smardon 1986). The questions listed below address issues commonly raised in visual analyses for energy facilities:

- Will the project substantially alter the existing viewshed, including any changes in natural terrain?
- Will the project deviate substantially from the form, line, color, and texture of existing elements of the viewshed that contribute to visual quality?
- Will the project substantially degrade the existing visual quality of the viewshed or eliminate or block views of valuable visual resources?
- Will the project significantly increase light and glare in the project vicinity, particularly night-time glare?
- Will the project result in significant amounts of backscatter light into the night-time sky?
- Will the project be in conflict with directly-identified public preferences regarding visual resources?
- Will the project comply with local goals, policies, designations or guidelines related to visual quality?
- Will the project result in a significant reduction of sunlight, or the introduction of shadows, in areas used extensively by the community?
- Will the project result in a substantial visible exhaust plume?

Commission staff considers these questions, where applicable, in its impact assessment.

Consideration of Impact Susceptibility and Impact Severity

For most operations impacts staff considers the assessment of the impact susceptibility in relation to the impact severity from each Key Observation Point to determine visual impact, as shown in VISUAL RESOURCES Figure B-5. Staff considers construction impacts, lighting impacts, and visible plume impacts separately.

Cumulative Visual Impacts

Staff reviews the proposed project and its related facilities as well as other past, present, and future projects in the vicinity to determine whether potential cumulative visual impacts will occur and whether those impacts will be significant. In addition, in the case of cogeneration facilities where the proposed power plant is to be part of an already existing industrial facility, this review examines whether the addition of the proposed project and its related facilities will result in cumulative visual impacts and whether they will be significant. If past activities have resulted in significant impacts, and the project will appreciably increase the total impact, the project will contribute substantially to a significant cumulative impact. When cumulative visual impacts are found to be significant, whether in relation to other proposed projects or to the host industry, feasible mitigation measures will be recommended to reduce those impacts.

MITIGATION

Applicant Proposed Mitigation

When it is evident from preliminary studies that potential significant visual impacts will occur, it is usual for applicants to propose a variety of mitigation measures in their application. These measures are then refined, as necessary, based on review by staff, other agencies, and the public.

Staff Proposed Mitigation

If staff's analysis concludes that potential significant visual impacts will occur and that any measures proposed by the applicant will not sufficiently reduce and mitigate those visual impacts, staff investigates whether additional mitigation measures exist. If staff identifies such measures and considers them feasible, staff recommends additional visual mitigation measures. If members of the public in the project vicinity have expressed concerns regarding the appearance of the project, staff solicits their input regarding appropriate mitigation.

METHODS

Visual resource mitigation, as it has come to be practiced in the visual resources profession, can consist of several methods, including relocation, design, color/texture, landscaping, and lighting control. The aim of such mitigation is to reduce the size, mass, bulk, line, and contrast of the proposed facilities in order to

VISUAL RESOURCES Table B-5
Staff's Visual Impact Significance Assessment Process

	VISUAL IMPACT SUSCEPTIBILITY				
	High	**Moderate to High**	**Moderate**	**Low to Moderate**	**Low**
VISUAL IMPACT SEVERITY					
Very Strong	Significant	Significant	Significant	Less than significant	Less than significant
Strong	Significant	Significant	Less than significant	Less than significant	Insignificant
Moderate	Significant	Less than significant	Less than significant	Insignificant	Insignificant
Weak	Less than significant	Less than significant	Insignificant	Insignificant	Insignificant
Negligible	Less than significant	Insignificant	Insignificant	Insignificant	Insignificant

achieve closer compatibility with the setting. Mitigation can be proposed by the project applicant, staff, an intervenor, an agency, or the public.

If required by the Commission's Decision, the plans referred to in the following sub-sections are prepared and submitted by the applicant after project approval. The plans contain the methods that the applicant proposes to use to accomplish required mitigation.

Relocation

Ideally, a project as proposed in the filing will be located so as to minimize or visual impacts. However, this may not happen due to competing considerations or other factors. If the project is expected to cause a significant visual impact as proposed, staff considers whether constructing the project on a different portion of the site, or relocating the project to a different site, has the potential to substantially reduce such an impact.

Design

Because power plant facilities normally involve large structures, design can be used to reduce the real or apparent mass, bulk, and line of the plant and thus its intrusiveness on the existing setting. This can be done by several methods, such as minimizing height, screening views of some project elements with other elements, enclosing project facilities in buildings, and using several buildings of varying dimensions rather than one large building.

Color/Texture

A judicious selection of color and textural treatment can help minimize the contrast that a project creates, whether in a human modified urban setting or a more natural one. Research has shown that white or very bright colors attract attention and can be seen from great distances. The use of specular, or reflective, materials or surfaces should be avoided, particularly in the construction of transmission lines. The use of color and textural treatments must be used on a case-by-case basis and must reflect the predominant character of the setting rather than a predetermined set of values. A highly urbanized, industrialized setting may call for colors and textures more typical of such a setting, while a project proposed in a rural and more natural setting should employ colors more appropriate to that area.

A specific color plan serves to ensure that the proposed colors will not unduly contrast with the surrounding landscape colors. The applicant submits such a plan as soon as possible so that any precolored buildings or structures can have colors approved and included in bid specifications for such buildings or structures.

Landscaping

Because of the need for open access within a power plant, landscaping as a mitigation measure is usually confined to the perimeter of, or approaches to, the plant. Use of berms and appropriate vegetation can reduce the contrast created by the perceived size, bulk, or line of the project. Typically, plant materials used are of a size such that the mitigation will be effective within approximately five years. Staff prefers the use of native evergreen vegetation, and, if appropriate, vegetation that is beneficial to wildlife. Vegetative species that may cause biological impacts or appear incongruous should be avoided. Whether and how landscaping is used depends on project-specific circumstances. For example, in an exceedingly open, relatively unvegetated area the application of massive amounts of landscaping can draw attention to a project and increase the contrast with the existing setting, even if the facilities are camouflaged. Many jurisdictions include requirements for fencing materials in landscaping plans.

Staff proposes landscaping if staff's analysis concludes that landscaping can reduce potential significant visual impacts of a project. A specific landscaping plan is prepared showing the location of such landscaping; the varieties and sizes of vegetation proposed to be used in such landscaping; the expected time to maturity and size at maturity for such vegetation; a discussion of the suitability of the vegetation for the site conditions and mitigation objectives; plan views and elevations from the direction of public view areas showing the location, size, and appearance of proposed berms and vegetation; maintenance procedures, including any needed irrigation; and a procedure for replacing unsuccessful plantings.

Lighting

Staff proposes mitigation if staff's analysis concludes that lighting will potentially result in an appreciable increase in direct light and glare or backscatter to the nighttime sky, visible to surrounding areas. This is particularly true where there are nearby residences or when the plant is sited in remote rural areas.
A specific lighting plan serves to ensure that project lighting is adequately designed, shielded, and placed so that off-site light and glare will be insignificant. This plan is designed to minimize backscatter to the nighttime sky, and includes provisions to minimize lighting of plant areas, consistent with operational and worker safety needs. A procedure to resolve any lighting complaints is implemented as part of the Commission's compliance procedures.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff reviews applications to determine whether they are in compliance with applicable laws, ordinances, regulations, and standards. If a project will not conform, staff investigates whether feasible means exist to achieve conformance. If such means exist, staff recommends them in its analysis.

STAFF PROPOSED CONDITIONS OF CERTIFICATION

When mitigation is needed to eliminate or reduce potentially significant visual impacts, staff develops proposed conditions of certification. These conditions of certification are designed to ensure that proposed mitigation measures are successfully accomplished and that the project is in compliance with applicable laws, ordinances, regulations, and standards.

OTHER POSITIONS/POLICIES

Two notable examples of detailed visual analysis procedures have been developed by federal agencies, the U. S. Bureau of Land Management (BLM) and the U. S. Forest Service (USFS). These procedures are designed to apply to the various types of environmental conditions that exist within the land under these agencies' jurisdiction. These conditions range from natural settings where cultural modifications must not attract attention to settings where contrast attracts attention and is a dominant feature of the landscape in terms of scale, and to settings where the natural character of the landscape has been disturbed to a point where rehabilitation is needed (BLM 1980). The environmental conditions of the land administered by these agencies do not include urban conditions.

U.S. BUREAU OF LAND MANAGEMENT (BLM)

The BLM has developed its Visual Resource Management (VRM) Program, an attempt at an objective-based visual analysis procedure, which it applies to projects proposed on BLM land. The VRM process uses an inventory/evaluation step to identify Scenic Quality, Sensitivity Level and Distance Zones and apply numerical values to them. These are then combined into Management Classes which determine the different degrees of modification which will be allowed. This is then compared to a Contrast Rating which measures the degree of contrast between the proposed activity and the existing landscape. This determines whether mitigation will be required.

The concept of breaking the landscape down into elements did not originate with the BLM, but underlies the VRM process. Staff, as well as much of the visual professional community, recognizes the value of identifying specific discrete elements which go to comprise the landscape. However, because virtually all the BLM lands are located in remote, rural areas the VRM process is heavily weighted toward natural undisturbed values. The VRM process in its entirety does not work well in more urbanized areas. However, staff believes that the underlying elements of the landscape, adopted by the BLM from existing methods of analyzing the visual resources, can be effectively used to analyze urban, rural, or natural landscapes.

U.S. FOREST SERVICE (USFS)

The USFS has developed a process that to some extent parallels the VRM process in that it uses an inventory of the landscape and viewer awareness and sensitivity, and applies these to Management Classes to project impacts in National Forest lands.

The USFS process is exclusively weighted to rural lands with natural landscape values, and is not easily adaptable to urbanized, urbanizing, or fringe rural lands. In addition, the process is primarily designed for land management rather than specific project review. Therefore, staff does not believe the process is appropriate for power plant siting.

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VISUAL RESOURCES APPENDIX C – COMMISSION'S STAFF'S ASSESSMENT OF VISUAL SUSCEPTIBILITY FACTORS FOR EACH KEY OBSERVATION POINT

KEY OBSERVATION POINT 2: ADELANTO ROAD AT CRIPPEN AVENUE

Key Observation Point 2 is located near the intersection of Adelanto Road and Crippen Avenue, on the eastern edge of Adelanto (see VISUAL RESOURCES Figure 2 in VISUAL RESOURCES Appendix A). This view was selected because it represented the closest residences on the west side of the project site.

VISUAL QUALITY

From Key Observation Point 2 views toward the project site include the airport security fence in the foreground, a small wood pole line and some airbase buildings in the middleground, and Quartzite Mountain and other mountains in the background. The view of the mountains is of high quality, but because of the intervening structures overall visual quality is moderate.

VIEWER SENSITIVITY

Because Key Observation Point 2 is in a residential neighborhood, viewer sensitivity is considered high.

VISIBILITY

Views of the project site would be partially obstructed from some of the area represented by Key Observation Point 2 by the existing airbase buildings in the middleground. Therefore, visibility is moderate.

VIEWER EXPOSURE

Distance

This view area is within midrange distance of the project site.

Number of Viewers.

This view area contains several dozen residences.

Duration of View

Because the view area is in a residential neighborhood, duration of view is long.

Overall Viewer Exposure

Considering the midrange distance, the moderate number of viewers, and the long duration of view, viewer exposure is moderate for Key Observation Point 2.

KEY OBSERVATION POINT 3: HIGHWAY 395 AT AUBURN AVENUE

Key Observation Point 3 is located at residences near the intersection of Highway 395 and Auburn Avenue, looking east toward the project site (see VISUAL RESOURCES Figure 4). This view was chosen because it represents a residential area with a less obstructed view of the project site than Key Observation Point 2, although it is farther from the site.

VISUAL QUALITY

From Key Observation Point 3 views toward the project site are largely unobstructed. The main visual feature is Quartzite Mountain on the horizon, with other mountains to the north and south of it. Joshua tree woodland with creosote bush vegetation is in the foreground to middleground. Highway 395 is in the foreground. Because of the high scenic quality of the mountains and vegetation, visual quality is moderate to high despite the presence of Highway 395.

VIEWER SENSITIVITY

Because Key Observation Point 3 is in a residential neighborhood, viewer sensitivity is considered high.

VISIBILITY

Because views toward the project site are largely unobstructed, visibility from Key Observation Point 3 is high.

VIEWER EXPOSURE

Distance

This view area is within midrange distance of the project site.

Number of Viewers

This view area contains several dozen residences.

Duration of View

Because the view area is in a residential neighborhood, duration of view is long.

Overall Viewer Exposure

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

KEY OBSERVATION POINTS 4, 5, AND 6: ORO GRANDE AREA

Key Observation Points 4, 5, and 6 represent a panoramic view from the vicinity of the town of Oro Grande west toward the project site and the northern portion of the proposed transmission line (see VISUAL RESOURCES Figures 6 and 8). This view was chosen because it represents the closest residential viewers and National Trails Highway.

VISUAL QUALITY

From the area represented by Key Observation Points 4, 5, and 6 views toward the project site vary according to the specific location in the view area. Residences on the east side of National Trails Highway have a foreground view of the highway as well as some storage buildings along the west side of the highway. They also have a middleground view of the Mojave River Valley, with some rural residences, and the eastern edge of the plateau on the west side of the Mojave River Valley, with trees on the SCIA visible to the south. The rural residences on the west side of National Trails Highway have a panoramic view of the valley and the eastern edge of the plateau. Because of the storage buildings and the highway in the foreground, the otherwise high visual quality of the Mojave River Valley is reduced to moderate for residences east of the highway. However, visual quality is high for the rural residences west of the highway.

VIEWER SENSITIVITY

Because Key Observation Point 4, 5, and 6 represents a residential area as well as a County Scenic Highway, viewer sensitivity is considered high.

VISIBILITY

The project would be skylined on the top of the plateau to the west. Portions of the project and the transmission lines would be screened from view because they are set back some distance from the edge of the plateau, therefore, visibility is moderate.

VIEWER EXPOSURE

Distance

This view area is within midrange distance of the project site.

Number of Viewers

This view area contains about one hundred residences and hundreds of travelers per day along National Trails Highway. The portion of the view area along the Mojave River with high visual quality views toward the project site contains approximately six residences.

Duration of View

Duration of view is long for the residents and moderate for the travelers on National Trails Highway.

Overall Viewer Exposure

Considering the midrange distance, the substantial number of viewers, and the long duration of view for many of the viewers, viewer exposure is high for Key Observation Point 4, 5, and 6 as a whole. For the rural residences west of the river, considering the midrange distance, the small number of viewers, and the long duration of view, viewer exposure is moderate.

KEY OBSERVATION POINT 8: AIR BASE ROAD

Key Observation Point 8 is located on Air Base Road, looking east toward where the proposed transmission line would cross the road (see VISUAL RESOURCES Figure 10). It was chosen because it represents the closest views for travelers on a road with relatively high usage.

VISUAL QUALITY

From Key Observation Point 8 views toward the transmission line route consists of partially disturbed open lands, with an existing transmission line and local electric lines. No features of high visual quality are visible. Considering these factors, visual quality is low.

VIEWER SENSITIVITY

Viewers in the area of Key Observation Point 8 are primarily local travelers, whose viewer sensitivity is considered moderate.

VISIBILITY

Views of the transmission line would be partially obscured by the existing transmission line. Therefore, visibility is moderate.

VIEWER EXPOSURE

Distance

The proposed transmission line would be within foreground views for travelers in the area of Key Observation Point 8.

Number of Viewers

Air Base Road is relatively highly traveled, so the number of viewers is high.

Duration of View

Because the open nature of the terrain, duration of view is be moderate for travelers on Air Base Road.

Overall Viewer Exposure

Considering the foreground distance, the high number of viewers, and the moderate duration of view, viewer exposure is moderate to high for Key Observation Point 8.

KEY OBSERVATION POINT 10: MOJAVE DRIVE

Key Observation Point 10 is located from near the closest residences to the point where the proposed transmission line route would cross Mojave Drive (see VISUAL RESOURCES Figure 12). The view was chosen because it represents the closest views of the transmission line from residences.

VISUAL QUALITY

The view from Key Observation Point 10 is dominated by an existing transmission line in the immediate foreground, with an electrical distribution line also in the foreground. Considering these factors, visual quality is low.

VIEWER SENSITIVITY

Because of the residences in the area of Key Observation Point 10, viewer sensitivity is high.

VISIBILITY

Some views of the transmission line would be partially obscured by the existing transmission line and yard fencing, but most of it would be visible from most portions of the view area represented by Key Observation Point 10. Therefore, visibility is high.

VIEWER EXPOSURE

Distance

The proposed transmission line would be within foreground views for residences in the area of Key Observation Point 10.

Number of Viewers

A moderate number of residences are in the area of Key Observation Point 10.

Duration of View

Because residences are present, duration of view is long.

Overall Viewer Exposure

Considering the foreground distance, the moderate number of viewers, and the long duration of view, viewer exposure is moderate to high for Key Observation Point 10.

KEY OBSERVATION POINT 17: SCIA GOLF COURSE

Key Observation Point 17 is located on the existing SCIA golf course (see VISUAL RESOURCES Figure 14). This view was selected because it is a recreation area that would be affected by the proposed transmission line, and represents other visually sensitive portions of the SCIA including the undeveloped public/open space areas in the eastern-most part of the SCIA.

VISUAL QUALITY

Although an existing transmission line is visible in the view from the existing golf course, the golf course may be expanded to the north, an area that now has no transmission lines in its views to the east. Overall, visual quality for the area represented by Key Observation Point 17 is high.

VIEWER SENSITIVITY

Because of the recreational use in the area represented by Key Observation Point 17, viewer sensitivity is high.

VISIBILITY

From the golf course views of the transmission line would be partially obscured by existing trees, so visibility is moderate.

VIEWER EXPOSURE

Distance

The proposed transmission line would be within foreground views for the existing golf course represented by Key Observation Point 17.

Number of Viewers

The number of users of the golf course is expected to be high.

Duration of View

Because the nature of golf course use, duration of view is long.

Overall Viewer Exposure

Considering the foreground distance, the high number of viewers, and the long duration of view, viewer exposure is high for Key Observation Point 17.

KEY OBSERVATION POINT 20: NORTHERN SECTION OF EL EVADO ROAD

Key Observation Point 20 is located on the northern section of El Evado Road, looking east (see VISUAL RESOURCES Figure 16). This view was selected because it represents the view that travelers using the SCIA Airport would have.

VISUAL QUALITY

The northern section of El Evado Road represented by Key Observation Point 20 has attractive view corridors to the river and the mountains to the east, so visual quality is high.

VISIBILITY

From the northern section of El Evado Road represented by Key Observation Point 20 the transmission line would be fully visible. Therefore, visibility is high.

VIEWER EXPOSURE

Distance

The proposed transmission line would be within foreground views for travelers on the northern section of El Evado Road represented by Key Observation Point 20.

Number of Viewers

El Evado Road, which is to provide access to the airport, is expected to have a relatively high number of travelers. However, the transmission line is proposed to be completed before the airport is built. The present number of travelers is small.

Duration of View

Travelers on the northern section of El Evado Road would see the proposed transmission line with the backdrop of the scenic features of Quartzite Mountain and the Mojave River for a short time, so duration of view is short for Key Observation Point 20.

Overall Viewer Exposure

Considering the foreground distance, the low number of current viewers, and the short duration of view, viewer exposure is low for Key Observation Point 20.

VISUAL RESOURCES APPENDIX D – COMMISSION STAFF'S ASSESSMENT OF VISUAL IMPACT SEVERITY FACTORS FOR EACH KEY OBSERVATION POINT

KEY OBSERVATION POINT 2: ADELANTO ROAD AT CRIPPEN AVENUE

VISUAL RESOURCES Figure 3 shows the appearance of the project from Key Observation Point 2 (the residential area near the intersection of Adelanto Road and Crippen Avenue).

CONTRAST WITH STRUCTURES

The project would cause a low level of contrast with existing structures in regard to form, line, texture, and scale because it would be similar in these respects to the existing SCIA structures that can be seen from Key Observation Point 2. The blue color proposed for the SCIA structures would contrast moderately with the sandy colors of the existing structures.

CONTRAST WITH VEGETATION

Vegetation visible in the view from Key Observation Point 2 toward the site consists of creosote scrub and Joshua trees. Because of the distance of the project from Key Observation Point 2, the project appears generally horizontal, with small vertical elements created by the stacks and transmission poles, so contrast with vegetation, which appears as discrete bushes or trees, would be moderate in regard to form and line. The proposed grey or blue colors of the project would contrast moderately with the grey-green tones of the vegetation in this view. Because of the distance of the project from Key Observation Point 2, the contrast between the flat surfaces of project elements and the moderate texture of existing vegetation would not be readily discernible, so contrast with vegetation in regard to texture would be low. The distance also would make the project appear similar in size to some of the existing vegetation, so scale contrast would be low. In summary, if no existing structures were visible, contrast with vegetation would be moderate in regard to form, line and color, and low in regard to texture and scale. However, because the existing SCIA structures are similar to the proposed HDPP structures, the increment of contrast with vegetation added by the proposed structures would be small, and contrast with vegetation would be low.

CONTRAST WITH LAND/WATER

The landform in the foreground and middleground is generally flat, with mountains in the background. Because of the distance of the project from Key Observation Point 2, the project appears generally horizontal, with small vertical elements created by the stacks and transmission poles, so contrast in regard to form and line would be low to moderate. The proposed grey or blue colors of the project would contrast moderately with the earth tones of the land that forms the foreground and backdrop for the project from this Key Observation Point. Because of the distance of the project from Key Observation Point 2, the contrast between the flat surfaces of project elements and the moderate texture of the existing land would not be readily discernible, so contrast with land in regard to texture would be low. The project would appear smaller than major land elements in the view, particularly the mountains in the background, so scale contrast would be low. No water is visible in this view. In summary. if no existing structures were visible, contrast with land would be moderate in regard to color and scale, low to moderate in regard to form and line, and low in regard to texture. However, because the existing SCIA structures are similar to the proposed HDPP structures, the increment of contrast with land added by the proposed structures would be small, and contrast with land would be low.

SCALE DOMINANCE

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

SPATIAL DOMINANCE

Because the spatial composition of the view from Key Observation Point 2 is panoramic, the project would be subordinate in regard to composition. Because the project site is in the central portion of the view and appears slightly elevated in relation to the key observation point, spatial dominance is co-dominant in regard to position. Because all of the project will be backdropped by land, spatial dominance in regard to backdrop would be subordinate. The overall spatial dominance rating would be subordinate to co-dominant.

VIEW BLOCKAGE

From Key Observation Point 2 the project will block the view of a small part of the background mountains that can now be seen. By itself, the blockage of a minor portion of a high quality scenic view would constitute a moderately severe impact. However, existing SCIA structures already block part of this view, so the change that would be caused by the project would be incremental. Therefore, the severity of view blockage would be weak.

KEY OBSERVATION POINT 3: HIGHWAY 395 AT AUBURN AVENUE

VISUAL RESOURCES Figure 5 shows the appearance of the project from Key Observation Point 3 (Highway 395 at Auburn Avenue).

CONTRAST WITH STRUCTURES

No existing structures are visible in this view, so the project would not cause any contrast with structures.

CONTRAST WITH VEGETATION

Vegetation visible in the view from Key Observation Point 3 toward the site consists of creosote scrub and Joshua trees. Because of the distance of the project from

Key Observation Point 3, the project appears generally horizontal, with small vertical elements created by the stacks and transmission poles. Vegetation appears primarily as a horizontal mass, irregular on the bottom and horizontal on top, where the plateau above the Mojave River ends. Individual Joshua trees extend above this horizontal line in irregular forms. The vertical elements of the stacks would also extend above the horizontal line of the vegetation, but they would be straight and vertical, so that portion of the project would contrast in form and line with the Joshua trees as well as with the other vegetation. As a whole, the project would contrast moderately in form and line with the existing vegetation. The proposed light grey or blue colors of the project would contrast moderately with the darker grey-green tones of the vegetation in this view. The flat surfaces of project elements would contrast moderately to the moderate texture of existing vegetation, but because of the distance of the project from the key observation point differences in texture would not be discernible, so the contrast with vegetation would be low in regard to texture. Because the project would appear similar in size to some of the existing vegetation due to its distance from the key observation point, scale contrast would be low. In summary, from Key Observation Point 3 contrast with vegetation would be moderate in regard to form, line, and color, and would be low in regard to texture and scale.

CONTRAST WITH LAND/WATER

The landform in the foreground and middleground is generally flat, with mountains creating an undulating form in the background. Because of the distance of the project from Key Observation Point 3, the project appears generally horizontal, with small vertical elements created by the stacks and transmission poles, so contrast in regard to form and line would be moderate. The proposed grey or blue colors of the project would contrast moderately with the earth tones of the land that forms the foreground and backdrop for the project from this Key Observation Point. The flat surfaces of project elements would contrast moderately to the moderate texture existing land. The project would appear smaller than major land elements in the view, particularly the mountains in the background, so scale contrast would be low. No water is visible in this view. In summary, from Key Observation Point 3 contrast with land would be low to moderate in regard to form, line, and color, and low in regard to texture and scale.

SCALE DOMINANCE

The project would appear small in comparison to the wide field of view, and would occupy a minor part of the setting. Therefore, scale dominance from Key Observation Point 3 would be subordinate.

SPATIAL DOMINANCE

Because the spatial composition of the view from Key Observation Point 3 is panoramic, the project would be subordinate in regard to composition. Because the project site is in the central portion of the view and appears slightly elevated in relation to the key observation point, spatial dominance would be co-dominant in regard to position. Because all of the project would be backdropped by land, spatial dominance in regard to backdrop would be subordinate. The overall spatial dominance rating would be subordinate to co-dominant.

VIEW BLOCKAGE

From Key Observation Point 3 the project would block the view of a small part of the background mountains that can now be seen. Because from this Key Observation Point the view of the mountains is generally unrestricted, the blockage of a minor portion of this moderate to high quality scenic view would constitute weak view blockage.

KEY OBSERVATION POINTS 4, 5, 6: ORO GRANDE AREA

VISUAL RESOURCES Figures 7 and 9 show the appearance of the project from Key Observation Points 4, 5, and 6 (in the community of Oro Grande).

CONTRAST WITH STRUCTURES

For travelers on National Trails Highway and residents near the highway, contrast in regard to structures would be low in regard to form, line, color, and texture because the project would be similar in regard to these factors to the existing structures on the east side of the highway. Because of the distance, the project would appear smaller than the existing structures, so scale contrast would be low. For residences along the Mojave River, no structures can be seen in the view toward the project site, so the project would cause no contrast with structures.

CONTRAST WITH VEGETATION

Because of the distance of the project from Key Observation Points 4, 5, and 6, the power plant and the transmission poles would be barely visible, so contrast with vegetation would be low.

CONTRAST WITH LAND/WATER

Because of the distance of the project from Key Observation Points 4, 5, and 6 the power plant and the transmission poles would be barely visible, so contrast with land/water would be low.

SCALE DOMINANCE

From Key Observation Points 3, 4, and 5 the transmission poles and the power plant would appear very small, so scale dominance would be subordinate.

SPATIAL DOMINANCE

The spatial composition of the view from Key Observation Points 4, 5, and 6 is panoramic, but due to the extensive visible length of the project (including the transmission line) the project would be prominent in regard to composition. Because the project site and the transmission line would be in the central portion of the view and would be somewhat elevated in relation to the key observation points, spatial dominance would be prominent in regard to position. Because a substantial portion of the project, including the transmission lines, would be backdropped by sky, spatial dominance in regard to backdrop would be prominent. Therefore, the overall spatial dominance rating would be co-dominant.

View Blockage -- From Key Observation Points 4, 5, and 6 the project would block the view of a small part of the background sky that can now be seen at the top of the plateau. For residences along the Mojave River, this blockage of a minor portion of a high quality scenic view would constitute a moderately severe impact. For travelers on National Trails Highway and residences east of the highway, existing structures already block part of this view, so the change that would be caused by the project would be incremental and view blockage would be weak.

KEY OBSERVATION POINT 8: AIR BASE ROAD

VISUAL RESOURCES Figure 11 shows the appearance of the project from Key Observation Point 8, showing the transmission line as it would look crossing Air Base Road.

CONTRAST WITH STRUCTURES

The largest structures visible from the area represented by Key Observation Point 8 are the existing lattice type transmission towers. Other structures include a small wood pole line and traffic lights on poles. The project would appear similar to the existing transmission towers in regard to form, line, color, texture, and scale. Therefore, contrast with structures would be low for Key Observation Point 8.

CONTRAST WITH VEGETATION

Vegetation visible in the view from Key Observation Point 8 toward the site consists of creosote scrub with the trees and grass of the SCIA golf course visible in the horizon to the right of the road. The vertical, lattice form of the towers would contrast highly to the low, irregular form of the creosote scrub and with the trees and grass of the SCIA golf course, which appear as an irregular primarily horizontal mass from this key observation point. The straight lines of the towers would similarly contrast highly with the existing vegetation. The grey color of the towers would contrast moderately with the variety of green tones of the vegetation. The texture of the towers as a whole would appear varied because of the complexity of the lattice design, and would contrast moderately with the texture of the vegetation. The towers would be substantially larger than any of the vegetation, so scale contrast would be high. However, the proposed line would only add a small increment to the contrast with vegetation caused by the existing towers, so contrast with vegetation would be low.

CONTRAST WITH LAND/WATER

The landform consists of low hills and intervening small drainages, creating a moderately undulating land surface. The proposed transmission towers would contrast highly with this land surface in regard to form and line. The grey color of the line would contrast moderately with the light earth tones of the land. The texture of the towers would contrast moderately with the grainy texture of the land. No large individual elements are visible in this landform, but the towers would appear small in comparison to the hills as a whole, so scale contrast would be low. In summary, if no existing structures were visible, contrast with land would be high in regard to form and line, moderate in regard to color and texture, and low in regard to scale. However, because the existing transmission towers are similar to the proposed towers, the increment of contrast with land added by the proposed structures would be small, and contrast with land would be low.

SCALE DOMINANCE

The transmission towers would be moderate in size compared to the wide field of view and would occupy a moderate part of the setting. They would be similar in size to the existing towers. Therefore, scale dominance from Key Observation Point 8 would be co-dominant.

SPATIAL DOMINANCE

Because the spatial composition of the view from Key Observation Point 8 is panoramic, the towers would be subordinate in regard to composition. Because one tower would be in the central portion of the view, spatial dominance would be prominent in regard to position. Because the transmission towers would be partially to completely backdropped by sky, spatial dominance in regard to backdrop would be prominent. The overall spatial dominance rating would be to co-dominant, similar to the existing towers.

VIEW BLOCKAGE

From Key Observation Point 8 one tower would block a small portion of the SCIA golf course. However, an existing transmission tower already blocks part of this view, so the change that would be caused by the project would be incremental. Therefore, the severity of view blockage would be weak.

KEY OBSERVATION POINT 10: MOJAVE DRIVE

VISUAL RESOURCES Figure 13 shows the appearance of the project from Key Observation Point 10, showing the transmission line as it would look from a residential area near Mojave Drive. However, it is staff's understanding that along this portion of the route lattice towers rather than steel poles would be used, so staff's assessment is based on lattice towers.

CONTRAST WITH STRUCTURES

The largest existing structures visible from the area represented by Key Observation Point 10 are the lattice type transmission towers. Other houses and a double wood pole transmission line. The project would appear similar to the existing transmission towers in regard to form, line, color, texture, and scale. Therefore, contrast with structures would be low for Key Observation Point 10.

CONTRAST WITH VEGETATION

Vegetation visible in the view from Key Observation Point 10 toward the site consists grass, shrubbery and trees of the residential neighborhood. Some parts of the view area may also have views of the desert scrub beyond the residential area. The vertical, lattice form of the towers would contrast highly to the low, irregular form of the creosote scrub and with the grass, shrubbery and trees of the residential area. The straight lines of the towers would similarly contrast highly with the existing vegetation. The grey color of the towers would contrast moderately with the variety of green tones of the vegetation. The texture of the towers as a whole would appear varied because of the complexity of the lattice design, and would contrast moderately with the texture of the vegetation. The towers would be substantially larger than any of the vegetation, so scale contrast would be high. However, the proposed line would only add incrementally to the contrast with vegetation caused by the existing towers, which are closer to the residences, so contrast with vegetation would be low.

CONTRAST WITH LAND/WATER

The landform consists of flat suburban yards and streets. The proposed transmission towers would contrast highly with this land surface in regard to form and line. The grey color of the line would cause low contrast with the concrete and asphalt surfaces of the land. The texture of the towers would have low with the concrete and asphalt. No large landforms are visible from this view, so the towers would create a high level of scale contrast. In summary, if no existing structures were visible, contrast with land would be high in regard to form, line, and scale, and low in regard to color and texture. However, because the existing transmission towers are similar to the proposed towers, the increment of contrast with land added by the proposed structures would be small, and contrast with land would be low.

SCALE DOMINANCE

The transmission poles would be prominent in size compared to the enclosed field of view and would occupy a substantial part of the setting. They would be similar in size to the existing towers. Therefore, scale dominance from Key Observation Point 10 would be co-dominant.

SPATIAL DOMINANCE

Because the spatial composition of the view from Key Observation Point 10 is enclosed, the towers would be prominent in regard to composition. Because one tower would be in the central portion of the view, spatial dominance would be prominent in regard to position. Because the transmission towers would be partially to completely backdropped by sky, spatial dominance in regard to backdrop would be prominent. The overall spatial dominance rating would be to co-dominant, similar to the existing towers.

VIEW BLOCKAGE

From Key Observation Point 10 the towers would block a moderate portion of the sky and a small portion of the view of the desert. However, an existing transmission tower already blocks part of this view, so the change that would be caused by the project would be incremental. Therefore, the severity of view blockage would be weak.

KEY OBSERVATION POINT 17: SCIA GOLF COURSE

VISUAL RESOURCES Figure 15 shows the appearance of the project from Key Observation Point 17, showing the transmission line as it would look from near the eastern edge of the SCIA golf course.

CONTRAST WITH STRUCTURES

The largest existing structures visible from the area represented by Key Observation Point 17 are the lattice type transmission towers of another transmission line. Poles are proposed for this section of the transmission line. The simple form of poles would cause moderate contrast with the complex form of the existing lattice towers. Line contrast with the towers would be low because the poles would be characterized as having straight line, similar to the components of the towers. The proposed color of the poles would be similar to that of the existing towers, so color contrast would be low. Texture contrast would be moderate because the complex form of the towers provides more contrast than the flat texture of the poles. Because the poles would be seen noticeably closer than the existing towers, they would appear substantially larger. The depiction of the pole locations in VISUAL RESOURCES Figure 14 show the poles farther away from El Evado Road than is actually proposed, so the poles will be larger than they appear in the figure. Therefore, contrast with structures in regard to scale contrast would be moderate. In summary, contrast with existing structures would be moderate in regard to form, texture, and scale, and low in regard to line and color.

CONTRAST WITH VEGETATION

Vegetation visible in the view from Key Observation Point 17 toward the transmission line consists grass, trees, and creosote scrub. The vertical form of the poles would contrast highly with the rounded shapes of the trees in the foreground, the areal form of the grass in the foreground, and the low, irregular form of the creosote scrub in the middleground. The straight lines of the poles would similarly contrast highly with the existing vegetation. The grey color of the poles would contrast moderately with the variety of green tones of the vegetation. The flat texture of the poles would contrast highly with the strong texture of the foreground trees, and moderately with the lower level of texture of the foreground grass and middleground creosote scrub vegetation. The poles would appear smaller than the foreground trees because of their greater distance from the observation point, so scale contrast with vegetation would be low. Because the proposed poles would differ from the existing lattice towers in form and would appear noticeably larger than the existing towers, the poles would add a substantial increment to the contrast caused by the existing structures. Therefore, contrast with vegetation would be high in regard to form, line, and texture, moderate in regard to color, and low in regard to scale from Key Observation Point 17.

CONTRAST WITH LAND/WATER

The foreground landform is flat, with gently rolling hills in the middleground and mountains on the horizon. The straight, narrow, and vertical appearance of the proposed transmission poles would contrast highly with these landforms in regard to form and line. The grey color of the poles would contrast moderately with the light earthtones of the land. The flat texture of the poles would create a moderate level of contrast with the moderate texture of the land. The poles would appear substantially taller than any existing landforms, so scale contrast would be high. Because the proposed poles would differ from the existing lattice towers in form and would appear noticeably larger than the existing towers, the poles would add a substantial increment to the contrast caused by the existing structures. Therefore, contrast with land would be high in regard to form, line, and scale, and moderate in regard to color and texture.

SCALE DOMINANCE

The transmission towers would be prominent in size compared to the limited field of view and would occupy a moderate part of the setting. They would appear noticeably taller than the existing towers. Therefore, scale dominance from Key Observation Point 17 would be dominant.

SPATIAL DOMINANCE

Because the spatial composition of the view from Key Observation Point 17 is enclosed, the poles would be prominent in regard to composition. Because one pole could be in the central portion of the view, spatial dominance could be prominent in regard to position. Because the transmission poles would be partially backdropped by sky, spatial dominance in regard to backdrop would be prominent. The overall spatial dominance rating would be to dominant, greater than the existing towers.

VIEW BLOCKAGE

From Key Observation Point 17 the poles would block a small portion of the scenic view of the mountains. Because of their solid appearance, they block more of the view than the existing lattice tower in the middleground. Therefore, the poles would cause a moderate increase in view blockage. Therefore, the severity of view blockage due to the poles would be moderate.

KEY OBSERVATION POINT 20: NORTHERN SECTION OF EL EVADO ROAD

VISUAL RESOURCES Figure 17 shows the appearance of the project from Key Observation Point 20, showing the transmission line as it would look from the northern section of El Evado Road looking east toward the mountains.

CONTRAST WITH STRUCTURES

No structures are visible in the view toward the mountains to the east from Key Observation Point 20. Therefore, the transmission line would not contrast with any existing structures.

CONTRAST WITH VEGETATION

Vegetation visible in the view from Key Observation Point 20 toward the transmission line consists of creosote scrub. The vertical form of the poles would contrast highly with the relatively flat appearance of the scrub. The straight line of the poles would contrast highly with the irregular lines of the scrub. The grey color of the poles would contrast moderately with the variety of green tones of the vegetation. The flat texture of the poles would contrast moderately with the moderate level of texture of the creosote scrub vegetation. The poles would appear much taller than the existing vegetation, so scale contrast with vegetation would be high. In summary, the poles would cause high contrast with vegetation in regard to form, line, and scale, and moderate contrast with vegetation in regard to color and texture.

CONTRAST WITH LAND/WATER

The foreground landform is flat, with gently rolling hills in the middleground and mountains on the horizon. The straight, narrow, and vertical appearance of the proposed transmission poles would contrast highly with these landforms in regard to form and line. The grey color of the poles would contrast moderately with the light earthtones of the land. The flat texture of the poles would create a moderate level of contrast with the moderate texture of the land. The poles would appear substantially taller than any existing landforms, so scale contrast would be high. No water is visible in this view. In summary, contrast with land would be high in regard to form, line, and scale, and moderate in regard to color and texture.

SCALE DOMINANCE

The transmission poles, because of their substantial height and foreground location, would be the most prominent elements in the field of view, so they would create a dominant level of scale dominance.

SPATIAL DOMINANCE

Despite the fact that the spatial composition of the view from Key Observation Point 20 is panoramic, several poles would be visible from the northern section of El Evado Road, so the poles would be prominent in regard to composition. Because of their foreground location, towering over the road, spatial dominance would be prominent in regard to position. Because the transmission poles would be mostly backdropped by sky, spatial dominance in regard to backdrop would be prominent. The overall spatial dominance rating would be dominant.

VIEW BLOCKAGE

From Key Observation Point 20 the poles would block a minor portion of the scenic view of the mountains. Therefore, the severity of view blockage due to the poles would be moderate.

CULTURAL RESOURCES

Testimony of Kathryn M. Matthews

INTRODUCTION

This testimony discusses cultural resources, which are the structural and cultural evidence of the history of human development and life on earth. Archaeological evidence indicates that California has been occupied by humans for many thousands of years. Evidence of California's early occupation is becoming increasingly vulnerable to the ongoing development and urbanization of the state. Cultural resources are considered non-renewable resources, because those who made them lived long before the present.

Cultural resource materials may be found nearly anywhere in California: along the ocean coastline and on coastal islands; along rivers and streams; in coastal and inland valleys and lowlands; throughout the coastal and inland mountain ranges; and throughout the interior deserts. Cultural resources may be found on the ground or may be found at varying depths beneath the surface. In some areas of the state, a sequence of settlements on the same site may cover multiple layers of cultural resources. In other areas, the distribution of cultural materials may be much more dispersed.

Cultural resources are significant to our understanding of our culture, our history and heritage. Critical to the analysis of cultural resources are the spatial relationships between an undisturbed cultural resource site and the surface environmental resources and features, and the analysis of the locational context of the resource materials within the site and beneath the surface. These relationships provide information that can be used to piece together the sequence of human occupation and use of an area and they begin to create a picture of the former inhabitants and their environment. Analysis of cultural resources can also provide insight into the broader patterns of human adaptation to environmental change.

Staff's primary concerns in its cultural resource analysis are to ensure that all potential impacts are identified and that conditions are set forth which ensure no significant adverse impacts will occur. The determination of potential impacts to cultural resources from the proposed High Desert Power Project (HDPP) is required by the Siting Regulations of the California Energy Commission (Energy Commission) and by the California Environmental Quality Act (CEQA). Three aspects of cultural resources are addressed in staff's analysis: prehistoric archaeologic resources, historic archaeologic resources and ethnographic resources.

PREHISTORIC RESOURCES

Prehistoric archaeological resources are those materials relating to prehistoric human occupation and use of an area; these resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of prehistoric human behavior. In California the prehistoric period began over 10,000 years ago and extended through the 18th century when the first Euro-American explorers settled in California.

HISTORIC RESOURCES

Historic archaeological resources are those materials usually associated with Euro-American exploration and settlement of an area and the beginning of a written historical record; they may include archaeological deposits, sites, structures, traveled ways, artifacts, documents, or other evidence of human activity. Under state requirements cultural resources must be greater than 100 years old, while under federal requirements such materials are considered if they are greater than 50 years old.

ETHNOGRAPHIC RESOURCES

Ethnographic resources are those materials important to the heritage of a particular ethnic or cultural group, such as Native Americans, African, European, or Asian immigrants. They may include traditional resource collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and structures.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS

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 for compliance with these laws. In addition, federal, state and local guidelines for the assessment of cultural resources are included in Appendix A of this analysis.

FEDERAL

- Antiquities Act of 1906, Title 16, United States Code, Sections 431, 432, and 433, and subsequent related legislation, policies, and enacting responsibilities.
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- National Historic Preservation Act (NHPA), Title 16, United States Code, Section 470, establishes a national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States.
-
- Executive Order 11593, “Protection of the Cultural Environment,” May 13, 1971, 36 Federal Register, 8921: orders the protection and enhancement of the cultural environment through providing leadership, establishing state offices of historic preservation, and developing criteria for assessing resource values.
-
- National Environmental Policy Act (NEPA): Title 42 United States Code, Sections 4321-4327; requires federal agencies to consider potential environmental impacts of projects with federal involvement and requires application of appropriate mitigation measures.

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- Federal Land Policy and Management Act (FLPMA): Title 43 United States Code, Section 1701-1784: requires the Secretary of Interior to retain and maintain public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric water resource, and archeological values; the Secretary, with respect to the public lands, shall promulgate rules and regulations to carry out the purposes of this Act and of other laws applicable to public lands.
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- Historic and Archaeological Data Preservation Act, Title 16, United States Code, Section 469, provides for the protection of archaeological resources as a result of construction of a dam or alteration of terrain caused by the federal government or a federally-licensed project.
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- American Indian Religious Freedom Act; Title 42 United States Code, Section 1996: protects Native American religious practices, ethnic heritage sites, and land uses.
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- Native American Graves Protection and Repatriation Act (1990); Title 25, United States Code Section 3001, *et seq.*: defines “cultural items”, “sacred objects”, and “objects of cultural patrimony”; establishes an ownership hierarchy; provides for review; allows excavation of human remains, but stipulates return of the remains according to ownership; sets penalties; calls for inventories; and provides for return of specified cultural items.

STATE

- Title 14, Public Resources Code, Section 5020.1 -- defines several terms, including the following:

  (j) “Historical resource” includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.

  (k) “Substantial adverse change” means demolition, destruction, relocation, or alteration such that the significance of an historical resource would be impaired.

- Title 14, Public Resources Code, Section 5024.1 -- establishes a California Register of Historic Places; sets forth criteria to determine significance; defines eligible properties; lists nomination procedures.

- Title 14, Public Resources Code, Section 5097.5 -- any unauthorized removal or destruction of archaeologic or paleontologic resources on sites located on public land is a misdemeanor.

- Title 14, Public Resources Code, section 5097.98 -- defines procedures for notification of discovery of Native American artifacts or remains; disposition of such materials.

- Title 14, Public Resources Code 5097.98 -- prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn; sets penalties.
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- Title 14, Public Resources Code, Section 21083.2 -- The lead agency determines whether a project may have a significant effect on unique archaeological resources; if so, an EIR shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, such resources must be avoided; if they can't be avoided, mitigation measures shall be required. The law also discusses excavation as mitigation; discusses the cost of mitigation for several types of projects; sets time frame for excavation; defines "unique and non-unique archaeological resources"; provides for mitigation of unexpected resources; sets limitations for this section.
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- Title 14, Public Resources Code, Section 21084.1 -- indicates that a project may have a significant effect on the environment if it causes a substantial change in the significance of a historic resource; the section further describes what constitutes a historic resource and a significant historic resource.
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- Guidelines for the Implementation of the California Environmental Quality Act -- Appendix K specifically addresses effects on historic and prehistoric archaeological resources, in response to problems that have arisen in the application of CEQA to these resources.
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- Title 14, Penal Code, Section 622.5 -- Anyone who damages an object or thing of archaeological or historic interest is guilty of a misdemeanor.
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- California Environmental Quality Act (CEQA): Public Resources Code Sections 5020.1, 5024.1, 21083.2, 21084.1, *et seq.* requires analysis of potential environmental impacts of proposed projects and requires application of feasible mitigation measures.
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- California Environmental Quality Act (CEQA) Guidelines: California Code of Regulations, Sections 15000, *et seq*, Appendix G (j), specifically defines a potentially significant environmental effect as occurring when the proposed project will "...disrupt or adversely affect...an archaeological site, except as part of a scientific study."
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- Public Resources Code, Section 5097.5. Any unauthorized removal of archaeological resources or sites located on public lands is a misdemeanor. As used in this section, a public land means lands owned by, or under the

jurisdiction of, the state, or any city, county, district, authority or public corporation, or any agency thereof.

LOCAL

Although the Energy Commission has pre-emptive authority over local laws, it typically requires compliance with local laws, ordinances, regulations, standards, plans, and policies.

San Bernardino County, General Plan

The county's General Plan recognizes the importance of cultural resources on lands over which it has jurisdiction and several goals; policies and actions have been established to address management of these resources. General Plan Goals C-10, C-11, and C-12 address the identification of resources; preservation or data recovery; and avoidance of potential conflicts with Native American beliefs and concerns. Policies / Actions CP-1, CP-2, CP-3, CP-4, and CP-5 set forth procedures to be followed to implement the county's goals. The county has developed specific requirements for the protection of cultural resources and mitigation of potential impacts to such resources. The county requirements are usually effected by placement of conditions on a project during the environmental review process. Refer to AFC section 5.10.2 for the discussion of the county's General Plan requirements.

City of Victorville, General Plan

The General Plan recognizes the "existence of rich … archaeological resources" in the HDPP project area. City policies 1.3 and 1.4 address cultural resources and they set forth corresponding implementation measures and programs to effect these policies.

SETTING

REGIONAL DESCRIPTION

The project region is located near the southern edge of the Mojave Desert Physiographic Province, in the northwestern portion of San Bernardino County. At the time of Euro-American contact, most of the Mojave had been traditionally occupied by the Serrano peoples, with an interfingering of tribal territories and boundaries at the edges of the Mojave, nearer to the mountain ranges and the Colorado River Basin. These early occupants had well established patterns of seasonal hunting and resource collection throughout the Mojave. As the weather patterns shifted away from the wetter cycles in the late Pleistocene, the climate became more arid, with corresponding changes in vegetation and animal resources. The native Californians had to adapt to a sparser distribution of water, food and other necessary resources. The presence of the Mojave River became an important factor in the ability of the early peoples to survive the changing environmental conditions.

The early peoples of California had well-established trade routes that often followed the river and other sources of water across the desert. The trade routes extended from the ocean coastal areas, northeastward across the Mojave Desert toward the tribes along the Colorado River and in northern Mexico. They also traveled northward and traded with the tribes along the eastern slopes of the Sierras. Many of the trade routes established by the native peoples of California were used by the Euro-American explorers and settlers as they spread into California. Eventually these same routes provided the foundation for the railroads and for modern-day highways. Due to topographic constraints and the presence of transportation access, these routes also were used for utility transmission facilities.

SITE AND VICINITY DESCRIPTION

Prior to Euro-American contact, the power plant site and immediate project vicinity were occupied by the Vanyume sub-group of the Serrano. The Vanyume were not a large group and by the time of Euro-American contact, they had generally disappeared. However, numerous archaeological sites found throughout the project area provide evidence of prehistoric occupation and use by the native peoples of California.

After contact, the area attracted settlers seeking open land and the opportunity to develop homesteads and small farms. Discovery of gold, silver, and borax (among many minerals found in the Mojave) drew other waves of settlers. Portions of the routes for project-related linear facilities cross remnants of early trails and wagon roads across the Mojave. The construction of the railroad brought another wave of settlers who spread out along the route to provide water and other services for the trains. Eventually, the military was drawn to the vast, unoccupied spaces in the Mojave and several military installations were developed.

The city of Victorville is located just over the crest of a ridge from the greater Los Angles basin and on the edge of the desert. The Mojave River provided a consistent supply of good water for travelers preparing to cross or arriving from crossing the desert. Victorville and the surrounding cities of Adelanto, Apple Valley, and Hesperia became the focus of all major transportation routes between the coast and other western states. Numerous archaeological sites found throughout the project area provide evidence of these waves of historic occupation and development.

Pre-AFC Literature and Records Search-AFC Literature and Records Search

Prior to preparation of the AFC, consultants to the applicant conducted a literature and records search at the San Bernardino Archaeological Information Center at the San Bernardino County Museum in Redlands, California. Pertinent topographic maps, archaeological resource survey maps and notes, site records, and pertinent research and literature were reviewed to establish the location of previously conducted cultural resource surveys and known resources within one-half mile of all project components. Records on file at the information center denote each known cultural resource site of isolate with a three-part identification number. If a site has a historic, as well as a prehistoric component to it, the trinomial designation is followed by an “H”.

The background record search provides a basis from which to predict the archaeological potential of the area. Literature on the history, prehistory, and ethnography of the area was also consulted as an aid in developing the archaeological potential of the area and to prepare a context to be used in evaluating the significance of known or predicted resources (HDPP 1997a, p.5.10-5). Results of the literature and records reviews were summarized in the AFC and site-specific information was filed with the Energy Commission under separate cover to maintain confidentiality of sensitive resource locations (AFC 1997b).

Power Plant Site and the Staging and Parking Areas

Records at the San Bernardino County Museum indicated that there were no known, recorded sites within one-half mile of the project site.

Electric Transmission Line Corridor

The record search indicated that there are 10 known cultural resources within the transmission line survey corridor, described as follows:

- Prehistoric site CA-SBR-182 is described as a large village and burial site. This significant site was relocated by the applicant’s consultant and was found to be intact and in fair to good condition. Its overall size was found to be more than four times that shown on the original site record.

- Historic site CA-SBR-6784H is described as a refuse disposal site. A visual search for this site yielded no cultural material. The site record states that the site is located in an intermittent drainage that periodically moves historical materials downstream. It is also next to Air Base Road which has been recently widened through this area, and this appears to have destroyed the site.

- Prehistoric site CA-SBR-8391: described as a lithic debitage and fire-cracked rock scatter. Both a visual search and use of a Global Positioning System (GPS) survey receiver were used to try to relocate this site. No evidence of the site was observed. The site record states that the site was at the toe of a dirt berm that supported Air Base Road. Air Base Road appeared to have been recently widened in this area, so the site was probably destroyed.

- Site CA-SBR-8389H: described as a historic period fire hearth and a modern dog burial. A visual and GPS search failed to relocate the site and it may have been destroyed during a road-widening project.

- Site CA-SBR-8393: described as a prehistoric campsite and lithic scatter. A visual and GPS search failed to relocate the site and it may have been destroyed by a road-widening project.

- Site PSBR-38H: is a three-cable, 115 kV transmission line originally built to provide energy for the Hoover Dam project. The line is 225 miles long and travels within the HDPP transmission line survey corridor for approximately four miles. This transmission line appears to be in good condition and it was found eligible for the NRHP in 1993.

- Site PSBR-62H: the second historic electrical transmission line that travels within the HDPP transmission line survey. Built in 1918, this line runs for 39 miles and appears to be in good condition.

- Site CA-SBR-7043: described as containing lithic tool manufacturing debris and milling stones. A visual and GPS search failed to relocate this site and it appears that the site could have been destroyed during road construction.

- Historic site CA-SBR-8392H: is a railroad spur from the Santa Fe main line to the SCIA that crosses the transmission line corridor. Constructed some time after 1941, the rails and wooden ties have been removed and the integrity of the resource has been greatly diminished.

- Sites CA-SBR-4272H and 4411H: these reportedly are remnants of the Mormon Trail and the Salt Lake - Santa Fe Trail respectively through this area. The integrity of these portions of the trails is very low and a previous researcher has indicated that the location is only speculation based on interpretation of early maps.

SWP Water Pipeline Corridor

The records search revealed no previously recorded sites along the proposed 7.2-mile water pipeline route.

Corridor for Natural Gas, Potable Water, and Sewage Pipelines

No known sites have been recorded along the proposed gas pipeline route. Note: as the corridors for water and sewage are within the gas pipeline corridor and any impacts are likely to be similar in nature, all of these will be addressed under the gas pipeline corridor.

Post-AFC Literature and Records Search

After the AFC was filed in June 1997, the applicant provided supplemental filings that withdrew the second water supply pipeline presented in the AFC and replaced it with a proposed well field and 6.5-mile pipeline (Self 1998a). In April 1998, the applicant filed a supplemental filing that proposed an additional 26-mile natural gas pipeline to connect the project with an alternative supplier. In June 1998, the applicant provided another supplement to the AFC in which the 26-mile natural gas pipeline route was withdrawn and a different, 32-mile route was proposed (Self 1998b).

Post-AFC Well Field and Pipeline-(Self 1998a)

Records at the San Bernardino County Museum indicated that there were four known, cultural resource sites recorded within one half mile of the well field and pipeline route. Two of the four recorded resources (PSBR-38H and PSBR-62H) are historic electric transmission facilities that would be crossed by the proposed pipeline route. The remaining two resource sites are CA-SBR-8861H (a pre-1900 historic dump) and CA-SBR-8862H (a historic scatter of artifacts). These four resource sites were previously described in the cultural resource report provided with the AFC.

Post-AFC, 26-Mile Natural Gas Pipeline (Greystone 1998a)

Literature and record searches were apparently conducted for the proposed 26-mile gas pipeline project and the cultural resource survey work was begun. After discussions with federal agency staff about sensitive species and habitat, this proposed pipeline project was withdrawn and no report on the cultural resource findings was filed with the Commission.

Post-AFC, 32-Mile Natural Gas Pipeline (Self 1998b)

The records search indicated that there are at least 54 known cultural resource sites and 73 historic and prehistoric isolates recorded within one quarter mile of the natural gas pipeline survey corridor. Recorded resources located within or adjacent to the 500-foot survey corridor were described as follows:

- Isolate A1841-281: described as a single rock core that was recorded in 1992 that was not relocated during the survey.

- Site CA-SBR-7431H: described as a remnant of one of several old wagon roads that emanating from the Randsburg mining district, that extended south toward Red Buttes and the Kramer Hills. The road currently is only faintly visible as a dirt track. The site was considered potentially significant.

- Site CA-SBR-7545H: is an abandoned section of historic Highway 395. The asphalt road segment is double lane, 26 feet wide and approximately 4 miles long. When originally recorded in 1993, the road still retained its white centerline striping and still appears as it did when first recorded. The age of this segment is not known from existing information. The site was considered potentially significant.

- Site CA-SBR-7670H: recorded as a scatter of historic debris. When recorded in 1993, the site consisted of a fence and posts, a well, three trash pits, a scatter of historic refuse, and a scatter of cinder block fragments. When inspected as part of this survey, the site was found to be mostly intact and as described on the record. The site was considered potentially significant.

- Site CA-SBR-7687H: first recorded in 1993, the site is a historic building foundation, a conical pit, a debris-filled shaft with adjacent piles of dirt, portions of a dirt road, two can concentrations, and a scatter of other historic debris. When inspected during the field survey, this site was still intact and appeared to be in the same condition as when first recorded. The site was considered potentially significant.

- Site PSBR-039H: is a portion of the Southern California Edison Company's Kramer-Victor 115kV Transmission Line. During the survey, it was not apparent how much of the existing transmission line may be original (unaltered) and of potential historic significance. The site was considered potentially significant.

- Site CA-SBR-7085: described as a large lithic quarry with associated lithic scatter situated on several ridgelines. The site contained both core reduction and biface reduction remnants were found. The site was considered potentially significant.

- Site CA-SBR-7202: described as a sparse lithic scatter containing less than 30 chert and rhyolite cores and flakes. The site was relocated during the survey and was found to extend an additional 450 meters north/south of the recorded site boundary. The existing site record will be updated to reflect the extension of the boundaries. The site was considered potentially significant.

- Site CA-SBR-7281: described as a sparse lithic flake scatter. Some, but not all, of the lithic flakes were relocated during this field survey. Fragments of colored glass were also relocated, confirming a historic dimension for this site. The original site record will be amended to include a description of the historic component. The site was considered potentially significant.

- Site CA-SBR-7282: described as a sparse lithic scatter exposed on the surface in and around areas of deflated soil. The site appears to be intact and was considered potentially significant.

- Site CA-SBR-7551: recorded as a light to moderate-density lithic scatter with two loci, situated on an alluvial plain. Although this site was not relocated during survey, it was considered potentially significant.

- Site CA-SBR-7672: recorded as a prehistoric quarry with associated lithic scatter situated on a series of low-lying ridgelines. This site was inspected during the field survey and appears to be intact. The site was considered potentially significant.

- Site CA-SBR-7674: recorded as a small lithic scatter. Although the site was not located during the field survey, it is considered potentially significant.

- Site PSBR-1582-2: recorded as a (presumably prehistoric) campsite but the site record is illegible and no further information on the resources present is available. If this was relocated, it would be considered potentially significant.

- Site CA-SBR-2257/H: recorded as a dual component site. The prehistoric component consists of a very large (1,387,880 square meters) scatter of flaked stone tools and debitage, with three loci separated by a sparse, discontinuous scatter of debitage. Two loci are lithic concentrations; the third is a historic can scatter with lavender glass shards. Investigations, including a limited testing program, have occurred on five separate occasions at this site (Smith 1971; Hampson et al. 1989; Macko 1989; Taylor and Tambunga 1990; and McKenna, *et al* (no date). The site was relocated during the field survey. The site boundary is estimated to extend south an additional 2000 feet and east an additional 700 feet. The site was considered potentially significant.

- Site CA-SBR-7544/H: described as a multi-component site consisting of a lithic quarry, a historic shaft, and a can scatter. Relocated during field survey, the site appears to be intact and the dimensions correctly rendered. The site was considered potentially significant.

Pre-AFC Field Surveys-

Following the literature and records search, an intensive on-the-ground surveys of the proposed power plant site and the proposed routes or corridors for the associated linear facilities were conducted by qualified professional archaeologists. The cultural resource consultants to the applicant conducted these pedestrian surveys between April 21 and 29, 1997. Survey crew members walked in a zig-zag pattern, in transect intervals varying from 15 to 30 meters (50 to 100 feet) or less. The width the corridors surveyed for the linear facilities ranged between 100 and 4,000 feet. Natural and manmade exposures were examined for lithic and cultural artifacts and isolates, for signs of possible midden deposits, for evidence of prehistoric and historic use, and to ground-proof the mapped topography and developments in the project area (AFC 1997b).

If a previously unknown site or an isolated artifact were found during these pre-project surveys, a map and a record form were completed and filed with the regional archaeological information center. The information center reviews the maps and survey forms and then assigns a three-part identification number to each recorded site or isolate.

Project Site and the Staging and Parking Areas

The survey of the project site included the 25-acre site and the 24-acre staging and parking areas. No surface evidence of cultural resources was found during these surveys.

Electric Transmission Line Corridor

The surveys for the electric transmission route varied from 2,000 to 4,000 feet in width, depending upon the need to pass under or over other existing transmission facilities. Three archaeological sites that had not been previously recorded were discovered and recorded during the survey of the transmission line corridor and consist of the following:

- Site CA-SBR-8861H is a pre-1900 historic dump with possible foundation remnants. Observed artifacts included glass and ceramic fragments and metal remains. The site measures about 15 meters (50 feet) in diameter and there is evidence of recent digging and/or possible bottle hunting.

- Site CA-SBR-8862H is a very dense historic artifact scatter (estimated at 3000+ artifacts) consisting primarily cans with a smaller quantity of bottle glass and ceramics. The site, about 30 meters (100 feet) in diameter, appears to date from about 1920 to 1930.

- Site CA-SBR-8863, is a prehistoric site consisting of a sparse lithic tool scatter and fire cracked rock. The site measures 30 meters x 25 meters (100 feet x 80 feet), but could be larger as sand deposits appear to have settled over cultural materials.

SWP Water Pipeline Corridor

The width of the survey of the 7.2-mile water pipeline corridor ranged between 250 and 500 feet. Although no sites had been previously recorded along this corridor, two new sites were discovered during the survey. The newly discovered sites consist of the following:

- Site CA-SBR-8859H: described as a pre-1890 historic can and bottle scatter, measuring about 15 meters x 15 meters (50 feet x 50 feet).

- Site CA-SBR-8860H: described as a historic can scatter with over 30 cans and bottle glass fragments. This site appears to date later than CA-SBR-8859H, to about 1920 to 1930.

Corridor for Natural Gas, Potable Water, and Sewage Pipelines

The surveys of the routes for these facilities were between 100 and 500 feet in width. No sites were previously recorded along the corridor and no new sites were encountered during the pre-AFC surveys.

Post-AFC Field Surveys

As noted above, the applicant filed supplements to the AFC that described additional facilities and identified additional linear routes that were subjected to the required record searches and surveys. The results of the surveys for the supplemental filings are summarized here.

Surveys of the Well Field and Pipeline (Self 1998a)

Portions of the route proposed for the new water supply pipeline run parallel the route for the natural gas supply pipeline that was surveyed for the AFC. Additional surveys were conducted on April 6 and 7, 1998 for the well field and for that portion of the water pipeline corridor that extends southward from the gas pipeline route. The archaeologist walked in a zig-zag pattern within a 100-foot wide corridor on either side of the center line for the pipeline and within a circle 300 feet in diameter around each of the seven proposed extraction well sites. No new archaeological sites were discovered and recorded during these surveys.

Survey of the 26-Mile Natural Gas Pipeline (Greystone 1998a)-

Surveys for this pipeline corridor were conducted in February or March 1998. However, since this supplementary pipeline proposal was withdrawn, no report on the survey results was filed with the Commission.

Survey of the 32-Mile Natural Gas Pipeline (Self 1998b)-

Cultural resource consultants to the applicant conducted a intensive pedestrian survey of the 32-mile proposed natural gas pipeline corridor between May 26 and June 3, 1998. Survey crew members walked in a zig-zag pattern across a 500-foot wide corridor, using transect intervals of approximately 85 feet or less. One steep slope (over 50 degrees) in the Kramer Hills was excluded from the survey for safety reasons but it was visually scanned for evidence of either historic mining debris or other historic remains, or rock outcroppings that might have served as shelters, or that might contain petroglyphs or incipient mortars. Ground visibility during the survey varied from good to very good depending on the vegetation. Twelve of the sixteen previously recorded archaeological sites were relocated during the surveys and six previously unknown cultural resource sites were discovered within the pipeline survey corridor.

The newly discovered and recorded sites encountered during the surveys are described as follows:

- Site CA-SBR-9390H: described as a metal-lined ventilation shaft located approximately 1500 feet southeast of a known mine shaft. The shaft drops to an unknown depth and there are several concrete, wood, and metal foundation components on the surface near the opening and in the general vicinity. This site was considered potentially significant.

- Site CA-SBR-9391H: described as an historic trash scatter, composed mostly of cans. It measures 15 feet north/south x 30 feet east/west. There are approximately 180 cans with an additional 20 or more outside the principal concentration. Can construction indicated they were manufactured after 1900. This site was considered potentially significant.

- Site CA-S BR-9392: described as a small lithic scatter consisting of approximately 20 flakes and three cores. The approximate size of the site is 15 meters x 15 meters. This site was considered potentially significant.

- Site CA-SBR-9393H: consists of three small stone circles with upright wood stakes and remnants of coffee cans embedded in the center and four wood stakes that form a square. The function of the circles and the associated staked square is not readily apparent. The site was considered potentially significant.

- Site CA-SBR-9394H: described as a small trash scatter measuring approximately 100 feet x 35 feet. Artifacts observed included glass fragments (likely pre 1917 manufacture), post-1900 type tin cans, thick, clear glass fragments, square aspirin tin, ceramic fragments, pieces of barbed wire, and some milled lumber. The site was considered potentially significant.

- Site CA-SBR-9395H: described as a large mine shaft or pit excavated in an outcrop of white, chalky rock; the excavation has been filled with modern debris. The site was considered potentially significant.

Refined Survey of 32-Mile Gas Pipeline Corridor (Self 1998c)

Approximately eight miles of the proposed 32-mile gas pipeline route are located on lands administered by the US Bureau of Land Management (BLM). BLM has determined that the pipeline project constitutes an "undertaking", and has indicated that the entire 32-mile route is subject to federal historic preservation laws and regulations, regardless of ownership.

For its review of a project, the BLM typically requires an applicant to provide a specific project design and a clearly defined Area of Potential Effect (APE). The APE is defined as "that area within which all direct, physical impacts of construction, operation, and maintenance will be confined. For a pipeline project, the APE is described in relation to the staked centerline, as an area 20 feet west of the staking and an area 90 feet east of the staking. These offset areas stay on the same side of the pipeline regardless of the direction of travel; thus, the 20-foot wide area continues along on the south side of the center line if the alignment shifts to an east/west heading, while the 90-foot wide area continues along the north side of the staking.

The initial surveys of the pipeline route were based on a 500-foot wide corridor. After the center lines and right-of-way boundaries were staked and the APE was identified, the findings of the May and June 1998 surveys were re-evaluated by the archaeological consultants and an additional survey was conducted on August 17 and 18, 1998. The narrowing the right-of-way to 110 feet within the 500 feet meant that 10 of the 21 known sites would now be avoided by pipeline construction; eleven known sites remained within or adjacent to, the APE. The eleven remaining sites of concern include:

- CA-SBR-7202, a large lithic scatter, with new, extended boundaries;
- CA-SBR-7545H, a lithic scatter, a historic shaft, and a can scatter;
- CA-SBR-9395H, a mine shaft or pit filled with debris;
- CA-SBR-7544/H, lithic quarry, historic shaft, and can scatter;
- CA-SBR-2257/H, a very large quarry site with a scatter of flaked stone tools and debitage, historic can and glass scatter, with newly extended boundaries

- CA-SBR-9390H, a metal-lined ventilation shaft and associated historic artifacts;
- CA-SBR-7282, a sparse lithic scatter;
- CA-SBR-7431H, remnant of early Randsburg wagon road;
- CA-SBR-7670H, historic debris associated with a well, a fenceline and trash pits;
- CA-SBR-7672, a prehistoric quarry; and
- PSBR-1582-2, recorded as a (probably prehistoric) camp site but not relocated;

IMPACTS

Impacts to cultural resources may result either directly or indirectly during the pre-construction, construction, and operation of the 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, or excavation. Placement of an industrial project such as a power plant, within the setting of an historic neighborhood or within an ethnically significant or sacred landscape may also have an adverse effect on these sensitive resources. Indirect impacts are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource materials due to improved accessibility. 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. In most instances, researchers prefer to avoid disturbance of known cultural resource sites and artifacts.

As described in the AFC, the potential for the project to impact cultural resources is directly related to likelihood that such resources are present and whether they are actually encountered during project development and construction activities. Since numerous cultural resource sites have been discovered in the vicinity of the project site and linear facility routes, there is a strong likelihood that cultural resources may be encountered during project-related site clearance and excavation. (AFC 1997b).

Often the potential for cultural materials to be found during project construction activities remains uncertain until the ground surface has been broken and excavation of sub-surface soils takes place. When a potential for discovery of cultural resources has been identified through literature search and reconnaissance surveys, there is a potential that project-related impacts may affect any cultural resources actually present. The potential for discovery does not measure the full significance of individual artifacts or other cultural resources present, since it is impossible to accurately predict what specific materials could be encountered. Often the full significance of recovered cultural resource materials can only be determined after they have been collected, prepared, and studied by professional archaeologists

Not all cultural resources are the same, nor do they offer the same degree of information or insight into past human activities and adaptations to their environment. Professional experience, the literature, and the records of previously discovered cultural resources all provide a means of assessing the relative value of a newly discovered site or a recently unearthed resource. Significant cultural resources are those that meet established scientific criteria that are generally accepted by professional archaeologists. Staff's objective is to ensure that there will be no adverse impacts to cultural resources during site development and project construction

SIGNIFICANCE CRITERIA FOR CULTURAL RESOURCES

The record and literature search and intensive field survey of the proposed pipeline corridor was conducted to identify any cultural resources already listed on or potentially eligible for listing on either the National Register of Historic Places (National Register) [36 CFR 800] or the California Register of Historic Resources. The determination of eligibility is made in compliance with the applicable provisions of the National Historic Preservation Act and the California Environmental Quality Act (CEQA) Guidelines contained in CEQA Appendix K.

Only historic or prehistoric sites, objects or features, or architectural resources which are assessed by a qualified researcher as "important" or "significant' in accordance with state and federal guidelines need to be considered during the planning process. The significance of historic and prehistoric cultural resources is judged in accordance with the criteria for eligibility for nomination to the National Register of Historic Places as defined in 36 CFR 60.4. If such resources are determined to be significant, and therefore eligible for listing in the National Register [or the California Register, under CEQA], they are afforded certain protection under the National Historic Preservation Act and/or CEQA. The Advisory Council on Historic Preservation, for example, must be given an opportunity to comment on any federally-funded or permitted undertaking that could adversely affect such resources.

The National Register criteria state that "eligible historic properties" are:

.districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that (a) are associated with events that have made a significant contribution to the broad patterns of our history,; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or (c) that represent a significant 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.

Resources determined not to be significant, that is, not eligible for National Register listing, are subject to recording and documentation only, and are afforded no further protection under state or federal law. 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 (HDPP 1998*).

Project-Related Impacts

More than 70 archaeological sites, features, or objects are known to be located on the Adelanto and Victorville topographic quadrangles, within one-half mile of the proposed project site. An additional 29 prehistoric, 16 historic, 9 historic/prehistoric, and 73 isolates had previously been recorded within one quarter mile of the 32-mile gas pipeline route and an additional six sites were identified during project-related surveys. The density of sites recorded in the project vicinity indicates a high potential for historic and prehistoric resources to be encountered in the immediate project area.

For the HDPP project, the majority of potential impacts to cultural resources will be associated with the construction phase of the project. Since project development and construction usually entail surface and sub-surface disturbance of the ground, the proposed HDPP has the potential to adversely affect known, as well as previously unknown cultural resources. The day to day operation of the HDPP power plant is not expected to have any significant impacts on the region's cultural resources. However, the presence of major known archaeological sites within the right-of-way for the 32-mile natural gas pipeline would generate the potential for on-going impacts to those resources throughout the lifetime of the HDPP project.

Power Plant Site and the Staging and Parking Areas

Site clearance and grading associated with the power plant site preparation and the excavations and foundation development associated with power plant construction is not expected to impact any known cultural resources materials. The potential for impact to cultural resources will depend on the extent of surface area to be disturbed during site preparation and the depth of excavation into previously undisturbed ground to build project foundations (AFC 1997b).

However, information provided in the AFC on project construction methods was generalized and the plans and site layouts for project structures were identified as "typical" or "conceptual". The project AFC and subsequent information responses do not indicate the depth of excavation or ground disturbance needed for construction of the power plant foundations. No geotechnical reports and borings were conducted for this project AFC and there is no information on whether fill materials are present at the proposed power plant site. While the AFC indicates considerable disturbance of the site, there is no information on the depth of this previous disturbance.

While no surface evidence of cultural resources was found during the initial surveys of exposed soil surfaces at the proposed power plant site, the high potential for discovery of cultural resource materials in the project study area suggests that previously unknown cultural resources may be encountered during excavations into the underlying soils for structural foundations. The varying extent and depth of excavations will result in different degrees of impacts on the cultural resources. The potential for impacts is directly related to the amount of excavation -- the more excavation there is, the greater the potential for impacts (AFC 1997b). Staff has proposed conditions of certification that will reduce the potential for significant impacts to cultural resources if they occur.

Electric Transmission Line

Information provided on project construction methods was generalized and transmission structures were drawn as “typical” or “conceptual”. The AFC description of the ground surface along the transmission corridor indicates it is variable - some areas have been previously disturbed and some areas are covered to varying degrees with vegetation. Portions of the proposed corridor are crossed by existing high voltage transmission facilities and access roads; other portions of the corridor run parallel to existing high voltage transmission facilities and access roads (AFC 1997b).

The final center lines for transmission line segments have not yet been identified. The width of the ultimate right of way for the proposed transmission line is expected to vary from 100 to 120 feet, depending upon the type of transmission structures used and the span length between them (AFC 1997b). As discussed in the AFC, the applicant will likely use lattice towers in those areas where the new line parallels existing lines using lattice towers and then use tubular poles elsewhere along the proposed route. The AFC indicates that the specific location of each transmission structure is to be delineated in engineering studies that are to take place after project certification.

Construction of either lattice towers or tubular poles will require drilling of the soil to variable depths for foundation footings, placement of rebar and anchors, pouring of concrete, and assembly and erection of the transmission structures. Depth and width of soil disturbance will depend on the height and diameter of the transmission structure designed for that portion of the route (AFC 1997b). Pending detailed design studies, the applicant has assumed an average span length of 700 to 800 feet between transmission structures which would indicate approximately 50 transmission structures would be required for the proposed 7.25 mile route (AFC 1997b).

Regardless of the actual location of transmission facilities, the high potential for discovery of cultural resource materials in the project study area suggests that previously unknown cultural resources may be encountered during excavations into the underlying soils for the foundations for transmission line poles or towers. The varying extent and depth of excavations will result in different degrees of impacts on the cultural resources. The potential for impacts is directly related to the amount of excavation -- the more excavation there is, the greater the potential for impacts (AFC 1997b). Staff has proposed conditions of certification that will ensure no significant impact to cultural resources

SWP Water Pipeline Corridor

Although no cultural resource sites had been previously recorded within the proposed pipeline corridor, two new sites were discovered during the pre-AFC surveys. Both were historic trash dumps. The high potential for discovery of additional cultural resources in this area, there is a potential that trenching for the pipeline could encounter previously unknown cultural resources. Staff has proposed conditions of certification that will ensure no significant impact to cultural resources.

Corridor for Natural Gas, Potable Water, and Sewage Pipelines

The AFC describes the largest diameter pipeline needed to supply natural gas to the HDPP, as 16 inches. The ground surface along the gas pipeline route is described as considerably disturbed and much of the alignment is now paved or otherwise covered by development. Portions of the proposed pipeline corridor are crossed by existing high voltage transmission facilities and access roads. Information provided on pipeline construction methods was generalized but did indicate that the new gas pipeline will be buried in trenches approximately two feet wide and seven feet deep (AFC 1997b).

As described in the AFC, the project's proposed potable water connection line will be about six inches in diameter and will run for about 500 feet along local streets. Information provided on pipeline construction methods was generalized but the AFC indicated the pipeline would be buried in a trench that was approximately 2.5 feet wide and 8 feet deep (AFC 1997b). As described in the AFC, the proposed HDPP sanitary sewer line will be connected to the existing sewer facility located just to the east of the project site AFC 1997b).

The final centerlines for these pipeline routes have not yet been identified. Regardless of the actual location of the connections and pipelines, the high potential for discovery of cultural resource materials in the project study area suggests that previously unknown cultural resources may be encountered during excavations into the underlying soils for pipeline trenching. The varying extent and depth of excavations will result in different degrees of impacts on the cultural resources. The potential for impacts is directly related to the amount of excavation -- the more excavation there is, the greater the potential for impacts (AFC 1997b). Staff has proposed conditions of certification which should ensure that no significant impact to cultural resources would occur.

Post-AFC Well Field and Water Supply Pipeline

Most of the new water supply pipeline will parallel that of the gas pipeline route that was described in the AFC as considerably disturbed with much of the alignment paved or otherwise covered by development. Four cultural resource sites were identified in the record search for the gas pipeline and no new sites were encountered during the surveys. Two of the known sites are electric transmission lines that would not be affected by trenching for pipeline construction. The other two known sites are located outside the APE and would not be affected by trenching for the pipeline.

The high potential for discovery of cultural resource materials in the project study area suggests that previously unknown cultural resources could be encountered during excavations into the underlying soils for pipeline trenching or well field development. The varying extent and depth of excavations will result in different degrees of impacts on the cultural resources. The potential for impacts is directly related to the amount of excavation -- the more excavation there is, the greater the potential for impacts (AFC 1997b). Staff has proposed conditions of certification which should ensure that no significant impact to cultural resources would occur.

Post-AFC, 32-Mile Natural Gas Pipeline

During the initial survey of the 32-mile natural gas pipeline survey corridor, 21 cultural resource sites were identified. Following flagging of the centerline and the right-of-way boundaries and the second survey of the pipeline route, eleven sites still remained within the APE. For these eleven sites, BLM required the archaeologist to make a determination whether any were potentially eligible for nomination to the National Register. Five were determined to be eligible and they are undergoing, or are scheduled for, testing and further evaluation. These five sites are CA-SBR-7202, CA-SBR-7544H, CA-SBR-2257/H, CA-SBR-7282, and PSBR-1582-2.

Each of these sites clearly will be significantly impacted by clearance of the ground surface and the construction of trenches seven feet deep and six to ten feet wide. Two of the sites extend over such a large surface area on either side of the centerline, that there is no room within, or outside of, the proposed pipeline right-of-way to avoid crossing through them. BLM staff has indicated that the presence of cultural resource sites that meet the federal eligibility criteria would not preclude BLM from granting a permit for construction of the gas pipeline project. They would require completion of the testing program and evaluation, preparation of a detailed “Historic Resources Treatment Plan, pre-construction testing and data recovery, as well as full-time monitoring and extensive mitigation during construction activities. Where trenching for the pipeline would impact cultural resource sites determined not to be eligible for the National Register, the BLM requirements are more limited (Kunkleman 1998c). The only way not to impact the five resource sites already determined to be eligible for the National Register is to not construct the gas pipeline in this route.

CUMULATIVE IMPACTS

Based upon previous cultural resource surveys and research, the desert areas of California have been inhabited by prehistoric and historic peoples for thousands of years. Proposed developments reaching wider and deeper into the Mojave Desert can contribute to the potential for loss of significant cultural resources. Usually, with proper planning and appropriate mitigation, such developments can help to preserve these resources and can also provide opportunities for increasing our understanding of the past environmental conditions and cultures. However, construction of the proposed 32-mile natural gas pipeline will add to cumulative impacts that have already occurred at two or more of the eligible sites.

FACILITY CLOSURE

The anticipated lifetime of the HDPP power plant is expected to be in excess of thirty years. At the time of closure all then-applicable LORS will be identified and the closure plan will address how these LORS will be complied with. Generally, if no additional ground disturbance occurs during closure activities and all conditions of certification placed on the original project have been met, then no impacts to cultural resources would be expected.

The potential for actual impacts to cultural resources depends, to some degree, upon final design and location of project structures, in relation to existing cultural resources. Likewise, the potential for project closure and structure removal to impact cultural resources will depend upon the spatial relationship between the project facilities and any known cultural resources. Since these spatial relationships will not be known until completion of final project design and site layout, staff can make no final conclusion this time with respect to potential impacts of facility closure on known cultural resources.

For the 32-mile natural gas pipeline, staff can conclude that any surface or sub-surface maintenance and repair or removal of the pipeline upon abandonment or closure, will have potentially adverse impacts on those known cultural resource sites located directly within the APE of this pipeline. Prior to any surface or sub-surface disturbance or pipeline removal, the project owner / operator must complete an archaeological resource treatment plan that meets BLM permit requirements and Commission conditions of certification.

MITIGATION

The literature and the records of known cultural resource sites and isolates indicate there is a high potential for discovery of cultural resources throughout the project area. The records also suggest that cultural resources may be found on the surface or may be uncovered during excavations into the underlying soils. The potential for impacts is directly related to the amount of project-related surface and or sub-surface disturbance -- the greater the disturbance, the greater the potential for impacts. For cultural resources, the preferred mitigation measure is for project-related construction to avoid areas where cultural resources are known to be present.

No project-specific geotechnical studies or project site lay-outs have been presented for the power plant site. The applicant does not propose to conduct these studies until after the project has been certified, prior to determining final project design. Except for the 32-mile natural gas pipeline route, the final center lines and right-of-way boundaries for the linear facility routes have not been identified within the wider corridors described in the AFC. The applicant does not propose to delineate the final center lines and right-of way limits for linear routes not on BLM-administered lands until after certification of the project (HDPP 1997b; 1998*).

The discussion of proposed mitigation measures is presented in two parts: the power plant site and associated facilities as described in the AFC, and the 32-mile natural gas pipeline project which was added to the project to provide a second, alternative gas supply. The proposed 32-mile gas pipeline project is presented separately because it is not needed for the HDPP project as proposed in the AFC and because the pipeline project is subject to review and concurrence by the US Bureau of Land Management.

Staff believes it can be reasonably inferred from the literature and the archaeological records that excavations for project structural foundations, trenching for pipelines, and augering the foundations for transmission line towers are likely encounter cultural resource materials. The varying surface extent and depth of project-related excavations will result in different degrees of impacts on cultural resources (HDPP 1997b). Absent more specific project information, Staff recommends that the designated cultural resource specialist conduct a pre-construction survey of the linear routes after the project owner has identified the final centerlines and right-of-way boundaries. Staff also recommends monitoring for cultural resources throughout the pre-construction and construction periods and the implementation of full mitigation measures wherever cultural resource materials are encountered. Monitoring and mitigation by a qualified cultural resource specialist are essential to reduce the potential for project impacts to cultural resources to a less than significant level.

APPLICANT'S PROPOSED MITIGATION MEASURES ‘

The applicant's proposed mitigation measures for the power plant and related facilities are listed on pages 5.10-1 through 5.10-22 of the AFC. As stated in the AFC, the proposed measures were based on the guidelines and requirements of the City of Victorville, the County of San Bernardino, and upon the archaeological consultant's professional experience and judgement.

Measures Presented in the AFC for the Power Plant Site and Related Facilities

Resource Avoidance

The ten significant archaeological sites and historic properties described in the AFC will be avoided during construction in accordance with the provisions of CEQA Appendix K. Further, a buffer of 50 feet will be established around each archaeological site to avoid impacts from ground disturbance resulting from pipeline trenching, transmission tower construction, electrical line installation, or construction traffic. Archaeological sites will be fenced to preclude inadvertent damage.

Construction will avoid sites PSBR-38H and 62H (the significant transmission lines and towers) by providing a buffer of a sufficient distance to mitigate potential visual impacts to the setting and integrity of the two properties.

In accordance with the San Bernardino County General Plan Policy CP-4, a program will be developed to address long-term avoidance or preservation of archaeological sites when avoidance is used as a mitigation measure. The plan will state how avoidance will be achieved, both during construction (e.g., through redesign of the project, fencing, flagging, or monitoring) and during operation (e.g., through an employee awareness program and/or monitoring).

Sites SBR-4272H and 4411H, the Mormon Trail / Salt Lake to Santa Fe Trail, should be avoided by allowing a buffer of 500 feet between the placement of transmission tower footings and the boundaries of the historic property.

Construction monitoring will occur when ground-disturbing activities take place within 100 feet of identified historic resources. A qualified archaeologist will be retained to coordinate monitoring needs with construction management to preclude unnecessary delays. The frequency of monitoring will be determined by the archaeological Principal Investigator in charge of the work based on the particular property in the construction and the type of disturbance anticipated.

A mitigation monitoring report will be prepared, describing the results of monitoring, artifacts or features discovered, a reference to subsequent data recovery reports (if any) and recommendations for post-construction preservation if necessary. The frequency of reports will be dependent upon the duration of monitoring and construction and could range from monthly to semi-annually to a single post-construction report. In addition to the CEC, the report will be submitted to the San Bernardino County Museum.

Any artifacts recovered during monitoring or data recovery will be prepared for curation and submitted to the San Bernardino County Museum for curation unless a satisfactory (certified) local repository is found.

State Historic Preservation Office

The State Historic Preservation Office (SHPO) will be consulted and given opportunity to comment regarding potential impacts and mitigation measures associated with sites eligible for listing on the California Register of Historic Resources. The lead agency must define the nature and location of the proposed undertaking, describe the resources identified within the project area that may be impacted by the proposed undertaking, and define measures to be used to mitigate impacts to significant resources. The SHPO has 30 days within which to respond.

Data Recovery

Should avoidance not prove feasible, it will be necessary to conduct data recovery on archaeological sites. Data recovery is the process whereby the inherently important data within an archaeological site are removed by a qualified archaeologist (meeting the Secretary of Interior’s Standards as Archaeologist under CFR 61) using generally accepted archaeological excavation techniques and other methods. Data recovery can be used to reduce impacts to non-avoidable sites to a less than significant level. For archaeological sites, an Excavation Plan will be prepared prior to conducting data recovery to address topical research questions, techniques, and reporting requirements for each impacted site. The results of the work will be presented in a final technical report prepared in accordance with applicable California Department of Parks and Recreation, SHPO, guidelines. The report will be submitted to the San Bernardino County Museum and all recovered artifacts prepared and curated in accordance with recognized professional standards.

Native American Consultation

In mid-April 1997, the Native American Heritage Commission (NAHC) was contacted in writing to request information on known Native American traditional or cultural properties within the project area, and to request a listing of individuals or groups with cultural affiliation to the project area. No one from the HAHC responded. Continued Native American consultation shall be conducted to ensure that concerns of the Native American community are addressed during the construction and operational phases of the project. Individuals or groups identified by the NAHC as having traditional or cultural affiliation in the project area shall be contacted for comment prior to construction.

Employee Cultural Resource Awareness Training

One or more construction employee briefing sessions will be conducted by a qualified archaeologist before work commences to aid in reducing inadvertent or intentional damage to archaeological sites, features, and objects. The training will describe the types of archaeological sites and historic properties in the area, mitigation measures on the project, avoidance techniques, and regulatory requirements, including statutes prohibiting damage or vandalism to historic properties.

Discoveries During Construction

Potentially significant sites, features, and objects may be obscured by vegetation or buried by sediments within the project area and may not have been observed during the pedestrian survey. If cultural resources are encountered during project construction activities, work shall be halted or diverted to allow an archaeologist an opportunity to assess the resource in accordance with the provisions of CEQA Appendix K. In the case of the discovery of human remains, the County Coroner, and if necessary, the NAHC will be contacted.

Post-AFC 32-Mile Natural Gas Pipeline Project, Proposed by Southwest Gas

Avoidance

Avoidance of a known cultural resource is the preferred mitigation and the cultural resource consultant to the applicant recommends that all known sites should be avoided by the proposed project if possible. Avoidance could ultimately lead to a finding of “No Effect” for some of the known resources. However, since the final design of the proposed pipeline has not yet been defined and the Area of Potential Effect (APE) was not yet delineated, a significance determination on properties in the survey corridor has not yet been completed. Once the APE has been determined, final recommendations will be made relative to the significance of each site, or the additional data needed to make such a recommendation.

Spanning

Certain linear resources, such as the historic transmission line (PSBR-039H), the Randsburg wagon road (SBR-7431H) and early Highway 395 (SBR-7545H), cross the pipeline corridor and will be contained within any APE for the gas pipeline.

However, if the tower footings for the overhead transmission line avoid the surface traces of these linear resources, there should be no adverse effect on the resource.

Tunneling

Similarly, if the surface manifestations of the two roadways are avoided (through tunneling, which is the proposed method, or bore-and-jack of the pipeline), or the roadway is returned to its pre-construction state after the work, there should be no adverse effect on these linear historic resources.

Buffers

Once the final design and APE have been defined, should the gas pipeline right-of-way be designed to pass within 150 feet of a known archaeological site boundary, a 50-foot buffer around the site should be established through the installation of flagging and/or fencing as necessary to preclude direct and indirect impacts to the resource. A qualified archaeologist should relocate the site and place the flagging or fencing as necessary.

If Resource Cannot Be Avoided

If avoidance of a site is not possible, as may be the case with CA-SBR-2257/H (because of its existence on both sides of the proposed route), a focused pre-construction subsurface testing program should be implemented within the staked centerline of the proposed gas pipeline trench and within intuitively selected areas of the APE or construction right-of-way, to assess the significance of the resource in the area of direct impact.

A pre-construction testing plan should be prepared which describes the methodology to be used during testing and artifact analysis, research questions to be addressed during testing, and the threshold of significance for data recovery should National Register-eligible resources be located within the area of direct impact.

The testing program for each site may differ depending upon the known and observed characteristics of the particular site. Large concentrations of prehistoric lithic artifacts occupying a widespread site area may require a more intensive testing effort than a small, diffuse scatter of artifacts over a small area. Similarly, small historic sites with limited visible resources may demand additional archival research and limited subsurface testing, while larger, more complex sites may require a more intensive effort.

Should any of the sites subject to direct impacts be located on Bureau of Land Management-administered lands, co-ordination with the appropriate District or Resource Area archaeologist will be necessary in the formulation of a testing or treatment plan and implementation of the work. Special Use or Archaeological Resource Protection Act (ARPA) permits may be required for archaeological excavation on BLM lands; Native American consultation will also be required as part of ARPA.

Several of the known cultural resource sites in the project area could not be relocated during the survey either because of their sparse nature, changes in the physical landscape over the intervening years since they were recorded, previous collection of the resource, or other reasons. Without the benefit of a visual assessment, these sites should also be considered potentially significant and avoided or treated as described above.

Native American Consultation

In April 1997, the Native American Heritage Commission was contacted in writing to request information on known Native American traditional or cultural properties within the project area, and to request a listing of individuals or groups with cultural affiliation to the project area. Continued Native American consultation should be conducted to ensure that concerns of the Native American community are addressed during the construction and operational phase of the project. Individuals or groups identified by the Native American Heritage Commission as having traditional or cultural affiliation in the project area should be contacted for comment prior to construction.

Employee Cultural Resource Awareness Training

One or more construction employee briefing sessions should be conducted by a qualified archaeologist before work commences to aid in reducing inadvertent or intentional damage to archaeological sites, features and objects. The training should describe the types of archaeological sites and historic properties in the area, mitigation measures on the project, avoidance techniques, and regulatory requirements, including statutes prohibiting damage or vandalism to historic properties.

Discoveries During Construction

Potentially significant sites, features and objects may be obscured by vegetation or buried by sediments within the project area, and may not have been observed during the pedestrian survey. If cultural resources are encountered during project construction activities, work should be halted or diverted to allow an archaeologist an opportunity to assess the resource in accordance with the provisions of 36 CFR 800.11 and CEQA Appendix K (Item IX).

Discovery of Human Remains

In addition to the requirements of NAGPRA, section 7050.5(b) of the California Health and Safety Code should be implemented in the event that human remains, or possible human remains, are located. It states:

- In the event of discovery, or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.

If the County Coroner recognizes the remains as being of Native American origin, he or she must contact the Native American Heritage Commission within 24 hours. The NAHC has various powers and duties to provide for the ultimate disposition of any Native American remains, as does the assigned Most Likely Descendant.

Sections 5097.98 and 5097.99 of the Public Resources Code also call for the protection to Native American human burials. These code sections include recommendations that construction personnel on the project be instructed as to the potential for skeletal remains to be encountered, the need to protect them from vandalism and inadvertent destruction, and the consequences of failure to notify the coroner of such a discovery in a timely manner.

CITY OF VICTORVILLE MITIGATION REQUIREMENTS

The majority of the power plant project and associated linear facilities are located within the boundaries of the City of Victorville. The City of Victorville has adopted the requirements of San Bernardino County as guidelines for the mitigation of potential project impacts to cultural resources (Victorville 1997).

US BUREAU OF LAND MANAGEMENT PROPOSED MITIGATION MEASURES

The US Bureau of Land Management manages approximately eight miles of the 32-mile route proposed for the second natural gas pipeline project and considers the project an undertaking, under federal definitions. While Staff have evaluated this natural gas pipeline project as part of the Commission's certification process, the US Bureau of Land Management, through the area office in Barstow, will have jurisdiction over cultural and paleontologic resource mitigation for the entire 32-mile route of this pipeline. The BLM, under a recent programmatic agreement with the state, now has the authority to act on behalf of the SHPO in making determinations of eligibility and effect for archaeological sites, once the final project design has been completed. The five cultural resource sites that are located within the APE of the proposed 32-mile natural gas pipeline are currently being evaluated for eligibility which will be reviewed by BLM, and possibly the SHPO.

The eligibility criterion that most often applies to archaeological (non-architectural) sites or objects (criterion d) states that they must "...have yielded or may be likely to yield, information important to prehistory or history". To evaluate a site against such a broad criterion requires consideration of the regional culture history, the types, ages; and distribution of other sites in the region, and the nature of questions that researchers are attempting to address regarding the history or prehistory of the region, among other factors. Often information about potential sub-surface resources and the potential for project impacts can not be easily gleaned from the surface evidence at a given cultural resource site. In such an instance, additional archival research (in the case of historic properties) or subsurface probing or testing (within archaeological properties) may be required to gather sufficient information to make a determination as to the significance of the resource site or its potential eligibility for the National Register.

The archaeological consultant to the applicant is currently developing a specific mitigation plan designed to meet BLM requirements. The applicant's mitigation measures presented above, for the 32-mile natural gas pipeline project are based upon BLM requirements and will be supplemented by the archaeological resource treatment plan now in preparation. Staff have requested that BLM include them in any site visits during testing and field work, review and oversight of the cultural resource monitoring and mitigation plan preparation, approval, and implementation.

STAFF'S PROPOSED MITIGATION MEASURES

Commission Staff concur with the mitigation measures proposed in the AFC for the power plant site and related facilities. Staff has suggested additional language to clarify the measures presented by the applicant and other participating agencies. The changes would extend the mitigation contingency planning to address the following aspects in greater detail, including: 1) Energy Commission staff review and approve the qualifications of professional archaeologists proposed for project monitoring and mitigation efforts; 2) recovery of any sensitive cultural resources prior to impact by project activities; 3) recordation and analysis of all pertinent data and scientific information from the site(s) and any recovered cultural resources; 4) curation in a qualified repository, of the data and materials recovered; 5) preparation of recovered materials to the point of identification and completion of an inventory of materials prepared for curation; 6) preparation of a final report on data recovery efforts associated with project mitigation; and 7) filing of pertinent maps, photos, and other information with the curated materials. These measures are incorporated into the conditions of certification specified below.

Project-Specific Mitigation Measures

Rather than setting forth project-specific measures here, staff's recommended mitigation requirements and guidelines have been incorporated into the proposed conditions of certification which follow the text of this staff analysis.

COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

If the cultural resources mitigation measures proposed by the applicant, by San Bernardino County, City of Victorville, Energy Commission staff, and by the BLM are implemented in a timely and proper manner, the project would be in compliance with the applicable laws, ordinances, regulations, and standards.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The project region is located near the southern edge of the Mojave Desert ,in the northwestern portion of San Bernardino County. Archaeological evidence indicates that California has been occupied by humans for many thousands of years. These early occupants had well established patterns of seasonal hunting and resource collection throughout the Mojave. The early peoples of California had well-established trade routes that extended from the ocean coastal areas, northeastward across the Mojave Desert toward the tribes along the Colorado River and in northern Mexico. They also traveled northward and traded with the tribes along the eastern slopes of the Sierras. Numerous archaeological sites found throughout the project area provide evidence of prehistoric occupation and use by the native peoples of California.

Many of the trade routes established by the native peoples of California were used by the Euro-American explorers and settlers as they spread into California. Portions of the routes for project-related linear facilities cross remnants of early trails and wagon roads across the Mojave. Eventually these early trade routes provided the foundation for the railroads and for modern-day highways. And due to topographic constraints and the presence of transportation access, these routes also were used for utility transmission facilities.

The location of the City of Victorville at the crest of a pass at the edge of the desert, plus the water available in the Mojave River made the area a focal point for all major transportation routes between the coast and other western states. The numerous archaeological sites found throughout the project area provide evidence of the succession of historic occupation and development.

Cultural resources are significant to our understanding of our culture, our history and heritage and they can also provide insight into the broader patterns of human adaptation to environmental change. Evidence of California's early occupation is becoming increasingly vulnerable to the ongoing development and urbanization of the state. Staff's primary concern is to ensure that all potential impacts are identified and that conditions are set forth to ensure that no significant adverse impacts will occur.

No project-specific geotechnical studies or site layout plan have been completed for the project site and the centerlines and right-of-way boundaries for project-related linear facilities not be identified. This project and site specific information is not expected to become available until after the Commission has certified the HDPP project. After the centerlines and rights-of-way have been identified, additional, pre-construction surveys should be completed by qualified professionals and a detailed monitoring and mitigation plan should be prepared, describing the measures proposed to mitigate potential project impacts to cultural resources. This plan would incorporate the measures and requirements set forth in discussion above and in the Conditions of Certification.

The applicant has also proposed construction of a second, 32-mile natural gas supply pipeline to serve the proposed HDPP project. Portions of the pipeline route crosses lands administered by the US Bureau of Land Management which has taken the lead over the evaluation and protection of cultural resources known to exist or yet to be discovered within the pipeline right-of-way. Surveys of a 500-foot corridor for the pipeline identified over twenty known cultural resource sites; refinement of the surveys to a specific 110-foot wide right-of-way still would impact eleven sites. Five of the eleven known sites were determined potentially eligible for the National Register of Historic Places and BLM will require special treatment and mitigation of construction impacts for these sites. Since pipeline construction requires excavation of a continuous trench along the entire route, the only way to avoid impacts to these eligible (significant) cultural resources would be to avoid construction of the pipeline.

The federal agencies are beginning preparation of an Environmental Impact Statement for this gas pipeline and their review process is not expected to be complete until late in 1999. BLM staff has indicated that they do not believe the presence of unavoidable cultural resource sites would preclude construction of the pipeline. Commission staff has requested that BLM staff keep them apprised of the schedule and activities of the federal review and permit process.

RECOMMENDATIONS

If the cultural resource mitigation measures proposed by the applicant, by San Bernardino County, by the City of Victorville, by the Bureau of Land Management, and by Staff are implemented in a timely and proper manner, the project is expected to be in compliance with the applicable LORS.

Staff recommends designation of a qualified professional cultural resource specialist to conduct a pre-construction survey of the linear routes after the project owner has identified the final centerlines and rights-of-way. Staff also recommends monitoring for cultural resources throughout the pre-construction and construction periods and the implementation of full mitigation wherever cultural resources are encountered. Monitoring and mitigation by a qualified cultural resource specialist are essential to reduce the potential for project impacts to cultural resources to a less than significant level.

Staff recommends that the Commission adopt the mitigation measures described above, and which are included in the following proposed conditions of certification to ensure adequate mitigation of potential impacts to cultural resources during the construction of the High Desert Power Project.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Project construction (defined as any construction-related vegetation clearance, ground disturbance and preparation, and site excavation activities), shall not begin until the designated cultural resources specialist approved by the California Energy Commission (Commission) Compliance Project Manager (CPM), is available to be on site.

The designated cultural resources specialist shall be responsible for implementing all the Conditions of Certification and for using qualified personnel to assist him or her in project-related activities. The designated specialist, with professional assistance from team members as needed, shall conduct final pre-construction surveys, flag areas to be avoided, and identify areas where shovel testing, test pits, or backhoe trenching needs to be done; prepare the Cultural Resources Monitoring and Mitigation Plan; prepare and present the pre-construction employee awareness training program; keep a daily log of monitoring and mitigation activities and prepare a summary of these activities to be included in the weekly construction status report filed with the CPM; direct and implement monitoring and mitigation procedures, as needed in sensitive resource areas, during any construction activities associated with all aspects of the project; conduct the mapping, recording, sampling, and collection of sensitive and diagnostic cultural resources; conduct the preparation and analyses of all data and cultural materials recovered during project monitoring and mitigation; identify and inventory recovered cultural resources; prepare recovered cultural resources for delivery and curation to a qualified public repository; and prepare the preliminary and final cultural resources reports to be filed with the receiving curation repository, appropriate regional information center(s), SHPO, and the Commission.

After CPM approval of the Cultural Resources Monitoring and Mitigation Plan, described below in Condition CUL-4, the designated cultural resource specialist and team shall be available to implement the mitigation plan prior to, and throughout construction of the project.

<u>Protocol:</u> 1) The resume shall include all information needed to demonstrate that the designated cultural resource specialist meets the minimum qualifications specified in the US Secretary of Interior Guidelines, as published by the State Office of Historic Preservation (199*). The Commission staff expects that these minimum qualifications would include the following: a graduate degree in anthropology, archaeology, California history, cultural resource management, or other comparable fields; at least three years of archaeological resource mitigation and field experience in California; and at least one year’s experience in each of the following areas: leading archaeological resource field surveys; leading site and artifact mapping, recording, and recovery operations; marshalling and use of equipment necessary for cultural resource recovery and testing; preparing recovered materials for analysis and identification; recognizing the need for appropriate sampling and/or testing in the field and in the lab; directing the analyses of mapped and recovered artifacts; completing the identification and inventory of recovered cultural resource materials; and the preparation of appropriate reports to be filed with the receiving curation repository, the SHPO, all appropriate regional archaeological information center(s), and the CPM.

2) The resume for the designated cultural resource specialist shall include a list of specific projects the specialist has previously worked on; the role and responsibilities of the specialist for each project listed; and the names and phone numbers of contacts familiar with the specialist's work on these referenced projects.

3) If additional personnel will be assisting the designated cultural resource specialist in project-related field surveys, monitoring, data and artifact recovery, mapping, mitigation, cultural resource analysis, or report preparation, the project owner shall also provide names, addresses, and resumes for these cultural resource team members.

4) If the CPM determines that the qualifications of the proposed cultural resource specialist are not in concert with the above requirements, the project owner shall submit another individual's name and qualifications for consideration.

5) If the previously approved, designated cultural resources specialist is replaced prior to completion of project mitigation, the project owner shall obtain CPM approval of the new designated cultural resource specialist by submitting the name and qualifications of the proposed replacement to the CPM, at least ten (10) days prior to the termination or release of the preceding designated cultural resource specialist. Should emergency replacement of the designated specialist become necessary, the project owner shall immediately notify the CPM to discuss the qualifications of its proposed replacement specialist?

Verification: At least one hundred twenty (120) days prior to the start of construction on the project, the project owner shall submit the names and resumes for its designated cultural resource specialist and the specialist's team members, to the CPM for review and written approval. The CPM shall provide approval or disapproval of the proposed cultural resource specialist. The submittal from the project owner shall also include an estimated schedule and the approximate number of hours needed to implement the monitoring and mitigation plan.

Thirty (30) days prior to start of construction, the project owner shall confirm in writing to the CPM that the previously approved designated cultural resources specialist and the team of assistants are prepared to implement the monitoring and mitigation measures for cultural resources, as described in the CPM-approved Cultural Resources Monitoring and Mitigation Plan, prepared per Condition CUL-4, below.

At least ten (10) days prior to the termination or release of a designated cultural resource specialist, the project owner shall obtain CPM approval of the replacement specialist by submitting to the CPM the name and resume of the proposed new designated cultural resource specialist. Should emergency replacement of the designated specialist become necessary, the project owner shall immediately notify the CPM to discuss the qualifications of its proposed replacement specialist?

CUL-2 Prior to the start of project construction, the project owner shall survey and stake all areas expected to be affected by construction and operation of the proposed project and its associated linear facilities. The surveys and staking shall reflect the final project design and site layout and the final post miles, centerlines, and right-of-way boundaries for the linear facilities.

Verification: At least ninety (90) days prior to the start of construction, the project owner shall stake and flag the boundaries of all areas expected to be affected by construction and operation of the proposed project and its associated linear facilities. The staking of linear routes shall define the mile-posts, centerlines, and right-of-way boundaries. The project owner shall notify the CPM when the surveys and staking have been completed.

CUL-3 Prior to the start of project construction, the project owner shall provide the designated cultural resource specialist and the CPM with maps and drawings showing the final project design and site layout, and the final alignment of all linear facilities, as surveyed and staked per Condition CUL-2, above. The routes for the linear facilities shall be provided on 7.5 minute quad maps, showing post mile markers, final center lines and right-of-way boundaries, and the location of all the various areas where surface disturbance may be associated with project-related access roads, storage yards, laydown sites, pull sites, pump or pressure stations, switchyards, electrical tower or pole footings, etc.

After reconnaissance surveys by the designated cultural resource specialist, the specialist may request, and the project owner shall provide, enlargements of portions of the 7.5 minute maps presented as a sequence of strip maps for the linear facility routes. The strip maps would show post mile markers and the detailed locations of proposed access roads, storage or laydown sites, tower or pole footings, and any other areas of disturbance associated with the construction and maintenance of linear facilities.

Verification: At least one hundred twenty (120) days prior to the start of construction on the project, the project owner shall provide the designated cultural resource specialist and the CPM with final drawings and site layouts for all project facilities and maps at appropriate scale(s) for all areas potentially affected by project construction.

CUL-4 Prior to the start of project construction, the designated cultural resources specialist shall conduct a reconnaissance survey of the final project site and the final center lines and rights-of-way for the project linear facilities, and all other areas expected to be affected by construction and operation of the proposed project. Surveys of the linear facilities shall use the centerlines and rights-of-way delineated by the survey stakes placed under Condition CUL-2, above. During the surveys, potentially sensitive cultural resource areas that must be protected during construction and operation shall be mapped and listed for specific monitoring and / or mitigation measures to be described in the Cultural Resources Monitoring and Mitigation Plan to be prepared per Condition CUL-5, below.

Verification: A least one hundred five (105) days prior to the start of construction, the designated cultural resources specialist shall conduct a reconnaissance survey of all areas expected to be affected by construction and operation of the proposed project and its associated linear facilities.

CUL-5 Prior to the start of project construction, the designated cultural resources specialist shall prepare a draft Cultural Resources Monitoring and Mitigation Plan to identify general and specific measures to minimize potential impacts to sensitive cultural resources. The CPM will review and must approve in writing, the Cultural Resources Monitoring and Mitigation Plan. After CPM approval, the project owner's designated cultural resource specialist and designated cultural resource team shall be available to implement the Monitoring and Mitigation Plan, as needed throughout project construction.

Protocol: The Cultural Resources Monitoring and Mitigation Plan shall include, but mot be limited to, the following elements and measures:

a. A discussion of the sequence and time frame for project-related tasks, such as any final pre-construction surveys, fieldwork, flagging or staking; construction monitoring; mapping and data recovery; preparation of a research design; cultural resource preparation and recovery; preparation of data and recovered materials for analysis, identification, and inventory; preparation of preliminary and final reports; and preparation of materials for curation.

b. An identification of the person(s) expected to assist with each of the tasks identified in (a), above, and a discussion of the mitigation team leadership and organizational structure, and the inter-relationship of tasks and responsibilities.

c. A discussion of the need for Native American observers or monitors, the procedures to be used to select them, the areas or post-mile sections where they will be needed, and their role and responsibilities.

d. A proposed research design that includes a discussion of questions that may be answered by the mapping, data and artifact recovery conducted during monitoring and mitigation activities, and by the post-mitigation analyses.

e. Where sensitive areas are to be avoided during construction and/or operation, the designated cultural resources specialist shall identify measures such as flagging or fencing, to prohibit or otherwise restrict access to sensitive resource areas. The discussion shall address how these measures will be implemented prior to the start of construction and how long they will be needed to protect the resources from project-related effects.

f. Where monitoring of project construction activities is deemed necessary by the designated cultural resource specialist, the specialist will determine the size or extent of the areas where monitoring is to occur and will establish a schedule for the monitor(s) to be present. If the designated specialist determines that the likelihood of encountering cultural resources in certain areas is slight, monitoring may be discontinued in that location;

g. The designated cultural resource specialist shall have the authority to halt or redirect construction if previously unknown midden deposits or cultural resource materials are encountered during project-related grading, augering, excavation and/or trenching. The halting or redirection of construction shall remain in effect until the designated cultural resources specialist has notified the CPM of the find and the work stoppage, and until the necessary data recovery and mitigation has been completed. After construction is halted or redirected, the designated cultural resources specialist shall act in accordance with the following procedures:

- The designated cultural resources specialist, representatives of the project owner, and the CPM shall confer within five working days of the notification of the CPM, if necessary, to discuss any mitigation measure(s) already implemented or proposed to mitigate potential impacts to these resources.

- If previously unknown cultural resources are encountered, the designated cultural resource specialist and team members shall monitor construction activities and implement data recovery and mitigation measures, as needed
-
- If midden deposits are exposed during ground clearance or excavation, then construction activities are to be halted and the construction area is to be spot-checked or monitored by the designated cultural resources specialist to determine whether cultural resources are present in the deposit
-
- All necessary and required data recovery and mitigation shall be completed as expeditiously as possible after discovery of any previously unknown cultural resources, unless additional time is agreed to by all parties.

h. A discussion of the availability and the designated specialist's access to equipment and supplies necessary for site mapping and recovery of cultural resource materials.

i. All cultural resources encountered will be recorded and mapped (may include photos) and all significant or diagnostic resources will be collected for analysis and eventual curation into a retrievable storage collection in a public repository or museum that meets the US Secretary of Interior standards and requirements for the curation of cultural resources

j. Identification of the public institution that has agreed to receive any data and cultural resources recovered during project-related monitoring and mitigation work. Discussion of any requirements, specifications, or funding needed for the materials to be delivered for curation and how they will be met. Also include the name and phone number of the contact person at the institution.

Verification: At least ninety (90) days prior to the start of construction on the project, the project owner shall provide the CPM with a copy of the draft Cultural Resources Monitoring and Mitigation Plan prepared by the designated cultural resource specialist. If the draft plan is not approved, the project owner, the designated cultural resources specialist, and the CPM shall meet to discuss comments and work out necessary changes.

CUL-6 Prior to the start of project construction, the designated cultural resources specialist shall prepare an employee training program. The project owner shall submit the cultural resources training program to the CPM for review and written approval.

Protocol: The training program will discuss the potential to encounter cultural resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

The training program shall also include the set of reporting procedures that workers are to follow if previously unknown cultural resources are encountered during project activities. The training program will be presented by the designated cultural resource specialist and may be combined with other training programs prepared for biological resources, hazardous materials, or any other areas of interest or concern.

Verification: At least sixty (60) days prior to the start of construction on the project, the project owner shall submit to the CPM (or designee) for review, comment, and written approval, the proposed employee training program and set of reporting procedures the workers are to follow if previously unknown cultural resources are encountered during construction.

The CPM shall provide the project owner with written approval or disapproval of the employee training program and set of reporting procedures. If the draft employee training program is not approved, the project owner, the designated cultural resources specialist, and the CPM shall meet to discuss comments and work out necessary changes.

CUL-7 Prior to the start of construction and throughout the project construction period as needed for all new employees, the project owner and the designated cultural resource specialist shall provide the CPM-approved training to all project managers, construction supervisors, and workers who operate ground disturbing equipment. The project owner and construction manager shall provide the workers with the CPM-approved set of procedures for reporting any sensitive resources that may be discovered during project-related ground disturbance.

Verification: Prior to the start of construction and throughout the project construction period as needed for all new employees, the project owner and the designated cultural resources specialist shall present the CPM-approved training program on the potential for project impacts to sensitive cultural resources. The training shall include a set of reporting procedures for cultural resources encountered during project activities. The project owner shall provide documentation to the CPM that the employee training and the set of procedures have been provided to all project managers, construction supervisors, and all workers.

CUL-8 Throughout the project construction period, the project owner shall provide the designated cultural resource specialist with a current schedule of anticipated weekly project activity and a map indicting the area(s) where construction activities will occur. The designated cultural resources specialist shall consult daily with the project superintendent or construction field manager to confirm the area(s) to be worked on the next day(s).

Throughout the pre-construction reconnaissance surveys and the construction monitoring and mitigation phases of the project, the designated cultural resources specialist shall keep a daily log of any resource finds and the progress or status of the resource monitoring, mitigation, preparation, identification, and analytical work being conducted for the project. The designated resource specialist may informally discuss the cultural resource monitoring and mitigation activities with Commission technical staff.

The project owner shall include copies of the cultural resources weekly progress or status summaries in the project owner's weekly Construction Status Report to the CPM.

Verification: Throughout the project construction period, the project owner shall include in the Monthly Compliance Reports to the CPM, a summary of the daily logs prepared by the designated cultural resource specialist on the progress or status of cultural resource monitoring and mitigation activities.

CUL-9 The designated cultural resource specialist shall be present at all times to monitor construction-related grading, excavation, trenching, and/or augering in the vicinity of previously recorded archaeological sites and in areas where midden deposits have been identified during project construction.

If the designated cultural resource specialist determines that full-time monitoring is not necessary in certain portions of the project area or along portions of the linear facility routes, the designated specialist shall notify the project owner of the changes. Mile post markers and boundary stakes placed by the project owner will be used to identify areas where monitoring is being reduced or is no longer deemed necessary.

The daily logs prepared by the designated cultural resource specialist shall indicate by post mile, where and when monitoring has taken place and where monitoring has been deemed unnecessary.

Verification: The project owner shall include in the Monthly Compliance Reports to the CPM, a summary of the daily logs prepared by the designated cultural resource specialist.

CUL-10 The project owner shall ensure the recovery, preparation for analysis, analysis, and preparation for curation of all cultural resource materials encountered and collected during pre-construction surveys and during the monitoring, data recovery, mapping, and mitigation activities related to the project.

Verification: The project owner shall maintain in its compliance files, copies of signed contracts or agreements with the museum(s), university(ies), or other appropriate research specialists which will ensure the necessary recovery, preparation for analysis, and analysis of cultural resource materials collected during data recovery and mitigation for the project. The project owner shall keep these files available for periodic audit by the CPM.

CUL-11 The project owner shall ensure preparation of a Preliminary Cultural Resource Report following completion of data recovery and site mitigation work. The preliminary report is to be prepared by the designated cultural resource specialist and the project owner shall submit the preliminary report to the CPM for review, comment, and written approval.

Protocol: The preliminary report shall include (but not be limited to) preliminary information on the survey report(s), methodology, and recommendations; site records and maps; determinations of sensitivity and significance; data recovery and other mitigation activities; discussion of possible results and findings of any analysis to be conducted on recovered cultural resource materials and data; proposed research questions which may be answered or raised by the data recovered from the project; and an estimate of the time needed to complete the analysis of recovered cultural resource materials and prepare a final report.

If no cultural resources were recovered during project construction, the CPM-approved preliminary report shall also serve as the final report and shall be filed with appropriate entities, as described in conditions CUL-12 and CUL-13.

Verification: The designated cultural resources specialist shall prepare a preliminary report on the cultural resource monitoring and mitigation activities conducted for the project. The report shall be prepared within ninety (90) days following completion of the data recovery and site mitigation work. The project owner shall submit a copy of the Preliminary Cultural Resources Report to the CPM for review, comment, and written approval.

CUL-12 The project owner shall ensure preparation of a Final Cultural Resources Report by the designated cultural resources specialist, if significant or diagnostic cultural resources are found. The Final Cultural Resource Report shall be completed within ninety (90) days following completion of the analysis of the recovered cultural materials and related information. The project owner shall submit the final cultural resources report to the CPM for review, comment, and written approval.

Protocol: The Final Cultural Resource Report shall include (but not be limited to) the survey report(s), methodology, and recommendations; site records and maps; description and inventory list of recovered cultural materials; determinations of significance and potential eligibility; data recovery and other mitigation activities; results and findings of any special analyses conducted on recovered cultural resource materials and data; research questions answered or raised by the data from the project; and the name and location of the public institution receiving the recovered cultural resources for curation.

Verification: The Final Cultural Resource Report shall be prepared by the designated cultural resources specialist for the project, within ninety (90) days following completion of the analysis of the recovered cultural materials and preparation of related text, maps, tables, charts, photos, etc. The project owner shall submit a copy of the final cultural resources report to the CPM for review and approval.

CUL-13 The project owner shall submit an original, or an original-quality, copy of the CPM-approved Final Cultural Resource Report to the public institution receiving the recovered data and materials for curation, to the SHPO, and to the appropriate archaeological information center(s). A legible copy of the final report shall be filed with the Commission CPM, with a request for confidentiality, if needed to protect any sensitive resources or sites.

Protocol: The copies of the Final Cultural Resource Report sent to the curating institution, the SHPO, and the information center(s) shall include the following (as applicable to the project findings set forth in the final report): clean and reproducible original copies of all text; originals of any topographic maps showing site and resource locations; original or clear copies of drawings of significant or diagnostic cultural resource materials found during pre-construction surveys, during project-related monitoring, data recovery, and mitigation; and photographs (including a set of negatives, if possible) of the site(s) and the various cultural resource materials recovered during project monitoring and mitigation and subjected to post-recovery analysis and evaluation.

Verification: The project owner shall maintain in its compliance files, copies of all documentation related to the filing of the original materials and the Commission-approved Final Cultural Resources Report with the public institution receiving the recovered data and materials for curation, the SHPO, and the appropriate archaeological information center(s). If no significant cultural resources were recovered, then the preliminary report shall serve as the final report and copies of the preliminary report shall be filed with these same agencies.

CUL-14 Following the filing of the CPM-approved Final Cultural Resource Report with the appropriate entities, the project owner shall deliver for curation all cultural resource materials, maps and data collected during data recovery and mitigation for the project. The materials shall be delivered for curation into a public repository that meets the US Secretary of Interior requirements for the curation of cultural resources.

Verification: All recovered cultural resource materials shall be delivered for curation within thirty (30) days following the filing of the CPM-approved Final Cultural Resource Report. The project owner shall maintain in its project history or compliance files, copies of signed contracts or agreements with the museum(s), university(ies), or other appropriate public repository(ies) to which the project owner has delivered for curation all cultural resource materials collected during data recovery and mitigation for the project.

REFERENCES

Greystone Environmental Consultants (Greystone 1998a). Cultural Resources Assessment for the 26-Mile Southwest Gas Pipeline

HDPP (High Desert Power Project, LLC) 1997a. Application for Certification, High Desert Power Project (97-AFC-1). Submitted to the California Energy Commission, June 30, 1997.

HDPP (High Desert Power Project, LLC) 1997b. Revised Application for Certification, High Desert Power Project (97-AFC-1). Submitted to the California Energy Commission, November 17, 1997.

HDPP (High Desert Power Project, LLC) 1998b. Data request responses for most of the 77 data requests and 11 discussion topics filed by the Commission staff on December 15, 1997. Submitted to the California Energy Commission, January 16, 1998.

Self, William, Associates (Self 1998b).

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SOCIOECONOMIC RESOURCES

Testimony of Amanda Stennick

INTRODUCTION

The technical area of socioeconomics encompasses several related areas of interest and concern. A typical socioeconomic impact analysis evaluates the effects of project-related population changes on local schools, medical and protective services, public utilities and other public services, and on the fiscal and physical capability of local governmental agencies to meet the needs of project-related changes in population. The socioeconomics analysis also addresses the issue of environmental justice. This analysis discusses the potential effects of the proposed High Desert Power Project (HDPP) on local communities, community resources, and public services, pursuant to Title 14 California Code of Regulations, Section 15131.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

CALIFORNIA GOVERNMENT CODE §§ 53080, 65955-65997

The code includes provisions for levies against development projects near schools. The administering agencies are Adelanto Elementary School District, Hesperia Unified School District, Victor Elementary School District, Snowline Joint Unified School District, Victor Valley Union High School District.

CALIFORNIA GOVERNMENT CODE § 65996

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

CITY OF VICTORVILLE ORDINANCE 1301

City of Victorville Ordinance 1301 was enacted in accordance with the City of Victorville’s General Plan to mitigate the overburdening of existing facilities. City of Victorville Ordinance 1301 establishes a development impact fee to be charged upon the issuance of all building permits. The ordinance imposes a building development fee of $0.35 per square foot for industrial projects. The project consists of about 45,000 square feet of building area, therefore, the impact fees resulting from the enforcement of this ordinance would be $15,750. However, because HDPP is located within the Southern California International Airport (SCIA), the project is eligible for various sales and tax use credits, including a waiver of all development impact fees (Cox 1998). Please refer to the section **Impact on Fiscal Resources and the Local Economy** for further discussion.

CITY OF VICTORVILLE ORDINANCE 1451

City of Victorville Ordinance 1451 was enacted in accordance with the City of Victorville’s General Plan to provide for street lighting, curb, gutters, and fire hydrants where they are not otherwise provided. Infrastructure fees would be charged on all HDPP building permits. Any requirements for the above-cited improvements will be determined through the city's plan review process, to the satisfaction of George Worley, Director of Building and Safety (Cox 1998). However, because HDDP is located within the SCIA, the project is eligible for various sales and tax use credits, including infrastructure improvements that may be provided by SCIA. Please refer to the section **Impact on Fiscal Resources and the Local Economy** for further discussion.

ENVIRONMENTAL JUSTICE

President Clinton's Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was signed on February 11, 1994. The order required the U.S. Environmental Protection Agency (EPA) and all other federal agencies to develop environmental justice strategies. The USEPA subsequently issued Guidelines that require all federal agencies and state agencies receiving federal funds, to develop strategies to address this problem. The agencies are required to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations.

Environmental Justice Screening Analysis

For all siting cases, Energy Commission staff will follow the federal guidelines' two-step screening process. The process will assess:

- whether the potentially affected community includes minority and/or low-income populations; and

- whether the environmental impacts are likely to fall disproportionately on minority and/or low-income members of the community.

Should the screening process indicate the presence of minority or low income populations, local community groups will be contacted to provide the Commission with a fuller understanding of the community and the potential environmental justice issues. In addition, local community groups will be asked to help identify potential mitigation measures.

Socioeconomics Table 1 contains demographic information for the Cities of Adelanto and Victorville. Data for this table were taken from the 1990 US Census Data, as specified in the USEPA Guidelines (guidelines) for use in an environmental justice analysis (USEPA 1996). Energy Commission staff is aware that data from the 1990 Census may not accurately represent the 1998 population of Victorville and Adelanto. Census estimates and projections are done only on a county-wide basis and the most recent data is for the year 1994 (Heim, Doche, Choi, Scheuermann 1998). There are inherent problems with using county-wide population projections for 1994. The HDPP area comprises the cities of Adelanto and Victorville. Using county-wide data could artificially inflate or dilute the presence of an affected minority and/or low-income populations. Energy

Commission staff is aware that population shifts since the 1990 US Census may indicate the presence of an affected minority and/or low-income populations in the HDPP area. However, if members of the community believe there may be potential environmental justice issues, Energy Commission staff will work with the community using non-traditional data gathering techniques, including outreach to community-based organizations to identify distinct minority and/or low-income populations living within the HDPP area.

According to the guidelines, a minority population exists if the minority population percentage of the affected area is fifty percent of the affected area's general population. Based on the screening process for environmental justice, information in Socioeconomics Table 1 indicates that the minority population of the affected area is not greater than fifty percent of the general population. Therefore, because the minority population is not fifty percent, there appears to be no potential minority population based environmental justice issues in the HDPP area.

SOCIOECONOMICS Table 1
Demographic Profile for Cities of Adelanto and Victorville

City of Adelanto	Percentage of Total	City of Victorville	Percentage of Total
White 5,430	64%	White -25,827	64%
Black 1,156	14%	Black - 3,750	9%
American Indian 114	1%	American Indian 323	<1%
Asian/Pacific Islander 322	4%	Asian/Pacific Islander 1,352	3%
Other Race 20	<1%	Other Race 69	<1%
Hispanic 1,475	17%	Hispanic 9,353	23%
Total Population 8,517	100%	Total Population 40,674	100%
Source: 1990 US Census Data, Statistical Information on Population			

The poverty threshold for a family of four persons was $12,674 (1990 US Census Data). To determine the number of persons below the poverty level, Energy Commission staff reviewed data from the 1990 US Census: Poverty Status By Age; Universe: Persons for whom poverty status is determined (the aggregate number of persons five years and under to seventy-five years and over) to arrive at the following figures:

- Adelanto - of the total city population, approximately 27 percent (2,323) of persons are living below the poverty level.

- Victorville - of the total city population, approximately 14 percent (5,750) of persons are living below the poverty level.

As stated above, a minority population exists if the minority population percentage of the affected area is fifty percent of the affected area's general population. Because the guidelines do not give a percentage of the population as a threshold to determine the existence of a low-income population, Energy Commission staff used the fifty percent rule as required for minority populations. Because the low-income population is less than 50 percent, there appears to be no potential low-income population-based environmental justice issues in the HDPP area. However, if members of the community believe there may be potential environmental justice issues, Energy Commission staff will work with the community by using non-traditional data gathering techniques, including outreach to community-based organizations to identify distinct minority and/or low-income populations living within the HDPP area.

SETTING

PROJECT LOCATION

The project site is located on a 25-acre parcel (Assessor's Parcel number 0468-231-01) within the 5,350-acre SCIA. The project site is located approximately 3.5 miles east of US 395 and is north of Phantom Street, contiguous to Perimeter Road on the east border of the site. The parcel is currently owned by the Victor Valley Economic Development Authority (VVEDA). The project site is within the City of Victorville city limits and is about three miles from commercial and residential development of the cities of Victorville and Adelanto. Please refer to the **Project Description** section of the Staff Assessment for a complete project description.

DEMOGRAPHY

The City of Victorville is located on the southern fringe of the Mojave Desert in southwestern San Bernardino County. Victorville is separated from the more urbanized areas in Southern California by the San Bernardino mountains. In recent years, Victorville and other desert cities have experienced growth rates that have succeeded the growth rates of older, more urbanized coastal cities. The current Southern California Association of Governments growth projections for Victorville indicate that the City's population in the year 2020 would be 111,196 (City of Victorville General Plan Environmental Impact Report). Conversely, the 1992 closure of the George Air Force Base has contributed to an out-migration of about 13,291 military personnel and dependents, and a total of about 1,117 Department of Defense civilian and other civilian employees (VVEDA Redevelopment Plan).

Population figures and estimates for Victorville and other cities of San Bernardino County are summarized in Socioeconomics Table 2. As shown in Table 2, substantial growth in the vicinity of the project has occurred in the Adelanto, Victorville, and Palmdale areas.

SOCIOECONOMICS Table 2
Total Population in Project Area

City	1980[1]	1990[1]	1995[2]	2000[3]	2010[3]
Victorville	14,220	40,674	60,577	69,209	90,337
Adelanto	2,164	8,517	13,300	27,000	61,000
Apple Valley	NA[4]	46,079	53,700	61,500	90,900
Hesperia	NA[4]	50,418	60,300	72,057	99,576
San Bernardino	118,794	164,164	185,900	191,837	228,528
Lancaster	48,027	97,291	118,500	151,256	220,385
Palmdale	12,277	68,842	104,700	161,139	262,132

1. US Department of Commerce, Bureau of the Census.
2. California State Department of Finance, Demographic Research Unit, January 1995 estimates.
3. Southern California Association of Government. June 1995 projections.
4. Apple Valley and Hesperia were unincorporated cities in 1980.

EMPLOYMENT

The City of Victorville economy is supported primarily by employment from government, commercial, and industrial activities. The 1990 Victorville General Plan EIR indicates the largest employers in Victor Valley were General Telephone (GTE), Victor Valley School District, and Southdown Portland Cement. SCAG estimates that by the year 2020, employment will increase to 59,748 jobs (City of Victorville General Plan EIR).

California Employment Development Department (EDD) data provided in the Application for Certification (AFC) estimated the civilian labor force available in the Victorville-Adelanto area in 1994 at 20,700. Total labor force in the county is about 214,000. Socioeconomics Table 3 and Socioeconomics Table 4 show the 1994 Average Annual Area Employment for San Bernardino County and 1994 Estimated Construction Employment, respectively.

The project is expected to employ a maximum of 370 construction workers. Operation of the plant is expected to employ about 27 employees, including plant managers, engineers, supervisors, maintenance personnel, secretarial and clerk support staff (HDPP 1997b, AFC page 5.6-3). Based on employment information obtained from Socioeconomic Tables 3 and 4, there appears to be a surplus of construction and utility workers available to staff the construction and operation of the project. However, the data in these tables do not indicate employment by trade.

SOCIOECONOMICS Table 3
1994 Average Annual Area Employment

	Civilian Labor Force	Employed Labor Force	Unemployed Labor Force	Unemploymen t Rate
Victorville	17,700	15,700	2,000	11.4%
Adelanto	3,000	2,400	600	19.8%
Apple Valley	21,200	19,300	1,900	8.9%
Hesperia	21,800	19,600	2,200	10.1%
San Bernardino	73,800	65,000	8,800	12.0%
Lancaster	44,532	40,559	3,973	8.9%
Palmdale	32,146	29,312	2,834	8.8%
Source: California Employment Development Department, Labor Market Information Division				

SOCIOECONOMICS TABLE 4
1994 Estimated Construction Employment

	1994 Total Employment[1]	Estimated Percent Construction[2]	Estimated Construction Employment
Victorville	15,700	5.82%	914
Adelanto	2,400	5.82%	140
Apple Valley	19,300	5.82%	1,123
Hesperia	19,600	5.82%	1,141
San Bernardino	65,000	5.82%	3,783
Lancaster	40,559	3.31%	1,343
Palmdale	29,312	3.31%	970
1. Source: California Employment Development Department, Labor Market Information Division 2. 1992 US Bureau of Economic Analysis, Regional Economic Information System			

Potentially, a portion of the construction work force could commute to the project from their primary place of residence located more than two hours' drive from the local project area. The applicant indicates in the AFC that few, if any of these workers are expected to move from their existing residence to the project area for the 18-month construction period (HDPP 1997b, AFC page 5.6-14).

HOUSING AVAILABILITY

Socioeconomics Table 5 presents housing information for the cities of Victorville and Adelanto. Housing characteristics provided in the AFC indicate that the City of Victorville currently contains about 23,143 dwelling units. The City of Adelanto currently contains about 4,960 dwelling units. Housing growth in the 1990s is due, in part, to the influx of residents from the Los Angeles basin. The 1992 George Air Force Base closure contributed to the current high vacancy rates in Victorville and Adelanto. The base closure also contributed to the loss of 1,639 single family on-base housing units and 1,786 beds in 26 on-base dormitories (VVEDA 1993 Redevelopment Plan).

SOCIOECONOMIC TABLE 5 HOUSING AVAILABILITY

HOUSING AVAILABILITY				
		1980	1990	1995
Victorville	Dwelling Units	6,086	14,967	23,143
	Vacancy Rate	12.4%	1.96%	17.1%
Adelanto	Dwelling Units	1,035	3,227	4,960
	Vacancy Rate	17.10%	10.72%	12.70%
Source: HDPP 1997b AFC; Southern California Association of Governments, Dept. of Finance, Demographic Research Unit				

PUBLIC SERVICES

Community Protective Services

The City of Victorville Police Department provides law enforcement service in the project area. The City of Victorville Police Department currently employs 53 sworn officers and 14 non-sworn officers; maintains 33 vehicles and two motorcycles. The department operates from two police stations and one mobile station. The service ratio is about one full-time enforcement officer per 1,150 residents (Martinez 1998). Average response time to the project site is about two minutes. The County Sheriff provides service to the unincorporated areas surrounding the City of Victorville from a substation within the city. This substation contains a 90-cell holding facility which serves all law enforcement in the Victor Valley (City of Victorville 1997 General Plan EIR).

The Victorville Fire Department provides fire protection, emergency medical services, and hazardous materials response for the Victorville Fire Protection District, which encompasses primarily the City of Victorville. As of February 1996, the department consisted of 37 professional firefighters, 34 on-call firefighters, and nine contract firefighters for SCIA. There are four stations in Victorville. The closest one to the site is Station #312, located next to the SCIA control tower, about a mile from the project. Information provided in the AFC indicates that average response time to the project site is about two to three minutes. The department operates six Class A pumpers, two brush fire pumpers, two heavy rescue units, one foam engine, one dry chemical unit, two water tankers, one hazardous materials unit, three heavy crash trucks, and one medical rescue unit. The Victorville Fire Department also maintains mutual aid agreements with neighboring jurisdictions's fire departments under the Regional Fire Protection Authority (City of Victorville 1997 General Plan EIR).

Additional fire protection would be provided by the Adelanto Fire Department, which includes 10 full-time fire fighters, and 20 on-call fire fighters. Station locations are Station #1, within the urban core of Adelanto, and Station #2, within the Industrial Park District of Adelanto. The Adelanto Fire Department is equipped to respond to hazardous material incidents (HDPP 1997b, AFC page 5.6-9).

Community Medical Services

Socioeconomics Table 6 provides a summary of hospital and emergency services within a ten-mile radius of the project. Additional emergency services are provided by Mercy Air, a medical evacuation unit which operates from a helipad at Fire Station #2 in Adelanto. There are also three hospitals available in the City of San Bernardino, about 40 miles from the project site; three hospitals in Loma Linda, about 45 miles from the project site; and the Kaiser Foundation Hospital in Fontana, also about 40 miles from the project site (HDPP 1997b, AFC page 5.6-9). The closest trauma center is in the City of San Bernardino, which is 15 minutes by airship.

Utilities

Utility services in the HDPP area are provided by Southern California Edison and Southwest Gas.

Schools

Five public school districts provide educational services to students in Victor Valley. Victor Valley comprises the cities of Victorville, Adelanto, the Town of Apple Valley, and the unincorporated communities of Lucerne Valley, Oro Grande, and Phelan. The five districts are:

- Adelanto Elementary School District (grades K-6)
- Hesperia Unified School District (K-12)
- Victor Elementary School District (K-6)
- Snowline Joint Unified School District (K-12)
- Victor Valley Union High School District (7-12)

SOCIOECONOMICS Table 6
SUMMARY OF HOSPITALS IN THE HDPP AREA

Hospital	Available Beds	Available Services
Desert Valley Hospital	83	Emergency Home Health Out / In Patient Surgery Medi-Van / Non- Emergency Ambulance
Victor Valley Hospital	122	Emergency Medical 4 Surgical 4 Cardio Thoracic Mental Health Pediatrics Oncology
St. Mary's Hospital	91	Out / In Patient Surgery Cardiopath Lab Open Heart Pediatrics Neo-Natal Oncology Home Health Hospice Non-Emergency Ambulance Skilled Nursing Facility
Source: City of Victorville General Plan EIR		

Socioeconomics Table 7 provides a summary of the school districts in Victor Valley.

Educational needs in the project area are served by the Adelanto School District. The Harold H. George Visual and Performing Arts School and the Shephard Middle School are located about one mile from the project site, within the SCIA. These schools will continue to remain open during project construction and operation.

Adelanto Elementary School District operates five elementary (K-6) schools in the project area. The Adelanto Elementary School District Board of Education has adopted classroom loading standards of twenty students per classroom for grades 1 through 3, and twenty-seven students per classroom for grades K, and 4 through 6 (City of Victorville 1997 General Plan EIR). Information contained in the City of Victorville General Plan EIR indicates that all school districts in Victor Valley are operating at or over their design capacity. Because of impacted conditions, each district uses portable facilities to accommodate increasing enrollments. As seen in Socioeconomics Table 7, all school districts operate with the use of portables; all schools are expecting increases in student enrollments, either within the current school year or the 1998-99 school year.

SOCIOECONOMICS Table 7
SUMMARY OF SCHOOL DISTRICTS, ENROLLMENTS, AND CAPACITIES IN THE HDPP AREA

School District	Enrollment	Capacity
Victor Elementary	8,170[1]	The District just implemented first grade class size reductions. Two other schools are awaiting state funding to reduce class size in order to place portables at schools with portable capacity. A K-6 school which will hold 800 students is expected to be finished within two years.
Adelanto	3,668[2]	District has a capacity of 3,900 students. New facilities and portables will facilitate expected enrollment for 1997-98 when it will reach maximum capacity.
Hesperia Unified	14,885	District has a capacity of 16,717 students. All schools have portables. A new elementary school opened in 1998.
Snowline	6,247[3]	All schools have portables; further reductions in class sizes would be through state funding which would require issuance of state bonds.

1. Expected increase of 2% in the 1998-99 school year.
2. Expected increase of 700 students in the 1997-98 school year.
3. Expected increase of 3% in the 1998-99 school year.

Source: HDPP AFC 1997; Adelanto School District

IMPACTS

PROJECT SCHEDULE

The applicant expects project construction to begin in July 1999 and end in December 2000 for a total of 18 months (HDPP 1997b, AFC page 5.6-14). Socioeconomics Table 8 indicates the total number of worker-months of employment by month during project construction. The peak construction period is expected to last from December 1999 through April 2000. There will be an average of 338 workers on-site during the peak construction period. The Applicant expects about 27 permanent workers will be needed for operation of the power plant.

POWER PLANT IMPACTS

Workforce and Employment

If construction begins as expected in July 1999, the peak construction period would begin in December 1999 and continue through April 2000. Socioeconomics Table 9 indicates the availability of workers by craft in the three-county project area (San Bernardino, Los Angeles, and Riverside Counties). As shown in Socioeconomics

Table 8, the number of construction workers needed for the project represents a small fraction of the available workforce.

Additionally, the applicant expects most of the construction workforce will be drawn from the communities of Victorville, Adelanto, Hesperia, Apple Valley, San Bernardino, Lancaster, and Palmdale, and that they would commute daily to the project area during the construction period (HDPP 1997b, AFC page 5.6-14). Certain specialty trade workers may not be available locally. Those workers might relocate to the project site for the duration of the construction period. As shown in Socioeconomics Table 9, the workforce required for project construction is available from the local and regional area.

Housing

As stated above, the applicant expects that most hiring of construction workers will occur within the three-county project area. The potential demand for housing is expected to be minimal. In-migrating or weekly-commuting construction workers could affect temporary housing stock such as motels or weekly rentals. However, any demand for additional housing as a result of project construction or operation can be accommodated by the existing 17.1 percent vacancy rate in Victorville and the 12.7 percent vacancy rate in Adelanto.

Public Services

Potential impacts to public services during construction could result from on-site construction activities. These impacts could result from construction-related demands for police, fire, medical, and other emergency services. Energy Commission staff does not expect potential impacts to public services to be significant because of the applicant's proposed mitigation. In addition, the City of Victorville Police Department does not expect significant impacts to law enforcement as a result of project construction or operation (Taylor 1998). The Applicant has proposed the following mitigation to offset the need for increased public services:

- a perimeter fence would enclose the plant site during construction and operation;
- internal fences would be constructed around the project switchyard and other areas for safety and security;
- an on-site fire protection system would be installed and designed in accordance with codes and standards set forth by the NFPA, Underwriters' Laboratory, OSHA, and all necessary state and local agencies;
- a fire risk evaluation would be performed in accordance with NFPA 850 and would form the basis for the identification and selection of appropriate fire protection systems;

SOCIOECONOMICS Table 8
Construction Requirements By Month

TRADE	**1999**						**2000**												
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTALS
Construction																			
Boilermaker Including: Millwright Operators Teamsters					46	102	129	137	135	94	79								721
Carpenter		6	12	21	19	20													78
Electrician			30	51	46	102	103	91	67	94									584
Ironworker		3	6	5															14
Laborer	17	14	15	26	46	51	52	52	46	101	66								434
Pipefitter					9	25	52	82	67	47	39	31							352
Painter Including Insulators											118	155	143	112	67				595
Bricklayer/ Cement Finisher	33	57	61	103	93														347
Instrumenta-tion										28	24	19	17	13	8				109
TOTAL (rounded)	50	80	124	206	259	300	336	356	370	329	260	205	160	125	75	0	0	0	3234

SOCIOECONOMICS Table 9
Available Construction Workers by Craft

Trade	Number of Workers by County				
	San Bernardino	Los Angeles	Riverside	Counties' Total	Total Workers Needed (Project)
Boilermaker millwright operators	0	870	NA	1,170	137
Carpenter	3,350	18,500	3,700	25,550	21
Electrician	1,440	13,960	1,510	16,910	103
Ironworker	320	2,320	110	2,750	6
Laborer	670	1,210	300	2,180	101
Pipefitter	1,290	7,740	1,030	10,060	82
Painter Insulator	1,110	7,510	1,100	9,720	155
Bricklayer Cement Finisher	1,110	4,480	1,270	6,850	103
Source: HDPP 1997b AFC: State Labor Market Information Division					

- a worker safety program would be implemented to comply with all appropriate regulations including safe operating procedures, operating and maintaining hazardous material systems, the proper use of personal protective equipment, fire safety, emergency response training, and hazard communications training;

- communication equipment would be available on site at all times in order to contact any required emergency response agency.

Please refer to the Section on **Worker Health and Safety** for a complete discussion of potential impacts and mitigation.

Utilities, Waste Management, Hazardous Waste, Water Demand, Wastewater Disposal

Potential impacts to utilities during construction could result from on-site construction activities. These impacts could result from construction demands for water, waste water disposal, solid waste disposal, and electrical utilities. The applicant has stated the utility hook-ups would be available at the site for water and electrical service. Sanitary wastes generated during construction would be collected in portable, self-contained toilets. Other waste generated during construction such as site dewatering and non-point source precipitation runoff, would be disposed in accordance with the City of Victorville regulatory requirements. Equipment wash water generated during project construction would be contained and discharged to the municipal sewer system. Solid wastes generated during construction would be collected on site and disposed at a Class III landfill. Please refer to the sections on **Waste Management** and **Water Resources** for detailed discussions relating to any impacts in these areas.

Schools

The Adelanto School District assesses developer fees of $.30 per square foot for commercial/industrial projects (Martin 1998). This fee is similar to a city- or county-assessed building permit fee. It is not a mitigation measure to compensate school districts which are at or over capacity for project-related impacts. The applicant states in the AFC that the project will total about 45,000 square feet. Thus, the HDPP will be assessed by the Adelanto School District a one-time fee of $13,500. Because the HDDP is located within the SCIA, the project is eligible for various sales and tax use credits, including a waiver of development impact fees. At this time, Energy Commission staff does not know if the school district fees will be waived. Fees are normally collected by the Adelanto School District and distributed to the Victorville Unified High School District in accordance with agreements between both school districts. Developer fees can be spent on both temporary and permanent construction and on offices, multipurpose rooms, bathrooms, and other facilities, and transportation as well as classrooms. There is no way to determine which schools will receive fees or how they will be spent.

Construction and operation of energy projects can cause impacts to local school districts which are at or over capacity by adding to the enrollment of those districts. To adequately address increases in enrollment, those districts must incur additional costs for additional teachers and classrooms. As stated above, all school districts in Victor Valley operate at or over their design capacity; all school districts operate with the use of portables; all schools are expecting increases in student enrollments, either in the current school year or the 1998-99 school year. Any increase in student enrollments as a result of project construction or operation would impact already over-burdened districts. Based on conversations with school district personnel and previous experience with other like-projects, Energy Commission staff believes that the project has the potential to cause some increase in local school enrollment, and thus may cause districts at or over capacity to incur additional costs. Also, because the project is located in the SCIA, Energy Commission staff does not know whether the school district fees will be waived (please refer to the section **Impact on Fiscal Resources and the Local Economy** for further discussion).

Impact on Fiscal Resources and the Local Economy

Based on a one percent tax rate, the $325 million HDPP normally would yield $3.25 million in property taxes in the first year and grow at a one percent increase per year (High Desert Report 1998). The applicant has provided information on property taxes based on the property tax rate allocated pursuant to definitions contained in the 1993 VVEDA Plan, tax sharing agreements with affected school districts, and the Joint Powers Agreement between the participating jurisdictions of VVEDA. This information represents tax projections for the life of the project (30 years) and is attached as **Appendix A**. However, after the project is constructed (Spring 2000) the HDPP will most likely be assessed by the State Board of Equalization and not by San Bernardino County. The difference in assessment and resulting revenues are explained below.

State Board of Equalization's Issue Paper

The State Board of Equalization's November 13, 1998 issue paper states that assessment of power generating facilities of 50 megawatts or more should be conducted by the state, using unitary valuation and allocation of revenues on a countywide basis. Board of Equalization staff recommends that implementation of state assessed facilities should be carried out in two phases. Phase 1, which was adopted by the Board on 12/7/98 and commences on 1/1/99, would assess those companies that have purchased electric generation facilities previously owned by regulated public utilities. Phase 2, which would include all companies producing 50 megawatts or more, is proposed to begin on 1/1/2000. Thus, when Phase 2 is implemented, the HDPP will most likely be assessed on the unitary tax roll, with revenues from property taxes allocated by formula on a countywide basis with each jurisdiction in the county (cities, school districts, and special districts) receiving a portion of the revenues (it should be noted that revenues from property taxes based on the unitary roll would not be distributed to Education Revenue Augmentation Fund). A primary difference between state assessment and county assessment is that under county assessment the valuation provisions of Article XIIIA of the California Constitution (Proposition 13) apply, including establishing a base year value, a limit of two percent on annual increases, and valuation on the lower of fair market value or adjusted base year value. These provisions do not apply to state assessed property, which is valued annually at fair market value (BOE 1998). Therefore, the City of Victorville , VVEDA, and other entities should expect substantial changes in the allocation of property tax revenues generated by the project and a substantial diminishment of revenues.

Local Area Military Base Recovery Act (LAMBRA)

As was discussed at the October 27 data response workshop, and as stated in CURE's comments on the Draft PSA, the SCIA has recently been designated Local Area Military Base Recovery Act (LAMBRA) status. Similar to Enterprise Zones, LAMBRA designations allow communities to extend California tax credits to companies locating in closed military bases. Because HDDP is located within the SCIA, the project is eligible for various sales and use tax credits because of SCIA's LAMBRA status. Energy Commission staff verified this information through the State Franchise Tax Board (Lagerstrom 1998). State business incentives include:

- fifteen-year net operating loss carryover
- tax credits for sales and use taxes paid
- hiring credits for wages paid
- business expense deductions

Local SCIA incentives include:

- waiver of development impact fees

- discounted business license and building permits
- local planning assistance
- infrastructure improvements
- tenant improvements - code compliance

Due to SCIA's LAMBRA Zone designation, HDPP would get a tax credit of up to $20 million for certain sales and use tax payments. HDPP also would receive hiring tax credits equal to a certain percentage of the employee's wages. Energy Commission staff's conversation with James Cox, City of Victorville City Manager indicated that all developer impact fees will be waived by the City of Victorville (Cox 1998). At the October 27 data response workshop, the applicant was asked by CURE and Energy Commission staff to provide information regarding expected benefits from sales and use tax credits. At this time, the applicant has not provided any information regarding the project's benefits due to the LAMBRA Zone.

Estimated Revenues from Sales Tax

The City of Victorville currently receives one percent of the State's 7.75 percent sales tax. Based on an estimated $2 million in non-fuel operating costs, HDPP expects that $150,000 in sales tax will be generated by the project. Socioeconomics Table 10 presents the distribution of sales tax in Victorville. HDPP's annual operation payroll is expected to be about $1.4 million. About $63,000 will be paid in state taxes from annual operation payrolls (HDPP 1997b, AFC page 5.6-15). As stated above, due to SCIA's Lambra Zone status, HDPP would get a tax credit of up to $20 million for certain sales and use tax payments, which would substantially offset any sales tax or payroll taxes paid by HDPP.

Impact on Local Property Values

The project is unlikely to have an impact on surrounding residential property values. The project site is located on a 25-acre parcel within the 5,350-acre SCIA and will be developed under the requirements of the SCIA Specific Plan, the City of Victorville General Plan, and the SCIA Comprehensive Land Use Plan. The Specific Plan land use designation for the site is ASF (airport and support facility). The site is currently designated as industrial and is zoned for heavy manufacturing. Please refer to the section on **Land Use** for a discussion of surrounding land uses.

SOCIOECONOMICS Table 10
General Tax Levy Within Cities

Victorville Fiscal Year 96-97	Adjusted %
City of Victorville	0%
RDA	12%
County General Fund	12%
Education Revue Fund	19%
Flood Control 4	2%
Flood Control Admin	0%
County Library	1%
Superintendent of Schools	1%
Victorville Fire District	5%
Victorville Park District	5%
Victorville Sanitation District	3%
Victor Valley Community College	6%
Victor Elementary	18%
Victor Valley High	15%
Comm. Services Area 60 – Victorville	1%
Mojave Desert RCD	0%
Victor Valley Water	0%
Mohave Water Agency	0%
Total	100%
Schools	40%
Source: HDPP 1997b AFC	

CUMULATIVE IMPACTS

The project site is owned by VVEDA who will lease the site to the applicant. In 1993, VVEDA prepared a Redevelopment Plan that provides mechanisms and funding to promote economic development within the area surrounding and encompassing the project site. VVEDA's primary goals are to promote economic development and job retention, improve public infrastructure, prevent the spread of blighting influences, and to encourage the investment of the private sector within the redevelopment area. VVEDA is a joint powers authority and its redevelopment plan encompasses a land area that falls within the legislative jurisdictions of the Cities of

Hesperia and Victorville, the Town of Apple Valley, and unincorporated areas of San Bernardino County.

Energy Commission staff spoke with Sean McGlade of VVEDA regarding current or proposed projects within the VVEDA Redevelopment Plan area. Current and proposed projects include the demolition of about eight to ten dormitory buildings, construction of a 70x700 square foot industrial building on a thirteen acre site, a federal prison proposed to be constructed in 1999, and major aviation repair facilities, which currently lease about fifteen buildings within the area. Information on other potential new development projects proposed in the VVEDA Redevelopment Plan area is either not available or speculative, at this time (McGlade 1998).

In addition to current and proposed projects within the VVEDA Redevelopment Plan area, about fifty acres of land in Adelanto is currently being developed as a commercial and retail center. The Da Zhong Hua Wholesale Town will house about 1,000 Chinese firms selling high-end retail products. The project is expected to contribute to employment and tax revenues in a region that lost 5,000 jobs and $15 million in yearly sales revenue due to the 1992 closure of the George Air Force Base. The Da Zhong Hua Wholesale Town is one of several projects with ties to China that are being developed at or near closed U.S. military bases (Sacramento Bee 1997). Another project headed by Sumitomo Corporation is currently under construction. The Sumiden Wire Products Corporation will be housed in a 60,000 square foot building within the VVEDA redevelopment area. The project is expected to begin manufacturing about 20,000 tons of wire in early 1999, and will provide about 15 or 20 jobs (Victorville Daily Press 1998). Other possible proposed uses within the VVEDA Redevelopment Plan include a convention center and hotel, an office park, and commercial uses. Based on existing and reasonable foreseeable projects, Energy Commission staff believes that the project by itself and cumulatively will induce population and economic growth in the Victorville-Adelanto area. Energy Commission staff does not consider this to be a significant impact because VVEDA has prepared a Base Reuse Plan (plan) to mitigate adverse impacts of the base closure, and to serve as a blueprint for future development and use of the site. In addition, the SCIA Community Plan Element of the Victorville General Plan and the VVEDA Reuse Plan were prepared to assist in implementation of the plan (Victorville 1997).

The eventual buildout of projects within the VVEDA Redevelopment Plan area and those currently under construction such as the Da Zhong Hua Wholesale Town and the Sumiden Wire Products Corporation, have the potential to cumulatively impact local school enrollments because of the potential of workers and their families to relocate to the project area and cause districts at or over capacity to incur additional costs. Because of the high vacancy rates in Adelanto and Victorville, Energy Commission staff does not expect the HDPP to significantly impact housing.

FACILITY CLOSURE

There are no known Socioeconomic LORS related to facility closure. Appropriate socioeconomic LORS 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.

MITIGATION

Because the applicant has proposed economic benefits to the project area through sales tax and direct purchases of construction materials and services from local vendors (HDPP 1997b page 5.6-14), Energy Commission staff is incorporating a contingency measure into the proposed conditions of certification.

CONCLUSION AND RECOMMENDATION

CONCLUSION

The applicant has proposed economic and fiscal benefits to the project area through sales tax and direct purchases of construction materials and services from local vendors. To ensure that the economic benefit occurs, Energy Commission staff has proposed a condition of certification that requires the project owner and its contractors and subcontractors to recruit employees and procure materials and supplies locally.

Energy Commission staff analysis indicates that the proposed project by itself and cumulatively, has the potential to impact local school districts because of the potential increase in local school enrollment due to the children of relocated construction and/or operation workers.

However, according to Senate Bill 50, signed by Governor Wilson on August 27, 1998, which amended section 17620 of the Education code, school funding is restricted to property taxes and statutory facility fees collected at the time the building permit is acquired. 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."

RECOMMENDATION

If the Commission certifies the proposed project, staff recommends that it adopt the following condition of certification.

PROPOSED CONDITIONS OF CERTIFICATION

SOCIO-1 The project owner and its contractors and subcontractors shall recruit employees and procure materials and supplies within San Bernardino County first, and Riverside and Los Angeles Counties second unless:

- to do so will violate federal and/or state statutes;
- the materials and/or supplies are not available; or
- qualified employees for specific jobs or positions are not available; or
- there is a reasonable basis to hire someone for a specific position from outside the local area.

Verification: At least 60 days prior to the start of construction, the project owner shall submit to the California Energy Commission (CEC) Compliance Project Manager (CPM) copies of contractor, subcontractor, and vendor solicitations and guidelines stating hiring and procurement requirements and procedures. In addition, the project owner shall notify the CEC CPM in each Monthly Compliance Report of the reasons for any planned procurement of materials or hiring outside the local regional area that will occur during the next two months. The CEC CPM shall review and comment on the submittal as needed.

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APPENDIX A

1

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5

BIOLOGICAL RESOURCES

Testimony of Marc Sazaki

INTRODUCTION

The Southern California International Airport has been selected as the site for the High Desert Power Project (HDPP). This airport was formally George Air Force Base, but as part of the federal government's base closure program, it is in the process of being converted for civilian use. In general, siting energy facilities in pre-existing urbanized areas is preferred from a biological resources perspective because potential impacts are likely to be considerably less than when these kind of facilities are sited in rural or wildland settings. However, where ancillary facilities (pipelines, transmission lines, etc.) or operational activities extend beyond the power plant footprint, project related impacts on biological resources, including threatened or endangered species, can present problems. Thus, though siting the HDPP on a former military base has some advantages, there are also disadvantages. Any biological resources located on undeveloped areas within the base boundaries that once functioned as a buffer against conflicts with nearby urban and rural land uses or along proposed linear facilities will no longer be protected to the extent that they have been.

Biological resource surveys were conducted by consultants for the applicant to provide information useful in determining the potential impacts related to the power plant and its ancillary facilities, including a thirty-two mile-long second natural gas pipeline that will parallel State Highway 395 in a northerly direction through a Bureau of Land Management designated utility corridor and interconnect with two existing natural gas supply pipelines. In addition, the applicant has prepared and submitted a Draft Biological Resources Mitigation Implementation Plan as well as a Draft Erosion Control and Revegetation Plan (HDPP 1998n, Data Response 27-29). These plans are relied on for information, and to some extent, incorporated into staff's project assessment. Based on the information developed by the applicant and other information gathered by Energy Commission staff, recommended mitigation for identified potential impacts are presented for review and comment by the California Department of Fish and Game (CDFG) as part of the Energy Commission's endangered species consideration. In the staff analysis, biological resources at the site are described, anticipated project related impacts are evaluated, and potential mitigation measures are proposed to reduce these impacts to acceptable levels.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

- The Endangered Species Act of 1973 (16 U.S.C., §1531 et seq.), and implementing regulations, (C.F.R.) §17.1 et seq.), designate and provide for protection of threatened and endangered plants and animals and their critical habitat.

- The Clean Water Act (33 U.S.C. § 404 et seq) prohibits the discharge of dredged or fill material into the waters of the United States without a permit. An individual 404 permit is required to fill more than 3 acres. Nationwide permit (NWP) 26 is required to fill 3 acres or less of wetlands and NWP 12 is required for utility line placement near waters of the U.S. causing temporary discharge of material. The statute requires water quality assessment when issuing 404 permits and for discharges into waters of the United States.

STATE

- The California Endangered Species Act, (Fish & G. Code, §2050 et seq.), protects California's endangered and threatened species. The implementing regulations list animals of California declared to be threatened or endangered(Cal. Code Regs., tit.14, §670).

- Fish and Game Code Section1603 requires that any person planning to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake designated by the department, or use any material from the streambeds, must notify the department prior to such activity so that the Department can carry out its mandate by proposing measures necessary to protect the fish and wildlife.

- Fish and Game Code Sections 3511, 4700, 5050 and 5515, prohibit the taking of birds, mammals, reptiles and amphibians, and fishes respectively listed as fully protected in California.

- Fish and Game Code Section1900 et seq., gives the Department authority to designate state endangered and rare plants and provides specific protection measures for identified populations.

LOCAL

- Title 8 of the San Bernardino County Code specifies that Joshua tree removal be by permit only. Joshua trees proposed for removal must be transplanted or stockpiled for future transplantation.

- The Victorville Municipal code, Chapter 1333, requires a permit from the Director of Parks and Recreation prior to the destruction or removal of Joshua trees.

SETTING

The emphasis in this analysis is on impacts to threatened or endangered species, fully protected species, species of special concern, recreational species, and areas of critical concern. Notwithstanding this adopted focus, it is understood that all habitat loss or conversion has an effect on wildlife species, particularly resident species in the vicinity of the proposed project, as well as the vegetation that comprises the affected habitat. The effect of this cumulative loss is difficult to assess and it is likely to be species-specific in nature because of different response capabilities of the affected species.

Threatened or endangered species are those formally recognized and listed by the state or federal government. Fully protected species receive special legal protection from the state in the form of prohibition against unauthorized take or possession, while species of special concern are candidate threatened or endangered species or unique species that are protected through state and local permitting processes by requiring mitigation to minimize potential adverse effects resulting from project development. This particular category also includes, but is not limited to, those rare and endangered plant species recognized by the California Native Plant Society. Though endangered plant species recognized by the California Native Plant Society may not be formally listed by state or federal governments, they may be considered endangered under the California Environmental Quality Act (CEQA) (Cal Code Regs, tit. 14, §15380 (d)). Recreational species are generally ones that are harvested by the public for sport or utilized for nonconsumptive purposes.

Areas of critical concern are special or unique habitats or biological communities. This category includes, but is not limited to, wildlife refuges and wetlands. Both species of special concern and areas of critical concern may be identified by the California Natural Diversity Data Base (CNDDB) and other state, federal, and local agencies with responsibility within the project area or by educational institutions, museums, biological societies and special interest groups that might have specific knowledge of resources within the project area.

REGIONAL DESCRIPTION

The western Mojave Desert, a portion of the 25-million-acre California Desert Conservation Area (CDCA) (BLM 1980), is a relatively high elevation terrain that has edaphic characteristics reflective of being situated in the rain shadow of the Tehachapi Mountains to the west and the San Gabriel and San Bernardino Mountains to the south. As a result of the low annual average precipitation (which normally occurs in episodes of high intensity) and the relatively poorly developed water holding capacity of desert soils, vegetation communities predominantly consist of low profile shrubby perennials and diminutive, but often showy desert annuals. Over-summer evaporation usually leaves dry lake beds with varying degrees of alkali deposits on the soil surface. This also happens on a decreased scale throughout the desert resulting in small playas and alkali sinks dotting the landscape. This situation gives rise to vegetation communities around the large playas that range from salt tolerant species to less and less salt tolerant ones as the distance from the playas increases. Creosote bush (*Larrea tridentata*), ubiquitous throughout California's desert region, grows primarily upslope and away from the playas. Joshua trees (*Yucca brevifolia*) typically grow still further upslope providing a new habitat element (relatively tall structure) for wildlife species. The variety of amphibians and larger mammals in the desert environment is reduced over other habitat types because of the extremely arid and hot conditions while reptiles are comparatively abundant and diverse. Avian species, because of their mobility, are able to take advantage of small areas of suitable habitat (such as temporary lakes or year-round springs) and can be both abundant and well represented in regards to species diversity. Suitable areas in the desert can provide birds with foraging, resting, and even breeding sites. In essence, the desert provides considerable habitat for wildlife species, but because of the extreme climatic conditions, complex life strategies have evolved for many of the resident animals as well as plants. As a result, if the desert habitat is altered by human activity, significant and lasting effects can result if they are not sufficiently mitigated.

In contrast to many parts of the CDCA that are predominantly open space, the western Mojave Desert has undergone moderate to severe land use change. Large areas have been dedicated for use as military reservations, including Edwards Air Force Base, Fort Irwin, and China Lake Naval Weapons Center. Mining activities vary in magnitude and intensity with the Borax surface mine near the town of Boron being one of the largest on-going surface mining operations. Agricultural development in the region is decentralized.

Off-highway vehicle (OHV) activities are a popular form of recreation in the desert. Both organized off-road races and individual and family riding take place in the western Mojave because of its close proximity to major metropolitan areas of Southern California and the sustained growth of local communities such as Victorville, Adelanto, Palmdale, Mojave, Ridgecrest, and Barstow. Also, access to many remote areas via transmission line and pipeline maintenance roads is another factor that likely encourages OHV recreational activity. Vegetation and wildlife habitat can be degraded and even destroyed by irresponsible users.

Solar electric generation facilities have been developed in the region. Two of the more prominent examples are the Luz Solar electric projects on the west side of Harper Lake and close to the junction of State Highways 395 and 58. By nature, solar energy development usually involves land intensive technologies. Slightly over 1,400 acres of desert habitat was used for these two projects. Continued solar development in the western Mojave will most certainly eliminate additional habitat for important species. Unmitigated encroachment of land intensive development into the desert environment can only lead to inevitable decline in the desert biome's overall quality.

SITE AND VICINITY DESCRIPTION

The proposed site for the power plant consists of 25 acres of previously disturbed land on the former George Air Force Base (now the Southern California International Airport [SCIA]) that was used by the previous base operators as a spoils area for storing miscellaneous refuse and debris. Outside of the developed facilities on the SCIA, there are many areas that are either ruderal in nature, or consist of relatively undisturbed natural desert scrub habitat. As reported in the Installation Restoration Program Remedial Investigation for Operable Unit 3 - George Air Force Base (Montgomery Watson 1996), most of the more natural areas exist in the eastern side of the air base (SCIA).

Habitat traversed by appurtenant facilities of the proposed project is described in the AFC and includes an approximately seven-mile transmission line from the project south to the Victor Substation, a water supply pipeline that is about 2.5 miles in length that will interconnect with a source line to the north of the SCIA, and a 2.75 mile long natural gas pipeline that originates south of the project (HDPP 1997b, AFC page 5.3-5 through 5.3-22). Subsequent to the AFC filing, the applicant proposed adding a field of seven ground water wells along with a water pipeline that is approximately 3.4 miles long. Habitat descriptions and plant and animal survey results of the areas where the ground water supply system is proposed are described in documentation submitted for these additional facilities (HDPP 1998n, Data Response 45).

A second natural gas pipeline was incorporated into the project somewhat later in the process. It will be approximately thirty-two miles long, thirty inches in diameter, and extend in a northerly direction to connect with existing major gas lines.

Habitat of variable quality for desert tortoise (*Gopherus agassizii*), a state and federal threatened species and Mohave ground squirrel (*Spermophilis mohavense*), a state threatened species, exists in the vicinity of the proposed project and related facilities. Other federal or state listed and plant and animal species and species of special concern that may inhabit the project area are listed in Table 5.3-1 and 5.3-2 of the AFC respectively (HDPP 1997a, AFC page 5.3-10 and 5.3-11). In addition to desert tortoise and Mohave ground squirrel, they include small-flowered androstephium (*Androstephium breviflorum*), Alkali mariposa lily (*Calochortus striatus*), pygmy poppy (*Canbya candida*), Mojave Indian paintbrush (*Castilleja plagiotoma*), Mojave spineflower (*Chorizanthe spinosa*), desert cymopterus (*Cymopterus deserticola*), Reveal's buckwheat (*Eriogonum contiguum*), Barstow woolly sunflower (*Eriophyllum mohavense*), sand linanthus (*Linanthus arenicola*), Mojave monkey flower (*Mimulus mohavensis*), short-joint beavertail (*Opuntia basilaris* var. *brachyclada*), Mojave indigo bush (*Psorothamnus arborescens* var. *arborescens*), salt spring checkerbloom (*Sidalcea neomexicana*), Lemmon's syntrichopappus (*Syntrichopappus lemmonii*), southwestern pond turtle (*Clemmys marmorata pallida*), San Diego coast horned lizard (*Phyrnosoma coronatum blainvillei*), short-eared owl (*Asio flammeus*), golden eagle (*Aquila chrysaetos*), Swainson's hawk (*Buteo swainsoni*), prairie falcon (*Falco mexicanus*), loggerhead shrike (*Lanius ludovicianus*), summer tanager (*Piranga rubra*), burrowing owl (*Athene cunicularia*), and Le Conte's thrasher (*Toxostoma lecontei*). Other species that could be affected by project construction and operation are listed in Table 2.3-1 of the High Desert Power Project LLC "Analysis of Proposed Natural Gas Pipeline" and include southern skullcap (*Scutellaria blanderi spp.*), Victorville shoulderband (*Helminthaglypta mohaveana*), California red-legged frog (*Rana aurora draytonii*), Cooper's hawk (*Accipiter cooperii*), long eared owl (*Asio otus*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), yellow warbler (*Dendroica petechia brewsteri*), willow flycatcher (*Empidonax traillii*),yellow-breasted chat (*Icteria virens*), gray vireo (*Vireo vincinior*), and Mojave River vole (*Microtus californicus mohavensis*) (SWGas 1998). Biological surveys were conducted in areas expected to be impacted by the project and results are reported in the AFC and subsequent informational submittals. Of the species of concern listed above, Mojave spineflower, Mojave indigo bush, loggerhead shrike, Le Conte's thrasher, desert tortoise, and Mohave ground squirrel were observed during the surveys (RMI 1998a).

Mojave River riparian habitat and associated wildlife occur in the Mojave River channel to the east of the project within about a mile and some of the new wells that will provide backup water for the project lie within approximately two miles of the river. Important species that likely inhabit this riparian zone include the state listed endangered western yellow-billed cuckoo (*Coccyzus americanus* occidentalis), arroyo toad (*Bufo microscaphus californicus*), southwestern willow flycatcher (*Empidonax traillii extimus*) which are federal endangered species, and the least Bell's vireo (*Vireo bellii pusillus*) which is both state and federal listed as endangered (Jones 1997).

Where project related facilities, particularly linear ones such as transmission lines and pipelines, cross desert washes, important habitat for desert wildlife can be affected. A jurisdictional determination for waters of the United States was performed by the applicant and verified by the Corps of Engineers (RMI 1998b and RMI 1998c). As part of this jurisdictional determination, it was concluded that no wetlands existed. The Corps of Engineers will be "...reviewing the permit application once the final design plans have been completed..." and issue the required permit under Section 404 of the Clean Water Act. This permit authorizes disposing of fill into areas considered waters or tributaries to waters of the United States. Staff is unfamiliar with the terms and conditions that might be associated with such a permit, but as part of National Environmental Policy Act compliance, an Environmental Impact Statement will be prepared which will disclose terms of the Corps of Engineers permit.

IMPACTS

PROJECT SPECIFIC IMPACTS

The project location itself raises few biological resource issues. However, certain aspects of the appurtenant facilities (including the water supply pipeline that connects to the State Water Project service line to the north, and the transmission line where it crosses less urbanized areas to the east and south of the project, as well as the second natural gas supply pipeline) cause concern because they will be developed in areas that still provide useful habitat for wildlife.

Tortoises, Mohave ground squirrels, and other animals could be killed during construction and operation by being run over by vehicles. Animals could fall into trenches dug for pipelines and killed by being crushed under foot, or buried alive. Habitat necessary for fulfilling life sustaining needs of plants and animals, such as nutrient rich top soil, food, cover, and nesting structure, will be temporarily and permanently lost due to trenching and other surface disturbing site preparation activities. In addition, these activities subject species such as desert tortoise and Mohave ground squirrel to potentially life threatening stress.

Loggerhead shrikes and Le Conte's thrashers could lose nesting opportunities with the removal of shrubs which may occur during pipeline construction, although no nest sites were identified during biological surveys.

An additional concern arises from the proposed backup water supply wells and associated water lines that will be installed to the south of the project. Withdrawal of ground water in the amount proposed could indirectly reduce available ground water in the Mojave River riparian area, exacerbating the losses of willows and cottonwoods that have occurred in recent years (Lines and Bilhorn 1996). This area supports arroyo toad, southwestern willow flycatcher, and least Bell's vireo. The applicant has submitted an addendum to their "Evaluation of Alternative Water Supplies for the High Desert Power Project" in which they estimate that water levels in the riparian area of concern will likely rise by a foot (RMI 1998e). The validity of this modeling result has been questioned by the California Department of Fish and Game and the U.S. Fish and Wildlife Service (Jones and Washick 1999). Field testing may have to be done in order to convince these two agencies that the potential for impacts on riparian vegetation along the Mojave River near the project will be minimal and likely positive. It is expected that meetings between the agencies and applicant will be conducted to resolve this issue.

Where pipelines cross desert washes, ground disturbing activities can cause impacts because washes provide refugia for many plant and animal species and often remain undeveloped because of flood risks to manmade structures. Unless special precautions are taken to minimize habitat destruction and to schedule activities during times of the year when flooding is not likely, significant impacts could occur by degrading habitat of important species such as desert tortoise. Wheeled vehicles cause greater levels of disturbance to desert soils that are saturated with water. Consequently, more vegetation is disturbed.

The second natural gas pipeline, which will be approximately thirty-two miles long and connect the power plant to major gas supply lines near Kramer Junction at State Highway 58 to the north, is of considerable concern from a biological resource perspective. Habitat for listed species will be lost for a period of time during construction and until restoration efforts have succeeded. The applicant suggests that by restoring the construction and permanent right-of-way, vehicle use will be restricted to existing dirt and paved roads (HDPP 1998z). Based on Energy Commission staff observations of the proposed gas pipe line route that parallels State Highway 395, it appears that the existing dirt and paved roads that parallel the route are approximately one hundred fifty to two hundred feet away. This would not lend itself to effective use for purposes of inspecting and maintaining the gas line at ground level. Eventually, whether intended or not, an access road virtually contiguous to the centerline of the pipeline will likely develop. This will probably be within the fifty foot permanent right-of-way identified by the applicant (HDPP 1998aa). This potential habitat loss is considered by Energy Commission staff to be permanent and significant because slightly more than fifty percent of the loss will be of desert tortoise habitat designated as "critical" in the desert tortoise recovery plan (FWS 1994).

Although the desert habitat impacted by the project and related facilities will be of varying quality, desert tortoise and Mohave ground squirrel are of key concern. Energy Commission Staff believes that state and federal endangered species “incidental take” authorizations issued by the California Department of Fish and Game and the U.S. Fish and Wildlife Service respectively, including associated terms and conditions imposed as part of the resulting biological opinions, if rendered, will be based on findings of no significant impacts. Energy Commission staff further believes these findings can be reached if adequate mitigation is committed to by the applicant. Aside from protecting individual organisms from direct construction and operational impacts which will be addressed through implementation of specific measures incorporated into action plans such as the Biological Resources Mitigation Implementation and Monitoring Plan and the U.S. Fish and Wildlife Service Habitat Conservation Plan Implementing Agreement, habitat loss will be mitigated by acquiring and preserving off-site habitat for these species.

Short-term and permanent habitat loss will occur for the desert tortoise and Mohave ground squirrel. The applicant has estimated land disturbance for the project and appurtenant facilities, except for the second natural gas pipeline, to be 104.2 acres long-term and 112.7 acres short-term (<10 yrs) for a total of 216.9 (RMI 1998d). Energy Commission staff considers this a reasonable estimate. However, where the applicant estimates 281.9 acres of long-term and 131.5 acres of short-term disturbance for the second natural gas pipeline, Energy Commission staff’s estimate is 45.9 acres of long-term and 336.7 acres of short-term habitat disturbance for a total of 382.6 acres. Energy Commission staff’s estimate is based on its expectation that for the pipeline segment paralleling State Highway 395, a fifteen foot access road will result adjacent to the gas pipeline over time, while the remaining ninety-five foot width of the construction right-of-way will be revegetated and restored to suitable habitat for desert tortoise, and possibly Mohave ground squirrel, in ten years or less. For the approximately six miles of gas pipeline that crosses State Highway 395 to the east and then south to the power plant, Energy Commission staff assumes that construction work will be done from existing roads and a fifty foot right-of-way would be disturbed for construction and subsequently rehabilitated to useful habitat. It is reasonable to assume that necessary inspection patrols can use existing roads along this segment, thus minimizing any intrusion onto the actual right-of-way except for emergency purposes.

CUMULATIVE IMPACTS

The project is in an urbanized area, the city of Victorville, and thus adds to the impacts associated with heavy growth and development desired by the local jurisdictions. Because the project is on a highly disturbed site, the cumulative impacts on biological resources will be insignificant. However, the extension of some of the linear facilities into surrounding undeveloped desert habitat contributes to the expanding loss of important wildlands on a cumulative basis. In the case of this project, the cumulative habitat losses can likely be effectively mitigated through acquiring off-site habitat for desert tortoise and Mohave ground squirrel and protecting it in perpetuity. The acquired habitat should be given in fee to a land management entity for the purpose of managing and protecting the acquired habitat.

FACILITY CLOSURE

Except for revegetation of any area where structures are removed at the power plant site, there is no anticipated need for other measures to address biological resource needs because by the time the facility is closed after 30 plus year operational period, the surrounding community will be probably be highly developed and densely populated if local desires of civil authorities are realized. If linear facilities remain in areas with little or no human habitation and they serve no secondary purpose to the power plant, consideration should be given to their removal. This will be addressed in a required facility closure plan in accordance with standard conditions of certification. Under certain circumstances, it would conceivably be advisable to leave such facilities in place from a biological resource perspective. Such considerations will be addressed in the closure plan.

COMPLIANCE WITH LORS

The applicant can comply with biological resource LORS if Energy Commission staff proposed mitigation is required and implemented.

MITIGATION

The applicant proposes to avoid impacting biological resources through avoidance measures based on preconstruction surveys. An on-call biological monitor will notify construction crews of steps to minimize disturbance. Project engineers will adjust project features to avoid impacting denning sites, Joshua trees, Mojave indigo bush, and desert washes (HDPP 1997b, AFC page 5.3-31 and 5.3-32). The applicant has submitted a draft Biological Resources Mitigation Implementation Plan (HDPP 1998n, Data Response 27) and an Erosion Control and Revegetation Plan (HDPP 1998n, Data Response 29) that provide details of measures proposed for mitigating anticipated biological resource impacts. Submittal of the final plans for review and approval should be required as a condition of certification. No site disturbance should be allowed before the plans are approved by Energy Commission staff in consultation with appropriate resource agencies.

Endangered species mitigation often takes the form of habitat compensation in situations in which habitat that the species rely on for life sustaining requisites is permanently eliminated by project structures or temporarily obliterated through construction practices such as trenching and clearing areas for work crews and mobile equipment marshalling yards. The level of habitat compensation, is dependent on factors such as quality of the habitat for endangered species, permanence of the habitat loss, proximity to other development, and potential growth inducing effects of the project. A ratio of habitat compensation is determined through consultation with the regulatory agencies along with input from interested public.

Habitat compensation is proposed by the applicant for desert tortoise and Mohave ground squirrels by establishing compensation ratios ranging from 0 to 2:1 for the project and appurtenant facilities, except for the second natural gas pipeline (RMI 1998d Table 5.2). Energy Commission staff considers this level of compensation ratio as applied, satisfactory, and concurs with the 269.8 acres proposed by the applicant (RMI 1998d). It is uncertain at this time if this will be acceptable to the California Department of Fish and Game and the U.S. Fish and Wildlife Service. Before the start of any ground disturbance prior to the start of construction at the site or any appurtenant project related facilities, the applicant should provide the habitat along with written concurrence from these two agencies that this level of compensation, at a minimum, for the aspects of the project as specified above, is acceptable.

With respect to the second natural gas pipeline, habitat compensation proposed by the applicant for desert tortoises and Mohave ground squirrels is based on ratios ranging from 1:1 to 4:1 (RMI 1998d Table 6-1). For habitat compensation associated with the second natural gas pipeline, the applicant is proposing 1,188.7 acres (RMI 1998d Table 6-2). Energy Commission staff adjusted ratios in critical habitat to 4:1 for long-term habitat loss and 2.5:1 for short-term losses. For habitat in BLM Category III zones, ratios are adjusted to 2.0:1 for long-term losses and 1.5:1 for short term losses. This is due to the growth inducing nature of the oversized pipeline. Approximately 17.25 miles of the pipeline that parallels State Highway 395 is in critical habitat. Eight miles is in Category III. The remaining length of pipeline, approximately six miles, is also in Category III desert tortoise habitat. Based on Energy Commission staff calculations, habitat compensation for the second natural gas pipeline should be 1,132.4 acres.

Total habitat compensation for desert tortoise and Mohave ground squirrel should be 1,402.2 acres.

The applicant suggests that habitat acquired to satisfy the mitigation requirements for the desert tortoise will also satisfy the habitat compensation needs of the Mohave ground squirrel. While this might be possible, and has been recommended in the past, the efficacy of this is uncertain. Although life history information has been developed for the Mohave ground squirrel in the northern extent of its range (Leitner and Leitner 1998), this information may not be applicable to southern extremes of the animals range, where the proposed project is located. Because of this uncertainty, the applicant should contribute $50,000.00 to research that will address this question. Dr. Leitner has estimated that comparable costs to develop habitat suitability information in the southern portion of the squirrel’s range will be 1 to 1.2 million dollars. The Desert Tortoise Preserve Committee is planning on conducting research to address this question in portions of the ground squirrel’s range that have not been investigated previously. With respect to the High Desert Power Project, Energy Commission staff believes a contribution to research, as proposed above, will be sufficiently beneficial to compensate for any loss that occurs because the habitats are not identically suited to both species.

Mojave River riparian habitat impacts will be mitigated by banking water in the area of withdrawal. The specifics of this mitigation action will be discussed in detail in the

Water Resources Section of this or the final Staff Assessment. To verify if any impacts occur in the riparian zone that lead to reduced habitat for important species there, a monitoring program must include sampling that will demonstrate whether or not these effects occur. The applicant has submitted a draft plan for review and approval which should take place before the start of project construction.

Staff proposes that the HDPP have an environmental awareness program to inform construction workers and operations personnel about sensitive biological resources that must be protected in accordance with existing laws and Energy Commission decision requirements[15].

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The final power plant configuration will not create impacts on biological resources because the footprint will remain within the 25 acre highly disturbed area dedicated as the power plant site. Biological resource impacts associated with the project's linear facilities and back-up water supply well field can be adequately mitigated. However, even though the impacts associated with the second natural gas pipeline can be mitigated, allowing this action may not be considered desirable by the U.S. Fish and Wildlife Service because of the loss of desert tortoise critical habitat. This, coupled with the fact that the second natural gas pipeline in not necessary for the project to operate might preclude approval of an endangered species "incidental take" permit by the U.S. Fish and Wildlife Service for this feature of the project. This issue remains to be resolved among the U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, and the Applicant.

The applicant has submitted a draft Biological Resources Mitigation Implementation Plan and a draft Erosion Control and Revegetation Plan. These plans will be finalized and deemed acceptable by staff and other appropriate agencies. Potential biological impacts related to the proposed project such as killing wildlife and destroying habitat are mitigable, but final mitigation details sufficient to meet state and federal endangered species requirements remain to be resolved.

The applicant has received draft Streambed Alteration Agreements for the project and appurtenant facilities as well as the second natural gas pipeline. These agreements are required respectively under Section 1603 and Section 1601 of the State Fish and Game Code.

In spite of the issue regarding the issuance of a endangered species "incidental take" permit for the second natural gas pipeline, Energy Commission staff considers the likelihood of the applicant complying with the federal Endangered Species Act

[15] The CPM has Worker Environmental Awareness Program materials (handouts and videotapes) developed for other power plant siting cases. These materials are available for inspection by the project owner at any time in the preparation of the current project's specific program.

"incidental take" requirements or the California Fish and Game incidental "incidental take" permit and streambed alteration agreement process is high.

RECOMMENDATIONS

If the committee approves the project, it should also adopt the proposed conditions of certification.

CONDITIONS OF CERTIFICATION

Staff proposes the following conditions of certification. Subsequent to further meetings with the applicant and the outcome of their meetings with appropriate federal agencies, additional conditions of certification may be recommended.

BIO-1 Construction-site and/or ancillary facilities preparation (described as any ground disturbing activity other than allowed geotechnical work) shall not begin until a CPM approved designated biologist is available to be on site.

Protocol: The designated biologist must meet the following minimum qualifications:

5. a bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field,

6. 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,

7. one year of field experience with resources found in or near the project area, and

8. ability to demonstrate to the satisfaction of the CPM the appropriate education and experience for the biological resource tasks that must be addressed during project construction and operation.

If the CPM determines the proposed designated biologist to be unacceptable, the project owner shall submit another individual's name and qualifications for consideration.

If the approved designated biologist needs to be replaced, the project owner shall obtain approval of a new designated biologist by submitting to the CPM the name, qualifications, address, and telephone number of the proposed replacement, ten working days prior to the termination or release of the preceding designated biologist.

No disturbance will be allowed in any designated sensitive area(s) until the CPM approves a new designated biologist and that designated biologist is on-site.

Verification: At least 90 days prior to the start of rough grading, the project owner shall submit to the CPM for approval, the name, qualifications, address, and telephone number of the individual selected by the project owner as the designated biologist. The CPM will notify the project owner of approval or disapproval of the designated biologist. Oral approval may be given by the CPM, and will be followed up in writing no later than 15 days after oral approval is granted.

BIO-2 The CPM approved designated biologist shall perform the following duties:

9. advise the project owner's supervising construction or operations engineer on the implementation of the biological resource conditions of certification,

10. supervise or conduct mitigation, monitoring, and other biological resource compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as wetlands and special status species, and

11. notify the project owner and the CPM of any non-compliance with any condition.

Verification: The designated biologist shall maintain written records of the tasks described above, and summaries of these records shall be submitted with the Monthly Compliance Reports to the CPM.

BIO-3 The project owner's supervising construction and operating engineer shall comply with the recommendation of the designated biologist to ensure conformance with the biological resource conditions of certification.

Protocol: The project owner's supervising construction and operating engineer shall halt, if needed, all construction activities in areas specifically identified by the designated biologist as sensitive to assure that potential significant biological resource impacts are avoided.

Protocol: The designated biologist shall:

12. tell the project owner and the supervising construction and operating engineer when to resume construction, and

13. advise the CPM if any corrective actions are needed or have been instituted.

Verification: Within 2 working days of a designated biologist notification of non-compliance with a Biological Resources condition or a halt of construction, the project owner shall notify the CPM by telephone of the circumstances and actions being taken to resolve the problem or the non-compliance with a condition.

Protocol: For any necessary corrective action taken by the project owner, a determination of success or failure will be made by the CPM within 5 working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.

BIO-4 The project owner shall develop and implement a CPM approved program in which each of its own employees, as well as employees of contractors and subcontractors who work on the project site or related facilities (including any access roads, storage areas, transmission lines, water and gas lines) during construction and operation, are informed about biological resource sensitivities associated with the project.

Protocol: The Worker Environmental Awareness Program:

14. shall be administered by the designated biologist and consist of an on-site or classroom presentation in which supporting written material is made available to all participants.

15. must discuss the locations and types of sensitive biological resources on the project site and adjacent areas,

16. the reasons for protecting these resources,

17. the meaning of various temporary and permanent habitat protection measures, and

18. who to contact if there are further comments and questions about the material discussed in the program.

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

Each participant in the on-site Worker Environmental Awareness Program shall sign a statement declaring that the individual understands and shall abide by the guidelines set forth in the program material. Each statement shall also be signed by the person administering the Worker Environmental Awareness Program.

Protocol: The signed statements for the construction phase shall be kept on file by the project owner and made available for examination by the CPM for a period of at least six (6) months after the start of commercial operation. Signed statements for active operational personnel shall be kept on file by the project owner for the duration of their employment and for six months after their termination.

Verification: At least 30 days prior to the start of rough grading, the project owner shall provide copies of the Worker Environmental Awareness Program and all supporting written materials prepared by the designated biologist and the name and qualifications of the person(s) administering the program to the CPM for approval. The project owner shall state in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date.

BIO-5 The project owner shall acquire a Streambed/Lake Alteration Agreement from the California Department of Fish and Game for project impacts to drainages, and implement the terms of the agreement.

Verification: At least 90 days prior to the start of rough grading, the project owner shall provide the CPM with a copy of the California Department of Fish and Game Streambed Alternation Agreement for this project.

BIO-6 The project owner shall submit to the CPM for review and approval a copy of the Biological Resources Mitigation Implementation and Monitoring Plan for this project.

The Biological Resources Mitigation Implementation and Monitoring Plan shall identify:

- all sensitive biological resources potentially impacted by project construction and operation;
- all mitigation, monitoring and compliance conditions included in the Commission's Final Decision;
- all mitigation measures specified in the Habitat Conservation Plan developed for issuance of an "Incidental Take Permit" from the U.S. Fish and Wildlife Service;
- all conditions agreed to in the CDFG Streambed/Lake Alteration Agreement;
- required mitigation measures for each sensitive biological resource; required compensation for any loss of sensitive biological resources;
- all locations, on a map of suitable scale, requiring temporary protection/signs during construction;
- aerial photographs (direct overhead) of all areas to be disturbed during project construction activities (at a scale of 1"=100') - one set prior to site disturbance and one set subsequent to completion of mitigation measures. Include planned timing of aerial photography and a description of why times were chosen;

- monitoring duration for each type of monitoring and a description of monitoring methodologies and frequency;

- performance standards to be used to help decide if/when proposed mitigation is or is not successful;

- all remedial measures to be implemented if performance standards are not met and,

- a process for proposing plan modifications to the CPM and appropriate agencies for review and approval.

Verification: At least 60 days prior to rough grading, the project owner shall provide the CPM with the final version of the Biological Resources Mitigation Implementation and Monitoring Plan for this project, and the CPM will determine the plans acceptability within 15 days of receipt of the final plan. The project owner shall notify the CPM five working days before implementing any modifications to the Biological Resource Mitigation Implementation and Monitoring Plan.

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

BIO-7 Prior to the start of rough grading of the project or any related facilities, the project owner shall acquire and transfer title in fee simple to a third party nonprofit habitat conservation organization with experience in acquiring and protecting desert tortoise and/or Mohave ground squirrel habitat, or to the California Department of Fish and Game, or to the U.S. Bureau of Land Management, one thousand four hundred two acres of suitable habitat for desert tortoise and Mohave ground squirrel. Funds equivalent to the cost of the land on a per acre basis shall be provided to the recipient of the land for establishing a long-term management endowment. Additionally, funds equal to one fourth of the cost of the land on a per acre basis will be provided to the recipient of the land for fencing the acquired land.

Verification: At least 90 days prior to the start of rough grading of the project or any related facilities, the project owner shall provide the CPM with a copy of the all land transfer documents including verification of recording of title in the County Assessor's Office of the county in which the property transfer took place. Copies of receipts for all funds provided the recipient of mitigation land for long-term management funds and fencing funds, shall be provided the CPM.

BIO-8 Prior to the start of rough grading of the project or any related facilities, the project owner shall provide the Desert Tortoise Preserve Committee

$50,000.00 to support Mohave ground squirrel research that will aid in determining habitat characteristics indicative of suitability within various parts of its range. Once transferred, the money shall be nonrefundable.

Verification: At least 90 days prior to the start of rough grading of the project or any related facilities, the project owner shall provide the CPM with a copy of receipts for all funds provided the Desert Tortoise Preserve Committee.

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SOIL & WATER RESOURCES

Testimony of Joseph O'Hagan & Linda D. Bond

INTRODUCTION

This testimony analyzes the water and soil resource aspects of the High Desert Power Project (HDPP), specifically focusing on the following areas of concern:

- how the project's demand for water affects surface and groundwater supplies;
- whether project construction or operation will lead to accelerated wind or water erosion and sedimentation;
- whether project construction or operation will lead to degradation of surface or groundwater quality;
- whether or not the completed facilities will be vulnerable to flooding; and
- whether the project complies with all applicable laws, ordinances and standards.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

FEDERAL

The Clean Water Act, 33 U.S.C.§ 1251 et seq., requires any construction activity (earth moving) disturbing five acres or more to operate under the provisions of the National Pollutant Discharge Elimination System (NPDES) General permit. In California, responsibility for administering the NPDES program has been delegated to the Regional Water Quality Control Boards.

STATE

To implement the NPDES program, the State Water Resources Control Board adopted Order No. 92-08-DWQ which established General Permit No. CAS000002, the California General Construction Activity Stormwater Permit. Under the order, a project, if it disturbs five acres or more, must comply with the requirements of this construction general permit. These requirements include the filing of a Notice of Intent with the Regional Water Quality Control Board (RWQCB), development of a stormwater pollution prevention plan incorporating best management practices for the control of erosion, sedimentation and runoff and implementation of the plan.

The State Water Resources Control Board also adopted Order No. 97-03-DWQ that established General Permit No. CAS000001, California General Industrial Activities Stormwater Permit. Under the order, operating industrial facilities that discharge stormwater, must comply with the requirements of the general industrial permit. These requirements include filing a Notice of Intent with the RWQCB, development of a stormwater pollution prevention plan incorporating best management practices for the control of erosion, sedimentation and runoff and implementation of the plan, including monitoring.

State Water Resources Control Board Resolution 75-58, discourages the use of fresh inland water for power plant cooling and encourages the use of wastewater or other alternative non-potable water sources. California Water Code section 461 and Water Commission Resolution 77-1 encourages conservation of water resources and maximum reuse of wastewater, particularly in water-short areas.

The Porter-Cologne Water Quality Control Act requires a waste discharge for injection of surface water into a groundwater aquifer to ensure the protection of groundwater quality. SWRCB Policy 68-16, Statement of Policy with Respect to Maintaining High Quality of Waters in California, requires any discharge to existing high quality waters to meet waste discharge requirements. These requirements will ensure that pollution will not occur and the highest water quality will be maintained.

Fish and Game Code, §1603 requires that the department be notified prior to any substantial diversion of flow or alteration of channel or bank of any stream, river or lake to allow the department to propose measures necessary to protect fish and wildlife.

LOCAL

Mojave Water Agency

Mojave Water Agency (MWA) Ordinance No. 9 establishes the rules and regulations for the sale and delivery of State Water Project (SWP) water. An application for SWP water must be submitted to the Mojave Water Agency. The City of Victorville has filed an application for SWP water with the MWA. Section 3.02 of the ordinance limits all agreements for SWP water to a term of one year, thus requiring existing customers to submit an new application each year. Section 3.05 of the ordinance states that SWP cannot be the sole source of water for a project and that a reliable source of water must be obtained prior to approval of any application to the MWA. Section 5.13 of the ordinance requires that, if there is a shortage in SWP water, deliveries to all parties shall be reduced proportionally. This section of the ordinance does allow MWA to apportion the water, if there is a shortage in SWP supply to ensure domestic, sanitary sewage and fire fighting needs are met.

The MWA, in its role as Watermaster of the Mojave River Basin has adopted rules and regulations regarding the agency’s responsibilities under the adjudication. Section 23 sets forth Uniform Rules for Storage Agreements which requires a storage agreement with the watermaster for any party desiring to store water for subsequent recovery.

City of Victorville

City of Victorville Ordinance No. 1500 requires a grading permit for earth moving activities exceeding 50 cubic yards.

SETTING

SITE AND VICINITY DESCRIPTION

The proposed site for the High Desert Power Project (HDPP) is located in northern San Bernardino County on the former George Air Force Base within the City of Victorville. This former base, which has been annexed by the City of Victorville is being developed by the Victor Valley Economic Development Agency (VVEDA) as the Southern California International Airport (SCIA).

Low precipitation, low humidity and high summer temperatures, as expected of a desert environment, characterize the project area. Annual precipitation is approximately four inches while evaporation is fourteen times this amount. The geology of the SCIA is comprised of granitic alluvial fan and river terrace deposits. Topography at the former base is generally level, with average slopes of two to four percent.

Soils

Soils developed in these deposits are generally deep, with low permeability and runoff. Surface textures are primarily sand with small amounts of clay and silt. The soil types affected by the different project elements with selected characteristics are shown in Table 1 below. As shown in this table, all of these soils have a high wind erosion hazard.

SOIL&WATER RESOURCES TABLE 1
Soils with Selected Characteristics Affected by the Project

Soil Name & Number	Percent Slope	Project Element(s)	Surface Texture	Runoff	Water Erosion Hazard	Wind Erosion Hazard
Bryman 105	2-9	Water & Gas Pipelines	Sand	Slow	Slight	High
Cajon 113	2-9	Water Pipeline	Sand	Slow	Slight-Moderate	High
Cajon 114	9-15	Water Pipeline	Sand	Slow	Slight-Moderate	High
Haplargids/ Calciorthids Complex 130	15-50	Gas & Sanitary Sewer Pipelines	Loamy Fine Sand to Sand	Medium-Rapid	Moderate-High	Moderate-High
Mohave 150	0-2	Water, Gas & Sanitary Sewer Pipelines, Power Plant	Loamy Sand	Medium	Slight	High

Source: HDPP 1997a Table 5.2-1; Soil Conservation Service 1986

The proposed power plant site is on the Air Force Installation Restoration Program (IRP) Site FT-20. This site was a fire training pit. Sampling at site FT-20 indicates the presence of low levels of chlorinated solvents in soil gas and low concentrations of total petroleum hydrocarbons in soil (Cass 1998). Because of the low level of contaminants in the soil, a No Further Action for soils at Site FT-20 has been issued. A No Further Action indicates there is no need for further remediation measures. See waste management section for further discussion of soil contamination. Groundwater contamination beneath the site will be discussed below under water quality.

Surface Hydrology

The Mojave River is the major surface drainage within the project vicinity. The river flows approximately one mile east of the proposed power plant site. In this vicinity, the river has cut a channel about one mile wide and two hundred feet below the elevation of the project site. Surface flows of the river within the project area typically occur only during heavy rainstorms. The exception to this is at the Upper and Lower Narrows, located approximately five miles from the project site. The Narrows are formed by a bedrock ridge that acts as a barrier, forcing subsurface river flows to rise to the surface. A stream gage at the Lower Narrows shows that from 1931 to 1995 annual mean flows were 75.7 cfs (USGS 1998). Average annual flows from 1991 to 1997 were significantly higher than the preceeding 60 year period (Bookman-Edmonston 1999). Northeast of the power plant site, the Victor Valley Wastewater Reclamation Authority (VVWRA) wastewater treatment plant discharges effluent to the Mojave River. In the 1995-1996 water year (October through September), the VVWRA facility discharged 8,475 acre feet or approximately 7 cfs (MWA 1997b).

Drainage within the immediate power plant site vicinity flows to the north and east. Most runoff in this portion of the site is conveyed by an existing drain located immediately west of the power plant site. This drain flows into a natural arroyo to the north of the site which then discharges into the river

Groundwater Hydrology

The Mojave Water Agency (MWA 1994) estimates that the Mojave River Groundwater Basin is overdrafted by approximately 68,000 acre feet per year. Overdraft refers to the amount of water pumped from the basin compared to the amount recharged. Because of this overdraft, the groundwater basin was adjudicated. See the discussion on the adjudication below.

For water resource management purposes, the Mojave River Groundwater Basin adjudication divided the basin into five subareas. The project area lies within the 600 square mile Alto Subarea. Groundwater levels in some portions of the Alto Subarea declined 25 feet between 1960 and 1990 (MWA 1994). The MWA (1994) estimate for groundwater overdraft within the Alto Subarea in 1990 was 19,900 acre feet per year. Soil & Water Resources Table 2 shows estimated water balance for the Alto Subarea for water years 1990-1991 through 1996-1997.

This table reflects estimated annual water supply minus consumptive use. Water supply includes measured and estimated surface and groundwater inflow and deep percolation of precipitation. Consumption use of groundwater reflects 50 percent measured and estimated urban and agricultural water use, assuming that half this water percolates into the ground and recharges the aquifer. Other sources of consumptive use include surface and groundwater outflow from the subarea and phreatophyte vegetation.

Phreatophyte vegetation refers to the riparian vegetation found along the Mojave River. This table does not reflect the long term overdraft of the Alto Subarea. Water surpluses found in the table simply reflect unusual high flows in the Mojave River. Additional information, collected over a number of years is necessary to be collected before the production safe yield can beestablished.

Recharge to the Mojave River Groundwater Basin occurs primarily by infiltration of precipitation runoff from the San Bernardino and San Gabriel Mountains. Hardt (1971) estimated that approximately 80 percent of the recharge to this basin is through coarse grained sediments which are found within the Mojave River channel and some ephemeral drainages. In the table above, water years 1991-1992 and 1994-1995 reflect periods when there were exceptionally high flows within the Mojave River. Importation of water into the Alto Subarea over the 1991 through 1997 period only totaled 23,800 acre feet. What other recharge occurs within the Alto Subarea results mainly from infiltration of water from irrigation and septic systems. Bookman-Edmonston (1999) data shows a decline in agricultural consumptive use from 11,500 acre feet in water year 1990-1991 to 6,200 acre feet in water year 1996-1997. Urban consumptive use of groundwater, averaging about 36,100 acre feet, has been fairly consistent throughout this period.

The MWA (1994) Master Plan estimates that by the year 2000, given historic patterns of growth and water consumption, overdraft within the Alto Subarea will be 29,800 acre feet of water, increasing to 45,400 acre feet by the year 2015. By the year 2015, basin- wide the overdraft is anticipated to reach 92,800 acre feet of water. These estimates, of course, do not reflect the more recent increase in groundwater storage within the basin from exceptionally high flows in the Mojave River.

These estimates also do not take into account the importation of SWP water. Full importation of MWA's SWP entitlement of 75,800 acre feet of water would significantly lessen the amount of overdraft within the basin. MWA estimates about 10,000 acre feet of SWP water will be recharged each year for the next few years (Caouette 1998b). It is possible, however, that no SWP water will be imported this year due to financial limitations (Caouette 1999).

The Mojave River Groundwater Basin, including the Alto Subarea, is composed of two primary water-bearing units. These units have been variously named in different reports. In this report, these two units will be called the Mojave River Alluvial Aquifer and the Regional Aquifer. These two aquifers are underlain by a low permeability basement complex.

The Mojave River Alluvial Aquifer occupies the channel of the Mojave River and forms a narrow band of permeable sediments. In the project area, these sediments are less than a mile wide. This aquifer supports both riparian vegetation and highly productive wells. The Mojave River Alluvial Aquifer is underlain by the Regional Aquifer.

The Regional Aquifer, which is up to 1,000 feet thick, underlies the project area. It is composed of older alluvium and fan deposits of interbedded gravel, sand, silt, and clay. In some locations, including the Victorville area, the Regional Aquifer contains extensive, low permeability, old lake and lakeshore deposits (DWR, 1967). The regional groundwater flow is to the northeast, except near the Mojave River where the flow is to the east. It appears that the lower aquifer is hydraulically connected with the Mojave River Aquifer. In the SCIA area, old lake and lakeshore deposits support a perched aquifer, separated from the underlying water table of the Regional Aquifer by an unsaturated zone. This extensive layer of clay and silt retards the downward movement of water.

Isotopic studies indicate that, prior to the development of groundwater in the Victorville area, groundwater in the Regional Aquifer flowed to the northeast, discharging to the Mojave River (Izbicki, et al., 1995). Groundwater discharge comprises the base flow of the Mojave River. The historic pattern of regional groundwater gradients persisted through the early years of groundwater development; maps that plotted groundwater level contours for 1961 (DWR, 1967) illustrate this flow regime. However, this pattern was disrupted by groundwater pumping by the 1990's (Mendez, et al., 1997). A significant cone of depression had formed from pumping, presumably by supply wells for VVWD, the city of Adelanto, and SCIA. These wells capture groundwater that would otherwise discharge to the Mojave River.

If groundwater levels decline to elevations below the stream flow in the Mojave River for an extended period of time, regional gradients would be reversed and would induce recharge from the Mojave River to the Regional Aquifer. The Mojave River does recharge the Mojave River Alluvial Aquifer. This occurs because this aquifer is very permeable and responds rapidly to small changes in the elevation of the flow of the River. Although the river has a rapid impact on groundwater levels in the Mojave River Alluvial Aquifer, the Regional Aquifer responds very slowly to similar changes in head in the river. This difference occurs because the Regional Aquifer is much less permeable than the Mojave River Alluvial Aquifer. The permeability difference of the two aquifers has a damping effect on short-term changes on elevation in river flows and in the groundwater levels of the Mojave River Alluvial Aquifer.

Water Quality

Groundwater quality in the project vicinity is generally good. Water quality data from VVWD wells in the project area meet all state and federal drinking water standards. Total dissolved solids (TDS), an important constituent for power plant use averages approximately 140 mg/l. In contrast, SWP water TDS levels averaged 218 mg/l during the 1995-1996 water year. SWP water quality can vary due to the amount of fresh water inflow into the Sacramento Delta and the amount of groundwater pumped into the aqueduct (Department of Water Resources [DWR]1997). Although generally, SWP water meets primary and secondary drinking water standards for organic and inorganic constituents, the Department of Water Resources (DWR) does not guarantee SWP water quality.

Groundwater contamination has been detected in the perched aquifer at the former George Air Force Base. A major trichloroethylene (TCE) plume has been detected in the north central portion of the base and is referred to as Operable Unit 1 (OU1). This plume extends to the northeast off the base to the Victor Valley Reclamation Authority (VVRA) wastewater treatment plant. A second groundwater contamination plume resulting from leaked jet fuel (JP-4) is found in the central portion of the base. A small, isolated plume of TCE has also been found in the upper aquifer beneath the power plant site at IRP Site FT-20 (Cass 1998). Well samples indicate TCE levels within this plume are about 6.1 micrograms/liter (Montgomery-Watson 1997). All groundwater contamination at the former base has been assigned to Operable Unit 1 (OU-1). A final decision regarding groundwater cleanup for OU-1 has not been made yet. A Record of Decision was adopted in 1994 setting forth remedial objectives, but a final workplan has not yet been adopted (Cass 1998). A small pump and treat facility that removes and aerates contaminated water from the major TCE plume is pumped from the shallow aquifer at the former base.

Water quality from VVWD wells in the vicinity of the proposed wellfields is good, with most constituents found in levels below drinking water standards (Bookman-Edmonston 1998d). Several City of Adelanto wells to the north of the proposed HDPP wellfield have encountered high levels of naturally occurring fluoride.

Water Supply

Mojave Water Agency

The Mojave Water Agency (MWA) is a State Water Project (SWP) contractor. The MWA's initial entitlement was 8,400 acre feet in 1972. An additional 2,300 acre feet was added to the entitlement each year until 1990, when the full entitlement of 50,800 acre of SWP water was reached. In 1996, an additional 25,000 acre feet entitlement to SWP water was acquired by the agency. Historically, SWP deliveries to the MWA have only been a fraction of the entitlement. The reason for deliveries being just a small fraction of the entitlement is due to a lack of money to pay for the water and the lack of facilities to deliver the water (Cauouette 1998).

In addition, direct use of SWP water for domestic consumption requires the water to be treated. There are no water treatment facilities available within the region. Another factor may simply be that pumping groundwater has been cheaper than paying for SWP water. Funds collected to aquire makeup and replacement water under the adjudication will allow MWA to buy more SWP water.

In 1995, the agency constructed the 71 mile long Morongo Basin Pipeline to provide water to the Lucerne and Yucca Valleys. In 1997, MWA began to build the Mojave River Pipeline to deliver water to the Alto and Centro Subareas. This pipeline, which is proposed to supply SWP to the HDPP, will also be 71 miles long when completed in 1999. The purpose of this pipeline is to provide groundwater recharge. Recharge ponds are planned approximately 30 miles north and east of Victorville. The maximum amount of water that can be carried by the pipeline is 71,000 acre feet per year.

SOIL&WATER RESOURCES Table 3
Mojave Water Agency State Water Project Entitlement and Deliveries In Acre Feet

Year	Entitlement	Delivery	Percent
1980	27,200	4,000	14.7
1981	23,100	4,000	17.3
1982	22,843	10,500	46
1983	34,300	0	0
1984	36,700	0	0
1985	39,000	0	0
1986	41,400	0	0
1987	43,700	17	0.04
1988	46,000	9	0.02
1989	48,500	200	0.4
1990	50,800	0	0
1991	50,800	3,423	6.7
1992	50,800	10,686	21
1993	50,800	11,514	22.7
1994	50,800	16,852	33.2
1995	50,800	8,722	17.2
1996	50,800	14,600	28.7
1997	50,800	12,635	24.8

Source: DWR 1997; Caouette 1998b

SWP project deliveries to the MWA have been used for groundwater recharge since 1991. Until 1994, SWP water was released into the Mojave River at Lake Silverwood. Since then a turnout on the Morongo Basin Pipeline at Rocksprings has been used to release SWP water into the river. These discharges rarely flow on the surface more than a few miles before percolating into the ground.

The High Desert Water District (HDWD), which is located outside the adjudicated Mojave River Basin, is entitled to purchase up to approximately 15 percent of MWA's allocation of SWP water. SWP water is delivered to HDWD via an eight mile pipeline that runs from the terminus of the Morongo Basin Pipeline. In 1997, SWP water deliveries to HDWD totaled 5,029 acre feet of water. Planned SWP water deliveries to HDWD in 1998 are an estimated 5,450 acre feet. In addition, HDWD and MWA have a conjunctive use program where SWP water, up to 10,000 acre feet per year, is being stored within the Warren Valley Basin. This water could then be purchased from the MWA by HDWD whenever SWP water is not available in sufficient quantities.

Other SWP water deliveries for the MWA include 1,500 acre feet per year for the Luz SEGS solar facility at Kramer Junction, which is located within the Centro Subarea. This water is delivered to the facility through an agreement with the Antelope Valley-East Kern Water Agency (AVEK). The remaining SWP water, 7,134 acre feet in 1997, was released from the Rock Springs outlet of the Morongo Basin Pipeline. This water is released into the Mojave River channel for groundwater recharge in the Alto Subarea. Estimated releases from Rock Springs for 1998 are 8,050 acre feet.

Adjudication of the Mojave Groundwater Basin

In response to a lawsuit by the City of Barstow and the Southern California Water Company filed in 1990, the Mojave Water Agency (MWA) requested the Superior Court (Riverside Superior Court Case No. 208568) to declare the natural water supply of the Mojave Basin inadequate to meet existing water demand and to establish the water production rights of individual producers throughout the basin. Several years later negotiations led to a proposed settlement which the court included in a stipulated judgement. Eventually over 80 percent of the water producers with an annual production greater than 10 acre feet per year signed the stipulated agreement. A trial was conducted over the claims of the non-stipulating parties in 1995. A judgement in 1996 adopted the measures included within the stipulated agreement. This judgement was appealed to the Court of Appeals. A decision was issued by the Court of Appeals in May of 1998, in favor of the plantiffs. The Court of Appeal, although recognizing that the adjudication raises significant issues regarding groundwater rights, addressed in its decision only the plantiffs specific complaints, excluding one group of farmers from the adjudication while awarding another plantiff full rights to the amount they claimed. The ramifications of this decision on the adjudication are not known at this point in time. The Court of Appeal decision, however, was appealed to the California State Supreme Court. The California Supreme Court granted a writ of certirari last year and is expected to issue a decision later in 1999.

The adjudication divided the Mojave Basin into five distinct, but hydrologically interrelated subareas. The proposed HDPP is located with the Alto Subarea. The judgement found each of the five subareas to be in overdraft due to the water demands of all producers within that area. As noted above, the Mojave Water Agency has identified an overdraft for the entire basin of 68,000 acre feet per year. The court also found that some of the subareas received water, either groundwater, surface water or both, from flows originating upstream. To maintain these flows, the judgement required the estimated flow between subareas, based upon the average annual historic flows between 1930 to 1990, to be met. Failure to meet the obligation requires the upstream subarea to provide makeup water to the downstream area.

Within each of the subareas, the adjudication established a base production allowance (BPA) based upon the producers' maximum water production between 1986 and 1990. The BPA was reduced 5 percent each year for four years to determine the free production allowance (FPA). Any water produced in excess of the FPA must be replaced, usually by payment to the MWA, which the court appointed as watermaster for the basin. In addition to these conditions, the court directed the MWA to develop a program to include the over 8,000 minimal producers who were not directly addressed in the adjudication. In light of the recent loss of over 400 acres of riparian habitat along the Mojave River in the vicinity of Oro Grande, the adjudication provided a fund to the Department of Fish & Game to acquire water to protect riparian resources adversely affected by groundwater drawdown.

The adjudication did not curtail the pumping of water in excess of the FPA nor are new wells prohibited. The underlying assumption of the judgement is that the adjudication provides a mechanism to achieve production safe yield. This is a safe yield based upon water production, not consumption, because it assumes 50 percent of the water pumped and used for municipal and agricultural purposes percolates back into the aquifer. The adjudication does not quantify the safe yield for the basin because it assumes supplemental water will be available. Supplemental water includes imported water, water available due to water conservation and the purchase and retirement of FPAs. The adjudication determined that achieving safe yield entirely through reductions in pumping would be economically devastating to the region.

As noted above, once the Mojave River Pipeline is completed in 1999, this facility will be used to recharge portions of the Alto and Centro Subareas. Money to purchase SWP water for groundwater recharge comes from both general funds and from money provided from producers exceeding their FPA. The MWA intends in the near future to start recharging about 10,000 acre feet per year purchased with general fund monies (Caouette 1998). Currently, many groundwater producers are purchasing available FPAs from other producers and therefore, are not paying for makeup water to the MWA. MWA staff anticipate that most of the available FPAs will be taken in the next few years and, at that time, the makeup water fund to purchase SWP water for recharge will start to grow (Cauoette 1998).

Victor Valley Water District

The Victor Valley Water District (VVWD) encompasses an area of approximately 51 square miles and is the main water supply for most of the City of Victorville and adjacent unincorporated areas. VVWD's service area does not include the SCIA. Instead, the water distribution system on the former base is to be turned over to the City of Victorville. VVWD and the City of Adelanto have separate memorandums of understanding (MOU) with the City of Victorville to provide water to the boundary of the SCIA (Roberts 1998). The MOU between VVWD and the City of Victorville provides for a domestic flow of not less than 1,000 gpm and a fire flow of not less than 3,000 gpm. The MOU between the Cities of Adelanto and Victorville has similar provisions (Roberts 1998).

The VVWD's water supply is entirely from groundwater. From July 1995 to June 1996, VVWD delivered approximately 15,009 acre feet of water. The district pumps an average of 14 million gallons per day (mgd) but during the summer months this rises to 21 mgd. The district's Master Plan (1995) anticipates, assuming 500 new connections per year, the increase in maximum water demand to be 53 mgd by 2015. The district assumes that 500 new connections per year is a typical (average) rate of growth. VVWD is a participant in the stipulated judgement. The district's FPA for 1998 is 10,683 acre feet, well below actual production levels (MWA 1997). Therefore, the district is obligated to pay for makeup water for all production above the FPA.

Although the former Air Force base is now a part of the City of Victorville, the wells used to supply the base with water were leased from the City of Adelanto and will be returned to the city. The FPA for the base is 3,433 acre feet per year. This is being allocated between the City of Victorville, which receives 60 percent, the City of Adelanto which receives 20 percent and the Bureau of Prisons which also receives 20 percent (Roberts 1998).

Alternative Sources of Water

The applicant had originally identified tertiary treated effluent from the VVRA wastewater treatment plant, located approximately 2.5 miles northeast of the project site, as a possible water source for the project. As noted above, this facility discharges over 8,000 acre feet of water to the Mojave River during the 1995-1996 water year. The California Department of Fish & Game (CDFG), however, expressed concern over the possible diversion of this water to the project. Effluent from the wastewater treatment plant is important in maintaining surface flows in the river which support fish populations and riparian vegetation. Furthermore, this discharge is counted towards the flow-through requirement of the Alto Subarea to the Centro Subarea. Shortfalls in the court determined flow-through levels must be compensated. Diversion of the effluent to the project may add to the financial burden of groundwater producers in the Alto Subarea through the need for the purchase of additional makeup water (Caouette 1998b).

Originally the applicant proposed three different potential configurations for the project. One was a simple cycle configuration expected to operate up to 2,000 hours each year, producing approximately 832 MW (HDPP 1997a). Average annual water demand for the simple cycle is 20 acre feet of water per year (Flour Daniel 1998). The majority of this water is used in the evaporative cooler which cools and humidifies the inlet air to the turbine. No cooling towers are required for this configuration. HDPP later decided to delete this alternative.

Wet, Wet/Dry Hybrid and Dry Cooling Towers

Historically, power plants would reject heat directly to an adjacent body of water. With increasing concerns over thermal pollution and conjunctive water uses, cooling towers have become more common, either as an intermediary step to cool the water prior to being returned to the body of water, or to reject the heat directly to the atmosphere.

Cooling towers reject heat from a power plant's steam rankine cycle to condense the steam exiting the steam turbine and to maintain the lowest possible condenser vacuum. The heat rejection mechanism in wet cooling towers is primarily the evaporation of water to the atmosphere. Dry cooling towers transfer heat convectively through heat exchangers, while wet/dry hybrid cooling towers use combinations of the two mechanisms to reject heat to the atmosphere. Cooling towers use forced or induced draft to move ambient air through the tower. The ambient air temperature, humidity, velocity, and mass flow rate affect the heat transfer rate and, ultimately, the efficiency of the cooling tower. The cooling tower heat rejection efficiency and pump and fan loading affect the overall power plant thermal efficiency and output.

The fundamental differences between wet, wet/dry hybrid, and dry cooling towers are initial capital costs and heat rejection effectiveness. Dry cooling towers are 22 to 3 times more expensive than a wet system. Hybrid systems fall in the range between the two, depending on the ratio of "wet to dry" cooling in the hybrid design. In general, the cost differences are due to the dry condenser, or heat exchanger, and taller and larger structures for dry and hybrid cooling systems.

Despite the significant cost differences, dry and hybrid cooling systems are occasionally employed because they use less water and reduce the occurrence of visible plumes common to wet systems. Dry and hybrid cooling systems are, however, less efficient in rejecting heat, and generally have higher parasitic (fan) electrical loads and can create a higher pressure (temperature) in the steam turbine condenser. [A wet system may provide < 3" Hg (1.5 psia) versus 4" to 8" Hg (2 to 4 psia) for a dry cooling tower.] Both of these factors decrease the thermal efficiency and power output of the project.

The effects are not as significant on a combined cycle project as compared to a steam-cycle only project, in that the cooling system only affects the steam side of the combined cycle project and not the performance of the gas turbine. The effect would be greater at higher ambient temperatures because the relationship is non-linear. Additional fuel can be burned to overcome some or all of the loss of output, but the fuel will be an additional operating cost and will produce additional air pollutant emissions.

A comparison of dry, hybrid, and wet cooling towers ultimately depends on the specific needs of the proposed application. Dry and hybrid cooling systems provide benefits in the areas of water use and plume visibility, but with some performance degradation and additional costs. Additionally, dry and hybrid cooling can be noisier, use additional fuel, or require the use of a more visually obtrusive structure.

An additional source of water for the proposed project considered by staff is treated water from an Air Force groundwater remediation facility at the SCIA. This is a pump and treat facility that removes and aerates TCE contaminated water from OU1 pumped from the shallow aquifer at the former base. This facility generates about 600 gpm of treated water (Sommers 1997). As part of the requirements for this remediation process, the Air Force must recharge approximately 350 gpm of the treated water back to the shallow aquifer. The City of Victorville has requested the remaining flow to use for golf course and park irrigation (Sommers 1997). Even if the city does not utilize this water, it would be insufficient to supply the proposed project. Nor is this treatment process likely to continue throughout the life of the project.

IMPACTS

PROJECT SPECIFIC IMPACTS

Erosion

Activities associated with facility construction may require significant site disturbances in the form of excavation, grading, and earth moving. As indicated in Table 1, all of the soils affected by project elements have a high wind erosion hazard. The applicant (HDPP 1997a) estimates that, without implementation of mitigation measures, wind erosion during construction could be as high a five tons per acre per year. Although an arid environment, intense storms are common in the Mojave Desert and can lead to water erosion. Water induced erosion has a high potential where linear facilities construction crosses natural drainages. During project operation, wind and water action can continue to erode unprotected surfaces. An increase in the amount of impervious surfaces can increase runoff, leading to the erosion of unprotected surfaces. The applicant (HDPP 1998b) has provided a draft Erosion Control and Revegetation Plan that identifies temporary and permanent erosion control measures. This plan is discussed further below. Furthermore, the applicant will have to prepare and implement a stormwater pollution prevention plan as required under the General Construction Activity Stormwater Permit issued by the State Water Resources Control Board.

Water Supply

The High Desert Power Project is proposing two different configurations of natural-gas fired combustion turbines operating in either a simple or combined cycle modes. The two configurations are:

- Combined cycle with three trains of “F” class combustion turbines; and
- Combined cycle with two trains of “G” class combustion turbines.

The combined cycle using three trains of “F” class combustion turbines is expected to operate up to 8,760 hours each year producing 720 MW (HDPP 1997a). Average water demand for this configuration is 2,376 gallons per minute (gpm) or approximately 3,832 acre feet of water per year assuming 8,760 hours of operation (HDPP 1997a; Fluor Daniel 1998). A significant portion of this water is use for cooling tower blowdown. The combined cycle with two trains of “G” class combustion turbines is expected to operate also up to 8,760 hours each year producing 678 MW (HDPP 1997a; Fluor Daniel 1998). Average water demand for this configuration is 2,049 gpm or approximately 3,305 acre feet per year assuming 8,760 hours of operation (HDPP 1997a; Fluor Daniel 1998). It should be noted that the Applicant's (Fluor Daniel 1998) revised average annual water demand figures in Tables 3.4-5 and 3.4-6 assumes maximum operation of 8,223 hours per year with the resulting total of 3,597 acre feet for the "F" class configuration and 3,102 acre feet for the "G" class configuration.

Groundwater Supply

The water supply for the proposed project is to be a combination of surface and groundwater. As noted above, groundwater essentially supplies all water used within the Mojave River area. For water year 1995-1996, 517 wells, pumping approximately 87,575 acre feet in the Alto Subarea were identified by the MWA (Bookman-Edmonston 1998a). This number does not include smaller producers, generally pumping ten acre feet or less per year. HDPP (Bookman-Edmonston 1998a) proposes that seven wells, constructed and operated by the Victor Valley Water District be located starting approximately three miles south of the power plant site. These wells will connect to a VVWD 16 inch pipeline being built to provide water to the SCIA.

Six of the new wells would serve as primary wells and the seventh would serve as a backup. It is estimated that each of the wells could have a production rate of 550 gpm or approximately 4,000 AFY. This would represent approximately a 4.6 percent increase in groundwater pumping in the Alto Subarea compared to 1995-1996 water production by major producers.

Staff in the PSA expressed a concern regarding interference between the proposed HDPP wellfield and existing and planned VVWD infrastructure. Supplying HDPP with 4,000 acre feet of water per year would represent an increase of almost 25 percent over the district's existing water demands. Furthermore, the proposed wellfield is located within Pressure Zone 2, a VVWD planning area.

Pressure Zone 2 has seen the greatest population growth over the last ten years of any area within the VVWD boundary (So 1998). In 1994-1995, water demand within Pressure Zone 2 was 10,458 gpm while supply was only 7,207 gpm. Furthermore, this is the area the district anticipates the largest amount of growth over the next 15 years.

There are a total of 33 production wells within the vicinity of the proposed HDPP wellfield. Neighboring production wells include one VVWD well located within a one mile radius of the proposed wellfield while ten VVWD wells are within a two mile radius of the wellfield. Two wells, installed for the still under construction Bureau of Prisons Facility on the SCIA are also within a two mile radius of the proposed wellfield. Eight additional VVWD wells are within a three mile radius of the proposed wellfield as well as six City of Adelanto wells and six George Air Force Base wells. As part of the base closure, these latter six wells are to be turned over to the City of Adelanto.

In light of the high number of existing production wells within a three mile radius of the proposed well field, the applicant conducted an analysis that estimated the effects of operating the proposed HDPP wells (Bookman-Edmonston 1998b). This analysis, based upon the Theis equation, a standard equation used for such an analysis, calculated the potential effect on groundwater levels and the pumping rates of adjacent wells. Drawdown of the aquifer by pumping HDPP wells would reduce the production of these wells accordingly. As discussed above, although Bookmsn-Edmonston (1998a) estimated in DWRSIM surface-water reservoir model simulations that the longest continuous period that the project must use groundwater would be two years. Bookman-Edmonston (1998a) evaluated the effect of three years continuous pumping in the groundwater model. The model simulated three years of pumping at a rate of 3,300 gpm (550 gpm per well). Subsequently, Bookman-Edmonston (1998c,d) expanded the study to model the effects of three years of injection, followed by three years of pumping, which is described below, under Mitigation. Aquifer parameters used in the equation (transmissivity and storage coefficient) were selected by Bookman-Edmonston based upon published values for the area. The aquifer was assumed to be unconfined and isotropic (horizontal and verticle permeability is equal).

The results of the Bookman-Edmonston (1998b) model run indicated that at the end of six years, the maximum drawdown on the nearest VVWD wells (Nos. 21 and 27) would be 11.3 and 11.9 feet, respectively. The potential decline in pumping capacity for these two wells would be 4.4 and 4.5 percent, respectively. The average reduction in groundwater levels and pumping capacity for the 25 VVWD production wells would be 2.7 feet and 7 gpm, respectively. The amount of drawdown would decline with distance from the HDPP proposed well locations.

To evaluate the Bookman-Edmonston study, VVWD (Geomatrix 1998) engaged the consulting firm Geomatrix (1998) and CURE engaged Environmental Management (Fox 1998). In addition to the parameters considered by HDPP, Geomatrix (1998) and Environmental Management (Fox 1998) expanded their evaluation of aquifer parameters and pumping period.

Geomatrix and Environmental Management considered aquifer confinement and a range of transmissivities and storage coefficients. Of the aquifer conditions, the most significant factor would be the effect of aquifer confinement. Low permeability zones within the aquifer significantly affect the drawdown from wells. The horizontal bedding of coarse and fine materials create anisotropic conditions in the aquifer. This means that the aquifer is more permeable horizontally and less permeable vertically. Anisotropic conditions can delay dewatering of an unconfined aquifer. If the fine materials are thick and continuous, they can create confined conditions within the aquifer. In the case of HDPP, the lake deposits, if located within the saturated zone of the Regional Aquifer, could create confining conditions.

CURE also considered different estimates of the period of groundwater pumping. As mentioned above, the Bookman-Edmonston (1998b) studied used three years as a worse case. The Geomatrix (1998) study did as well, but pointed out that this time estimate does not reflect the full effect of groundwater pumping over the life of the project. Outside of the Mojave River Alluvial Aquifer, groundwater extraction exceeds recharge resulting in lowered groundwater levels over time. Without additional on-site recharge, even intermittent pumping by the project would be additive, leading to a long term drawdown of the aquifer, because of incomplete groundwater level recoveries (Geomatrix 1998; Fox 1998; Martin 1998). At the very least, HDPP will be pumping groundwater one month each year while repairs are made to the California Aqueduct. With no other interruptions in SWP deliveries, this still represents two and half years of pumping over the assumed 30 year life of the project. Additional pumping will be dictated by the availablility of SWP water.

Fox (1998), utilizing data taken from work done at the former George Air Force Base and well logs, questions the aquifer transmissivity and storage coefficient values and the maximum length of potential surface water shortages used in the Bookman-Edmonston (1998b) study. Based upon information from the base and VVWD well logs, Fox (1998) suggests that the aquifer in the area of the HDPP well field may very well be confined. Recognizing the lack of site-specific information to resolve the issue, Fox (1998) ran six simulations reflecting a variety of aquifer conditions and a range of pumping periods. The results of some of these scenarios showed an even more drastic drawdown than the Geomatrix (1998) study.

A further issue of concern, raised by the CDFG and CURE, is the potential effect of groundwater drawdown from operation of the wellfield on the riparian vegetation found along the lower Narrows of the Mojave River. Drawdown at the Lower Narrows on the Mojave River was estimated to be a minimum of approximately one-foot by Geomatrix (1998). Even a one-foot drawdown within the alluvial aquifer could adversely affect riparian vegetation as well as base flow in the river (Geomatrix 1998). The potential impact to this valuable habitat is still being evaluated by staff and staff of the California Department of Fish & Game as additional information from HDPP, as discussed below, still needs to be provided.

To address the issues raised by VVWD, CURE and Fish and Game, HDPP has proposed three actions. To address the first issue, the potential conflict with existing and future VVWD facilities, HDPP is proposing that the wells be installed, owned and operated by the water district (HDPP 1998o; HDPP 1997b). In light of VVWD's conditional approval to provide the wells, staff assumes that the district is confident that the issue of well interference can be resolved. A complete list of the conditions VVWD have placed on the proposed project are discussed below. To address the uncertainty in aquifer conditions, HDPP is proposing to conduct aquifer pumping tests to better characterize the groundwater aquifer in the vicinity of the proposed wellfield,. This information, when available, will provide information to more accurately depict the effect of pumping by the proposed project. The third issue, is the cumulative impact of pumping. Even the small amount of drawdown estimated by Bookman-Edmonston would cause a significant cumulative impact. Certainly, the greater levels of drawdown simulated by Geomatrix (1998) and Fox (1998) would cause a significant, project specific impact. In response to this issue, HDPP (1998c,d), has proposed a program of groundwater recharge to mitigate the impact of cumulative drawdown.

Subsidence

There is insufficient information to definitively address this concern. However, if the groundwater system is susceptible to subsidence in the Victor Valley area, the incremental effect of drawdown by HDPP is likely to be proportional to the effect of the VVWD and Adelanto pumping. Because subsidence depends in part on both the duration and magnitude of aquifer depressurization, the potential impact of HDPP pumping would be less than the year-round, long term pumping of municipal production wells. In addition, HDPP recharge activities would probably mitigate pumping impacts to some degree.

State Water Project

As noted above, the HDPP (1997a; Bookman-Edmonston 1998a,b) intends to use State Water Project water for the power plant water supply whenever this water is available. To ensure that the project receives SWP water, the City of Victorville in October 1998 applied on the project's behalf to the MWA for 4,000 AFY of water for the year 2002 (MWA 1998a). The application requests approximately 296 acre feet per month for all months except June, July and August when the requested amount increases to approximately 447acre feet. Ordinance No. 9 of the MWA stipulates that contracts with the MWA for State Water Project water are for a single year. Furthermore, as discussed above, SWP deliveries are not firm.

The ability of the SWP to deliver water in a given year depends on rainfall, snowpack, runoff, water in storage, pumping capacity in the Delta and regulatory constraints. Total entitlement to SWP water is approximately 4.2 million acre feet (maf). Actual deliveries of SWP water have totaled only about 2.8 maf (Department of Water Resources [DWR] 1998). The State Water Resources Control Board (SWRCB 1998) and the DWR (1998) simulated potential SWP delivery levels if the hydrologic conditions of the 73-year period from 1922 to 1994 were repeated. The model, developed by DWR and known as DWRSIM, simulated SWP deliveries with existing facilities operated under the requirements of the SWRCB's interim Water Quality Control Plan for the San Francisco Bay-San Joaquin Delta Estuary. The model also took into account 1995 and estimated year 2020 levels of demand on the SWP, as depicted in the California Water Plan Update, Bulletin 160-98.

SWRCB (1998) and DWR estimates that the SWP has a 65 percent chance of delivering 3.25 maf and an 85 percent chance of delivering 2.0 maf in any given year under 1995 water demands. The calculated average annual delivery during a repeat of the 1928-1934 drought under these assumptions is estimated by SWRCB (1998) to be about 2.1 maf per year. For year 2020 estimated demands, the model shows that full deliveries (4.2 maf) will occur less than 25 percent of the time, but that approximately 3 maf will be available 70 percent of the time.

The DWRSIM model parameters do not take into account Delta export reductions due to take limits of protected or potentially threatened or endangered species. Nor does the model reflect other activites that may affect delta, such as the Calfed Bay-Delta Program and the Central Valley Project Improvement Act (Wilcox 1999).

Given the uncertainty, MWA (1994; 1998) estimates that on average 70 percent of the agency's SWP entitlement will available. This does not reflect other water sources that MWA may receive water from.

HDPP (Bookman-Edmonston 1998b) used the DWRSIM model to estimate the amount of SWP water that would be delivered to the MWA over the 1922 to 1994 period. This simulation model assumed that one-seventh of the SWP water delivered to MWA would go to the Morongo Basin, which is outside the adjudicated Mojave River Groundwater Basin. The model then was run with the assumption that the first 12,000 acre feet delivered to MWA was reserved for the agency's own purposes, including the delivery of 1,500 acre feet to the Kramer Junction solar facility. Based upon these assumptions, the model shows that the project would not be required to pump groundwater throughout the 73 year period. The exception to this is when the month long closure of the aqueduct occurs each fall.

Subsequent simulations allocated the first 20,000, 30,000 and 40,000 acre feet of water to MWA prior to the project receiving its 4,000 acre foot allocation. The results of the 20,000 acre foot simulation indicates that groundwater pumping would only be required in two full years. The 30,000 acre foot simulation indicates that seven full years and one half year (2,000 acre feet) of pumping will be required. This increases to nine full years of pumping for the 40,000 acre foot simulation.

Fox (1998) uses the Bookman-Edmonston DWRSIM model to estimate the time periods SWP water would not be available and groundwater pumping would be necessary. The simulations run by Fox varied from the Bookman-Edmonston model runs only in the amount of water required by MWA. The first simulation, (Scenario A in Fox) actually is the same as the first Bookman-Edmonston run. The results of this run shows that HDPP will not be required to pump groundwater, given the hydrological conditions found in the period 1922 to 1994. The second simulation (Scenario B) is predicated on MWA receiving 26,000 acre feet per year of SWP water prior to HDPP receiving 4,000 acre feet. The 26,000 acre feet of SWP water is based upon the 12,000 acre feet assumed for MWA's use in the first simulation plus an additional 14,000 acre feet of water identified in the 1994 MWA Water Management Plan. This figure, which was prepared prior to the final adjudication, was based upon very preliminary estimates, and only assumed a reduction in agricultural pumping (Caouette 1999).

The result of this second run indicates that HDPP would receive SWP water all but six years out of the 73 addressed by the model. Since six years represents 8.1 percent of the period modeled, Fox assumed that over the 30 year life of the project, SWP water would not be available 2.42 years. The third run (Scenario C) is based upon the assumption that 70,000 afy of SWP would be required by MWA to address the adjudication before the project could receive SWP water. This 70,000 acre foot figure is again based upon the figure in the 1994 plan that shows 58,000 feet of replacement water being required by 2005 in addition to the 12,000 acre feet identified in the original run. Based upon this simulation, HDPP would receive no SWP water (Fox 1998). The time groundwater pumping would be required by the project was used by Fox (1998) to estimate the well interference effects of the proposed project.

An unknown factor in these simulations, besides future drought occurrence, is the actual amount of SWP water MWA will require for addressing the overdraft. As noted above, HDWD has the option to buy approximately 15 percent of the MWA's SWP allocation each year. MWA also has an agreement to provide approximately 1,500 acre feet of SWP water to the solar facility at Kramer Junction through Antelope Valley East Kern Water Agency. The adjudication (1995) clearly identifies the reduction in groundwater pumping and the importation of water as the key elements in addressing the overdraft. The adjudication, however, is silent on the amount of water that needs to be recharged.

Other than these agreements discussed above, the MWA has no specific plan on how to allocate SWP water. Soil and Water Figure 4 shows estimated annual imported water demand with and without the proposed project. The estimates reflected in this figure prepared by MWA (1999) are based upon a two percent population growth rate for the basin and a five percent annual ramp down of free production allowance until production safe yield is reached. Currently, there has been no determination by MWA or the court for additional FPA rampdown. As noted above, a firm estimate of production safe yield has also not been made and must wait until more hydrologic information is available (Caoutte 1999). As shown in this

figure, SWP water importation sharply increases after the year 2000. While the information used to compile this figure is extremely preliminary, it does reflect the expectation by MWA that demand for SWP water will greatly increase and that eventually, the demand will exceed the entitlement.

The sharp increase in demand shown in the figure for imported water starting at year 2000 reflects the assumption that most of the FPAs that can be transferred will have been transferred and, therefore, the amount of payments to MWA for makeup water will increase. It should be noted that during SWP water shortages, use of SWP water for recharge, if deemed necessary by the watermaster, could take priority over non-recharge uses (Cauoette 1998b). In general, however, the MWA has the flexibility to purchase extra SWP (and other) water when available and recharge as much water as possible to compensate for the inevitable dry years. The availability of such water in the future is not known.

In case of reduced SWP deliveries, Section 3.03 of MWA Ordinance No. 9 indicates that “All applications shall be evaluated and deliveries authorized based upon the following priority uses: 1) municipal, 2) industrial, 3) agricultural...”Ordinance No. 9 also states that during SWP shortages, all parties will be proportionately reduced. The ordinance does go on to allow MWA to allocate the water, if there is a shortage in SWP supply, to ensure domestic, sanitary sewage and fire-fighting needs are met. In light of the lack of a water treatment facility, municipal demands for direct use of SWP water in the near future are not likely. Nonetheless, in the future, HDPP may be in competition for SWP water with other users when deliveries are reduced.

The MWA accepted for processing the application for SWP water for the HDPP on November 10, 1998. Section 3.05 of the Ordinance No. 9 states that SWP cannot be the sole source of water for a project and that a reliable source of water must be obtained prior to approval of any application to the MWA. Both the VVWD (1998) and the City of Victorville (Roberts 1998) indicated to the MWA that they will serve as an independent source of water for the project when imported water is not available. The application by reference included the 12 draft conditions of approval by VVWD (Rowe 1998). See discussion under groundwater impacts below. These conditions are included in Appendix A. Final approval of the application to the MWA will follow certification of the project by the CEC. The MWA board included as well 12 measures to ensure project coordination with the various agencies involved and compliance of the permit approval with applicable requirements. These conditions are found in Appendix B.

While there is certainly uncertainty over future climatic patterns and regulatory actions that will affect the delta and SWP deliveries, staff is unaware of any information that clearly indicates that SWP deliveries will be significantly reduced. In addition, MWA has the ability to buy additional SWP or other water when available.

At this point in time, the question of how much SWP water must be used to address the overdraft is also unknown (Caouette 1999). The framework provided by the adjudication is to deal with the overdraft, not only through the importation of water, but also by the transfer of FPAs and water conservation measures driven by water makeup and replacement charges. No one has a clear understanding how these factors, coupled with future growth, will resolve the overdraft. It is also clear that both the adjudication and the MWA, although not providing a specific plan for allocation of SWP water, allow for continuing growth in the Mojave River Groundwater Basin. Lacking information that clearly indicates a specific amount of the MWA's SWP entitlement must be used to rectify the existing overdraft and cannot be used to supply the proposed project, the question becomes one of what type of future growth should be allocated SWP water. Staff feels, lacking evidence of a significant environmental impact, that this is a local decision.

Staff is concerned about the long-term availability of SWP water to the project. Since future conditions may change, there is no guarantee that this water will be allocated to the project. Drought, court decisions and competition for SWP water may limit the availability of this water. As noted above, SWP water from MWA must be applied for each year. Clearly, this requirement to provide water on a single year basis is to allow decision-makers as much flexibility in allocating this resource as possible. Without SWP water, the project would have to rely on groundwater pumping. Without SWP water for injection and storage, the project would cause a significant environmental impact to groundwater supplies.

CUMULATIVE IMPACTS

HDPP has proposed mitigation measures, which, if feasible and properly implemented, will mitigate any contributions to long-term decline of groundwater levels.

FACILITY CLOSURE

Typically, closure raises concerns are in regard to potential erosion. Since, however, there are no significant cut and fill slopes associated with HDPP, this is not a significant concern for the project. Low term concerns deal with site drainage. In addition, groundwater wells to be used by the project will be owned and operate by VVWD, their closure should not be an issue for the project.

MITIGATION

HIGH DESERT POWER PROJECT

Erosion and Sedimentation

The applicant (HDPP1997b; 1998n) has submitted a draft Erosion Control and Revegetation Plan. This plan addresses both the power plant and the associated linear facilities. Mitigation measures identified in the plan include control of stormwater runoff through the use of silt fences and straw bales to ensure sediment does not move off-site. The plan also identifies dust control measures including the use of gravel on roads, controlling traffic speed and the use of water on exposed area. For linear facilities, the plan identifies measures to protect stockpiled soil and to prevent sediment from reaching adjacent drainages. Permanent erosion control measures primarily deal with revegetation of the laydown area and along the linear facilities. The plan calls for the diskcing of compacted soils, stockpiling of topsoil and seeding with native species. Monitoring measures and remedial actions (for failed revegeation efforts) are also identified in the plan.

Staff finds the draft erosion and revegetation plan satisfactory to mitigate any potential erosion impacts. The applicant HDPP (1997a) has indicated it will prepare construction and industrial stormwater pollution prevention plans as required by the State Water Resources Control Board.

Water Supply

As a condition of their agreement with VVWD, HDPP has agreed to 12 conditions. These conditions are found in Appendix A. The specific conditions of importance here are:

- The HDPP and the VVWD will set rules under which groundwater service could be reduced or terminated by the VVWD, such as significant reductions in well levels within three miles of the project wells, restrictions in providing service to existing and future customers, or declaration of a stage three water shortage emergency by VVWD.
- The HDPP shall apply for permission from the Mojave Basin Area Watermaster to bank water in an amount specified by the service provider and consistent with the Watermaster rules and regulations in order to maintain a positive balance in the water bank at all times.
- The project well will be designed to provide for direct injection so that recharge will occur in the same area as extraction.
- The HDPP shall treat all water before injection. Treatment will bring all water for injection into compliance with all federal, state, and local water quality standards and criteria.
- The HDPP shall provide monitoring wells to measure the impact on water levels and water quality of both extraction and injection.

HDPP (Bookman-Edmonston 1998c,d) has evaluated the feasibility of banking SWP water in the groundwater aquifer. The same model that was used to estimate groundwater drawdown from HDPP groundwater production, was used to estimate both the effects of injection and extraction on groundwater levels. Basically, groundwater recharge creates a mound of elevated groundwater levels around the well. Fox (1998), utilizing data taken from work done at the former George Air Force Base and well logs, questions the aquifer transmissivity and storage coefficient values and the maximum length of potential surface water shortages used in the Bookman-Edmonston (1998b) study. Based upon information from the base and VVWD well logs, Fox (1998) suggests that the aquifer in the area of the HDPP well field may very well be confined. Recognizing the lack of site-specific information to resolve the issue, Fox (1998) ran six simulations reflecting a variety of aquifer conditions and a range of pumping periods. The results of some of these scenarios showed an even more drastic drawdown than the Geomatrix (1998) study.

A further issue of concern as noted above, raised by the CDFG, U.S. Fish & Wildlife Service and CURE, is the potential effect of groundwater drawdown from operation of the wellfield on the riparian vegetation found along the lower Narrows of the Mojave River. Geomatrix (1998) estimated drawdown at the Lower Narrows on the Mojave River to be a minimum of approximately one-foot. Even a one-foot drawdown within the alluvial aquifer could adversely affect riparian vegetation as well as base flow in the river (Geomatrix 1998). Staff and staff of the California Department of Fish & Game and the U.S. Fish & Wildlife Service are still evaluating this issue. Specifically, the discussion is centering on what information obtained by field studies HDPP needs to provide, as well as the nature of the monitoring program needed to gauge the success of the proposal.

Bookman-Edmonston (1998d) estimated that after three years of groundwater injection at 4,000-acre feet per year followed by three years of extraction at the same level would cause a decline of approximately three feet at the two closest VVWD wells. As discussed above, the drawdown at these two wells without recharge would be 11.0 and 11.5 feet. Modeling also indicated that some residual mounding from the recharge would occur beyond a radial distance of approximately two miles from the center of the wellfield.

Staff's concern regarding the feasibility of the injection program is that clay layers contained in the regional aquifer could compromise the effectiveness of HDPP groundwater recharge. The regional aquifer is composed of interbedded clays and permeable aquifer zones. These clay layers provide favorable conditions for groundwater perching. If HDPP recharge water is injected by "free fall" rather than injected under pressure into the saturated portion of the aquifer, the injected water may become perched above the regional water table. When pumping subsequently occurs in these wells, drawdown of the water table may create separation and unsaturated conditions between the perched, recharged water and the active portion of the aquifer. These conditions would delay the recharge of the aquifer. The potential for perching of injected water and the corresponding impacts for recharge should be considered in the design of HDPP wells.

As noted above, the quality of SWP water varies with the inflow of fresh water into the Delta. Low runoff years generally lead to low mineral concentrations in SWP water (DWR 1997). Conversely, during high runoff years, SWP water may greatly increase organic carbon levels, raising the potential for the formation of THMs. A comparison of SWP water quality with that of groundwater from VVWD production wells shows that total dissolved solids (TDS), chloride and sulfate levels may exceed those of the native groundwater (Bookman-Edmonston 1998d). To comply with water quality regulations, HDPP (Bookman-Edmonston 1998d) prepared and submitted a Report of Waste Discharge to the Lahontan Regional Water Quality Control Board (RWQCB). The RWQCB staff intends to issue a draft waste discharge requirement (WDR) or a waiver by the end of January. A final WDR can only be issued after certification of the project by the CEC (Maxwell 1999).

As part of the Report of Waste Discharge, HDPP (Bookman-Edmonston 1998d) used a groundwater flow and solute transport model (FEMFLOW3D, U.S.G.S. 1997) to estimate the distance and the direction a particle, such as a chloride ion, would move under groundwater injection and extraction. This model allows a more sophisticated depiction of the groundwater system; including taking into account the Mojave River Alluvial Aquifer. Groundwater parameters were based upon published data.

This model also was used to evaluate the effects of three years of water injection and three years of water extraction. Bookman-Edmonston (1998c,d) reports that the model shows that the direction and velocity of movement for a particle is dominated by the regional gradient. Close to the injection wells, the model shows the particles traveling slightly faster than the regional gradient, with distance the velocity drops until it matches the gradient velocity. Thus in three years a particle would move about 1,370 feet from the injection well. The model indicates that it is unlikely that any particles would reach VVWD or City of Adelanto production wells. The model also shows that groundwater pumping would retard particle pumping, but complete recapture would not occur.

A problem with this analysis is that the effect of drawdown from the local municipal production wells was not included in the model. Fox (1998), utilizing data taken from work done at the former George Air Force Base and well logs, questions the aquifer transmissivity and storage coefficient values and the maximum length of potential surface water shortages used in the Bookman-Edmonston (1998b) study. Based upon information from the base and VVWD well logs, Fox (1998) suggests that the aquifer in the area of the HDPP well field may very well be confined. Recognizing the lack of site-specific information to resolve the issue, Fox (1998) ran six simulations reflecting a variety of aquifer conditions and a range of pumping periods. The results of some of these scenarios showed an even more drastic drawdown than the Geomatrix (1998) study.

Treatment of the SWP water is sufficient that this is not a concern unless there is an upset in the water treatment plant. If the movement of the injected water is an issue of concern, this analysis should be corrected. For further discussion of the proposed water treatment program, see below.

Concerns raised by the RWQCB staff (Bookman-Edmonston 1998d; Maxwell 1999) about the proposed injection of SWP water into the groundwater aquifer are:

- To ensure that injected TDS, chloride and sulfate approach background (groundwater) levels;
- That trihalomethanes (THM) not be introduced into the groundwater. THMs include such compounds as chloroform and bromoform. These compounds form when naturally occurring organic matters is combined with oxidizing compounds such as chlorine and other disinfectants commonly used in water treatment; and
- That Surface water parasites, such as *giardia* are not introduced into the groundwater aquifer.

HDPP (1998d) proposes that a water treatment plant be built at the power plant site to address these water quality concerns. Water treatment will include rapid mixing, adsorption clarifier with granulated activated carbon, mixed media filtration and reverse osmosis. Specific water treatment requirement will be set forth in the draft WDR.

HDPP (Bookman-Edmonston 1998 c,d) has proposed a water quality monitoring and reporting program. Pre-injection raw and treated SWP water would be monitored for general physical parameters, minerals and THM potential. In addition, HDPP would monitor water quality at City of Adelanto Well Nos. 4 and 8a and VVWD Well Nos. 21, 27, 32 and 37 (Bookman-Edmonston 1998c,d). Water quality parameters would be reported semi-annually.

The water quality-monitoring plan for HDPP, with the inclusion of one of the proposed prison wells, appears to staff to be adequate for water quality purposes. Final determination must await RWQCB draft WDR conditions. A plan for groundwater level monitoring, however, has not been included in Bookman-Edmonston studies (1998c,d). Although Bookman-Edmonston (1998c,d) reports indicate that VVWD will be performing groundwater level measurements, no specific information on groundwater level monitoring has been provided identified by HDPP.

To evaluate the effectiveness of HDPP mitigation operations in the area of the well field, at a minimum, static (non-pumping) groundwater levels should be measured and reported on a semi-monthly basis for both the HDPP wells and the area's production wells. In addition, monthly rates for surface water injection and groundwater production should be measured and reported. Additional information from HDPP on groundwater level monitoring is necessary before staff can evaluate the proposed monitoring program. Furthermore, the Mojave River Groundwater Basin Watermaster (MWA) will require a groundwater monitoring program as part of a storage agreement for which approval is necessary before banking of SWP water can begin (Caouette 1999).

To evaluate the effectiveness of the actual mitigation operations to offset any negative project impacts on groundwater levels for riparian vegetation, the use of a 3-dimensional, numerical model is recommended. At a minimum, field measurement of the aquifer parameters for both the Regional and Mojave River Alluvial Aquifers would be needed. In the case that more complex concerns or problems arise during the operation of the project that relate to groundwater levels, a larger set data would be needed to evaluate the relation of the project's water use to the groundwater issue. Water deliveries and wastewater disposal, as well as well construction data should be recorded for the area, including HDPP. The other data needed for groundwater level analysis would include precipitation, stream flow for the Mojave River, the water service population and land use, which are usually compiled by various local, state and federal agencies. These data would also be needed for a subsidence study.

CALIFORNIA DEPARTMENT OF FISH & GAME

As part of the draft Streambed Alternation Permit (No. 5-313-98) issued September 17, 1998, the California Department of Fish & Game has identified conditions to reduce erosion, sedimentation and other water quality impacts from project related activities in desert washes and streams. These conditions include: revegetation with native species; replacement of topsoil, avoidance of wet areas, vehicle maintenance to avoid leaks and the use of clean fill. To reduce impacts on the Mojave River and associated riparian vegetation, the draft agreement requires the project to only pump groundwater from previously banked water sufficient to meet groundwater demand when State Water Project Water is not available. Any groundwater pumped from the banked supply will not exceed this supply and shall not cause a decline in bank and base flow of the Mojave River. The draft permit requires that prior to project approval, HDPP shall submit a report that demonstrates by studies and field-tests that the above condition can be met. The studies and field tests may include a combination of well testing, stratigraphic cross-sections and aquifer hydraulics (Bilhorn 1999). An annual compliance and monitoring report which provides data on the banked water sufficient in time and place to take corrective action to assure the above conditions shall be met, is also required. As of January 19, 1999, this report has not been submitted to the California Department of Fish and Game (Bilhorn 1999).

CEC Staff

Staff recommended conditions of certification are to ensure project compliance with applicable laws, ordinances and standards as well as to ensure that potentially significant environmental impacts are mitigated to a less than significant level. Staff is aware that HDPP is planning a pump test to better establish aquifer. Staff is not aware of the details of this test, but does agree a properly conducted test may resolve many of the groundwater issues discussed above. Absent draft WRD conditions from the RWQCB, a groundwater level monitoring plan and concerns about the groundwater modeling that have been discussed above, no mitigation measures are being recommended at this point. Resolution of these factors will help dictate the need and nature of a subsidence-monitoring plan as well. Lacking this information, resolution of CDFG and USFW concerns about protecting riparian vegetation along the Mojave River have not been possible.

Mitigation measures found in the Conditions of Certification address the need for the project utilize SWP water whenever possible and to bank SWP water for two years prior to any groundwater pumping. These are consistent with HDPP proposals to VVWD and MWA. As noted above, additional measures will be developed as new information is provided. The other measures proposed include that necessary to ensure project compliance with erosion control and stormwater runoff requirements.

CONCLUSIONS AND RECOMMENDATIONS

The HDPP is not likely to cause significant impacts to soil resources through erosion and sedimentation, or cause water quality degradation. ~~This statement,~~

~~however, does not apply to the proposed 26 mile natural gas pipeline which staff has not evaluated.~~ HDPP has proposed an ambitious program of treating and banking State Water Project water in the aquifer to offset potential project specific and cumulative adverse environmental impacts on groundwater. Operation of the project is predicated on sufficient SWP water being available and the project maintaining a positive groundwater balance. Staff concludes that allocation of this imported water supply to the project will not significantly affect the ability of the groundwater overdraft to be rectified. It is also necessary to acknowledge that there is no mechanism to secure a long-term commitment of SWP water to the project. Given increased demand for this water, prolonged drought or court decisions regarding the adjudication, the project may not always be able to secure SWP water.

Lacking draft Waste Discharge Requirements from the Lahontan Regional Water Quality Control Board, a groundwater level monitoring plan and the results of field testing to be undertaken by HDPP staff cannot at this time complete the evaluation of the proposed mitigation program of treating and injecting State Water Project water. In addition, without this information, CDFG and USFW concerns about protecting riparian vegetation along the Mojave River cannot be resolved.

CONDITIONS OF CERTIFICATION

SOIL&WATER 1 Prior to beginning any clearing, grading or excavation activities associated with closure activities, the project owner must submit a notice of intent to the State Water Resources Control Board to indicate that the project will operate under provisions of the General Construction Activity Storm Water Permit. As required by the general permit, the project owner will develop and implement a Storm Water Pollution Prevention Plan (SWPPP).

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

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

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

SOIL&WATER 3 Sixty days prior to commercial operation, the project owner must submit a notice of intent to the State Water Resources Control Board to indicate that the project will operate under provisions of the General Industrial Activity Storm Water Permit. As required by the general permit, the project owner will develop and implement a Storm Water Pollution Prevention Plan (SWPPP).

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

SOIL&WATER 4 The project's water supply will be SWP water whenever it is available. The applicant or another party on the applicant's behalf will apply each year for sufficient SWP water to operate the project as well as sufficient SWP water to inject into the groundwater aquifer as necessary. Groundwater may only be used by the project when SWP water is not available and that there is a positive balance of banked groundwater water to meet pumping needs. To ensure sufficient banked water is available, the applicant shall inject 8,000-acre feet of SWP into the aquifer at the site of the wellfield prior to any groundwater pumping. No other sources of water may be used by the project. The applicant shall install flow monitors to measure the amount of SWP water and groundwater used by the project. The applicant shall also monitor the amount of SWP water treated and injected into the aquifer.

The applicant shall provide a copy of the application submitted to the MWA each year to obtain SWP water for the project. The applicant shall notify the CPM when MWA will act on the application and the results of MWA's action. The applicant shall provide, in the annual report the amount of SWP water and groundwater used by the project and the amount of SWP water treated and injected into the wellfield aquifer.

PALEONTOLOGIC RESOURCES

Testimony of Kathryn M. Matthews

INTRODUCTION

This analysis presents an assessment of potential impacts to paleontologic resources from constructing and operating the proposed High Desert Power Project (HDPP). Paleontologic resources are the fossilized remains or trace evidence of prehistoric plants or animals preserved in soil or rock. Paleontologic resources are considered non-renewable resources, because the plants and animals they represent were extinct long before the present. Fossils are scientifically important because they can be used to document the evolution of particular groups of organisms and to reconstruct the environment in which they lived. In addition, fossil evidence of California's early environmental conditions and biologic resources is becoming increasingly vulnerable to the ongoing development and urbanization of the state.

Staff's primary concerns in its paleontologic resources analysis are to ensure that all potential impacts are identified and that conditions are set forth which ensure no significant adverse impacts will occur. Impacts to paleontologic resources may result either directly or indirectly during the pre-construction, construction, and operation of the 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, or excavation. Indirect impacts are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource materials due to improved accessibility.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Paleontologic resources are indirectly protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, § 431-433) and subsequent related legislation, policies, and enacting responsibilities. The following laws, ordinances, regulations, standards, and policies apply to the protection of paleontologic resources in California. Projects licensed by the Energy Commission are reviewed for compliance with these laws.

FEDERAL

- National Environmental Policy Act (NEPA): Title 42 United States Code, § 4321-4327; requires that "... important historic, cultural, and natural aspects of our national heritage ..." be protected; requires that "... a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences ... in planning and decision making ..." be followed. NEPA also requires federal agencies to consider potential environmental impacts of projects with federal involvement and to consider appropriate mitigation measures.

- Federal Land Policy and Management Act (FLPMA): Title 43 United States Code, Chapter 35, Sub-Chapter VI, Section 1781-1782; requires the Secretary of Interior to retain and maintain public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric water resource, and archeological values [1781(a)(8)]; requires public lands to be inventoried and provides that permits may be required for the use, occupancy, and development of the public lands; requires the Secretary, with respect to the public lands, to promulgate rules and regulations to carry out the purposes of this Act and of other laws applicable to public lands [Section 1740].

Federal Guidelines for Paleontologic Resources

The US Bureau of Land Management (BLM) recently adopted a new section for its policy and procedures manual. This section focuses on treatment of paleontologic resources on public lands managed by the BLM and it is consistent with the recommendations of a professional society, as described below.

- United States Dept of Interior, Bureau of Land Management: BLM Manual, New Section 8270, Paleontological Resource Management; effective July 13, 1998. As stated in the new section of the manual, BLM policy is that:

- The paleontological resources found on public lands are recognized by the BLM as constituting a fragile and non-renewable scientific record of the history of life on earth, and so represent an important and critical component of America's natural heritage. BLM will exercise stewardship of these resources as part of its public land management responsibility.

- United States Dept of Interior, Bureau of Land Management: Handbook H-8270-1 General Procedural Guidance for Paleontological Resource Management; published as a supplement to BLM Manual Section 8270; Effective July 13, 1998.

STATE

- California Environmental Quality Act (CEQA): Public Resources Code sections 5020.1, 5024.1, 21083.2, 21084.1, *et seq*; requires analysis of potential environmental impacts of proposed projects and requires application of feasible mitigation measures.

- California Environmental Quality Act (CEQA) Guidelines: California Code of Regulations, § 15000, *et seq*, Appendix G (j)], specifically defines a potentially significant environmental effect as occurring when the proposed project will "...disrupt or adversely affect...a paleontological site, except as part of a scientific study."

- Public Resources Code, § 5097.5. Any unauthorized removal of paleontologic resources or sites located on public lands is a misdemeanor. As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority or public corporation, or any agency thereof.

LOCAL

San Bernardino County, Department of Community and Cultural Resources

Although the Energy Commission has pre-emptive authority for the HDPP, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies. San Bernardino County has developed specific requirements for the protection of paleontologic resources and mitigation of potential impacts to such resources. County planning department policy requires a literature search, pre-project surveys, mitigation and data recovery, analysis, and curation for paleontologic resources affected by a proposed project. Please refer to the Mitigation Section for further discussion of the county requirements.

PROFESSIONAL GUIDELINES AND CRITERIA

In 1994, the Society for Vertebrate Paleontology (SVP), a national professional organization, distributed final revisions to a set of draft guidelines that outline acceptable professional practices in the conduct of paleontologic resource surveys, monitoring and mitigation, data and fossil recovery, sampling, preparation, analysis, and curation (SVP 1994). Prior to the adoption of the final guidelines, many practicing professional paleontologists in California had chosen to adhere to the proposed mitigation and monitoring requirements in the guidelines. At the annual meeting in late 1994, the revised guidelines for mitigation were adopted by the membership of the society and published in the society journal (SVP 1995).

In its guidelines for monitoring and mitigation, the SVP established three categories of sensitivity for paleontologic resources: high, low, and undetermined (SVP 1995). Areas where fossils have been previously found are deemed to have a high sensitivity and a high potential to produce fossils. In areas of high sensitivity, full-time monitoring is typically recommended during any project disturbance. Areas that are not sedimentary in origin and that have not been known to produce fossils previously, typically are deemed low sensitivity and monitoring is usually not needed during project construction. Areas that have not had any previous paleontologic resource surveys or fossil finds are deemed undetermined until surveys and mapping is done. After reconnaissance surveys, observation of exposed cuts, and possibly sub-surface testing, a qualified paleontologist can determine whether the area should be categorized as having high, low, or undetermined sensitivity; that is, whether there is a high or low potential to encounter fossil resources (SVP 1995).

SETTING

REGIONAL PALEONTOLOGIC RESOURCE DESCRIPTION

The HDPP Project has been proposed for construction near the southwestern edge of the Mojave Desert, in the west central portion of San Bernardino County. The project site is located within the former George Air Force Base in the City of Victorville. Please refer to the **Project Description** section of this report for a more detailed description of the project and related facilities, maps of the project vicinity and site, and for conceptual drawings of the project on the proposed site.

As described in the AFC, the proposed HDPP site, transmission line route, and the pipeline corridors are located within the southern portion of the Mojave Desert Physiographic Province of California. The Mojave Desert is bounded on the north and northwest by the Tehachapi Mountains, on the west by the Garlock fault, on the east by the Colorado River, and on the south and southwest by the San Andreas fault.

The geologic resource map in the AFC was prepared based on data from a source map made in 1960 and the paleontologic resource map in the AFC was prepared based on data from a source map made in 1986. These two maps use somewhat different terminology when describing the rock units that underlie the project area (HDPP 1997b). No new geotechnical studies were performed for the HDPP project.

As described in a 1960 mapping study, the Mojave Desert Province is characterized by broad alluvial basins of Cenezoic sedimentary and volcanic materials overlying pre-Cenezoic plutonic and metamorphic rocks (HDPP 1997b).

The types of rocks present in the project region can be generally sub-divided into three main groups: 1) pre-Tertiary age crystalline rocks [greater than 67 million years before present (BP)]; 2) Tertiary age sedimentary and volcanic rocks [67 million to 1.6 million years BP]; and, 3) sedimentary and localized volcanic rocks of Quaternary age [1.6 million years to current]. Fossils are abundant throughout the Mojave Desert Province and have been found in sediments of both Tertiary and Quaternary age. The fossil remains recovered in the Mojave generally range in age from the early Miocene [24 million years BP] to the Pleistocene [1.6 million years BP to 10,000 years BP] (HDPP 1997b).

Fossils are well known from the alluvial deposits in the Victorville-Adelanto-George Air Force Base area, as well as to the east of the project site, near Oro Grande. Museum records indicate that fossil materials have previously been recovered from an area south of the project site and transmission corridor, from the El Evado Road area, from the bluffs along the Mojave River, and from many points along the US Highway 395 corridor (HDPP 1997b; HDPP 1998*).

Previous mitigation and data recovery work at numerous locations in the Mojave Desert has indicated that the Pleistocene age and recent sediments often are intermingled in close contact, and that the older deposits may be covered by only a thin veneer of the recent alluvium. Since the lithology of these two types of sediments is quite similar, it is often difficult to be sure which deposit is present unless dateable fossil materials are recovered. For the AFC evaluation of resource sensitivity and impact potential, the paleontologic consultant has grouped both sediments together as older alluvium (HDPP 1997b).

Pre-AFC Literature and Records Search

Prior to preparation of the AFC, consultants to the applicant conducted a literature and records search at the San Bernardino County Museum. Pertinent geologic maps, paleontologic resource locality records, and literature were reviewed for information on fossil resources within and near the project area and to assess the potential to encounter sensitive paleontologic resources during project construction. Results of the museum review were summarized in the AFC and site-specific information was filed with the Energy Commission under separate cover to maintain confidentiality of sensitive resource locations (HDPP 1997b).

Records at the San Bernardino County Museum indicate there are over 150 known fossil localities in the vicinity of the project, most of them found in the older, Pleistocene-Age alluvial deposits (HDPP 1997b). The locality records indicate that fossil materials have been recovered from the ground surface, as well as from depths of five or six feet to as deep as twelve to fourteen feet, or more. Fossils previously recovered from these sediments include vegetative root casts, invertebrates, extinct large and small mammals, as well as the micro-fossil evidence of much smaller species. Among the taxa recognized so far are: *Mammut* (mastodon), *Equus* (extinct horse), *Mammuthus* (mammoth), *Camelops* (extinct camel), *Lepus* (extinct rabbit), and several types of rodents (Jefferson 1986).

These recorded finds indicate the potential for fossils to occur in the sediments at or near the surface, as well as deep below the surface. Based on the record search and the number of previous fossil finds, consultants to the project owner indicated that areas potentially affected by project construction met the SVP criteria for designating the project area as having high sensitivity for paleontologic resources. The consultant recommended continuous monitoring by a qualified professional paleontologist during the project construction in these areas (HDPP 1997b; 1998*).

Pre AFC Field Survey

Following the literature and records search, an on-the-ground reconnaissance survey of the project area was conducted by a qualified professional paleontologist on April 4 and 5, 1997. The paleontologic resource consultant to the applicant surveyed all of the proposed project-related sites and linear facility corridors. Linear corridors were walked in transects spaced 100 feet apart along the preferred routes. Natural and manmade exposures were examined for fossils and to ground-proof the mapped geology of the project area (HDPP 1997b).

Observations made during the surveys indicate that the project area is underlain by alluvial deposits, consisting of sand with lesser amounts of silty and clayey materials (AFC pg 5.2-3). Based on information in a 1986 mapping study, three rock units have been identified within the immediate project setting: 1) Quaternary Age, undifferentiated alluvium; 2) older alluvium; and 3) well-dissected alluvial fan deposits, probably of Pleistocene Age. These sediments originated as deposits from rivers, streams and lakes that occupied the region in the past (HDPP 1997b).

The undifferentiated alluvium is known to contain both older and younger alluvial deposits. The younger, geologically more recent alluvium would be less than 10,000 years old while the older alluvium may be as much as 600,000 years old.

Post-AFC Field Survey of New Gas Pipeline

In June 1998, the applicant filed a supplement to the AFC in which it proposed a new natural gas pipeline to serve as an alternative natural gas supply. The pipeline would extend northward from the HDPP project site to Colusa Road, westerly to US Highway 395, and northward alongside Highway 395 to tap into the existing Kern River and PGandE gas pipelines which run parallel to State Highway 58. This gas pipeline route runs through an area of shallow desert washes, deeper stream beds, and through rising hills and rocky outcrops. These areas are also subject to seasonal outwash, sheet flow, and periodic inundation during heavy storms which affect the depth of occurrence and visibility of paleontologic materials.

The paleontologic resource consultant to the applicant conducted pedestrian reconnaissance surveys for fossil resources on May 24 and 25, and on June 6, 1998. The surveyor walked in a zig-zag pattern back and forth across a 500-foot wide corridor. Natural and man-made exposures were also examined for signs of fossil materials. Fragmentary fossil plant material was observed in an exposure of the upper part of the Tropico Group, at the north end of the pipeline route. A single isolated bone fragment was observed during the surveys in the fanglomerate deposits, also in the northerly portion of the route. Although no fossils were observed in the alluvial deposits during the surface surveys of the new pipeline route, there have been a number of previous finds in these sediments, including invertebrates, fish, and large and small mammals. Each of the rock units found in the proposed pipeline route has a high potential to produce significant fossils during construction (HDPP 1998*).

SITE AND VICINITY DESCRIPTION

The description of the surface geologic conditions at the power plant site and in the project vicinity were obtained from geologic maps of the area, the literature review, and visits to the site and surveys of the routes for the linear facilities. As presented in the AFC, the HDPP project site and most of the associated linear facilities are located on portions of several large alluvial fans west of the Mojave River. The ground surface in the project region generally slopes gently downward in a northeast direction at a gradient of less than two percent. This surface is subject to seasonal outwash and sheet flow across it and may receive periodic inundation during heavy storms. These factors may affect the occurrence and visibility of paleontologic materials on the surface (HDPP 1997b).

Power Plant Site

The HDPP project site is located on a low bluff formed by erosion of the Mojave River which is located one mile or less east of the project site. The surface of the proposed power plant site is on a gentle slope that is subject to seasonal outwash and sheet flow across surface and the site is also subject to periodic inundation during heavy storms. These factors may affect the occurrence and visibility of paleontologic materials on the surface (HDPP 1997b).
The power plant site consists of 25 acres and the staging areas associated with the power plant project consist of an additional 24 acres. The ground surface elevation at the project site ranges from about 2,840 to 2,860 feet above mean sea level datum (msl) while the river channel lies an elevation of about 2,610 feet msl. Erosion cuts and gullies along the west bank of the river channel have exposed sub-surface depositional patterns for sediments that underlie the project area (HDPP 1997b).

Due to previous military uses, large portions of the project site have been disturbed and during the 1997 paleo resource field surveys, large portions of the site were covered with piles of debris. Only a few relatively undisturbed areas remain within the project site. In these areas it appears that undifferentiated alluvium was present. Dissected alluvial fan deposits are exposed in the area immediately east of the project site. The contact boundary between these two units probably runs through the site. No exposed fossils were observed during the 1997 field survey (HDPP 1997b).

Electric Transmission Line

As described in the AFC, the proposed electric transmission line corridor extends generally southward from the project site to the Victor Substation. The corridor has been divided into four segments:

- From the project site along the new El Evado Road alignment to just southeast of SCIA Gate 5;
- From just southeast of Gate 5 along the LADWP's IPP DC line;
- Continuing south from the south edge of LADWP's IPP DC line to one-half mile south of Rancho Road; and
- From one-half mile south of Rancho Road to the Victor Substation, along the west side of SCE's Victor-Gale 115 kV line (HDPP 1997b).

The topography along the transmission line alignment and other utility corridors is generally similar to that of the proposed plant site, with the exception of a short segment of the proposed route. This segment is located within the incised Mojave River drainage course that trends northeast and southwest. Fan deposits are exposed in segments 1 and 2 of the transmission line; older alluvial deposits are exposed along segment 2 south of Turner Road, along segment 3, and along the northern half of segment 4; and the undifferentiated alluvium is exposed in the southern half of segment 4. No exposed fossils were observed during the 1997 field survey (HDPP 1997b).

AFC Natural Gas Pipeline

The proposed gas pipeline alignment is paved or otherwise covered by development, with only a short section along El Evado Road not paved. The presence of pavement and other developed features limited the field survey efforts to examination of a few exposures along the edges of the corridor and made determination of the distribution of the fan deposits difficult (HDPP 1997b).

Based on information in a 1986 mapping study, the rock units within the gas pipeline corridor were identified as undifferentiated alluvium and alluvial fan deposits. The older, fan deposits were reported to be present in the northern end of the corridor and the remainder of the corridor is underlain by undifferentiated alluvium. No exposed fossil materials were observed during the 1997 field survey (HDPP 1997b).

Post-AFC Supplement, Natural Gas Pipeline

Most of the new gas pipeline corridor is underlain by younger and older alluvial deposits, similar to those found at the HDPP project site. They consist primarily of sand, with some silty and clayey materials. Portions of the pipeline route, however, cross through rocks of Tertiary age, identified as the “Tropico Group” which are estimated to date back to 17 to 22 million BP. This group is further subdivided into three informal members: the upper part, the Saddleback Basalt, and the lower part; all three members have been identified within the pipeline corridor. Fossils have previously been recorded from the upper part of the Tropico Group at several localities in the project vicinity. These finds were especially significant because they represented a time period not previously recorded and mammal species not previously known (HDPP 1998*).

A second rock unit present in portions of the pipeline route are fanglomerate deposits which were formed by erosional weathering of the hills during the Pleistocene. Similar deposits located south of the pipeline route have been dated at 700,000 years old. Fossils have been reported from numerous localities throughout the Mojave Desert and, specifically in the vicinity of the proposed pipeline route (HDPP 1998*).

The remaining rock units identified during the literature search and during the surveys, are alluvial deposits that range in age from the older alluvium that was deposited within the last 700,000 years to the younger alluvium that was deposited relatively recently -- within the last 10,000 years. The older alluvium was formed by streams and run-off flows across the region and it may also include lake and/or pond deposits that have since been lifted by seismic activity and covered by the younger alluvial deposits. The younger alluvium is often mapped as "undifferentiated" because it has become inter-mingled with the older alluvium due to weathering and surface changes. Both the younger and the older alluvial deposits have been highly productive and a wide variety of fossil have been recorded from numerous localities in the Victorville, Oro Grande, Edwards Air Force Base, Kramer area (HDPP 1998*).

AFC Water Supply Pipeline

The AFC indicated the pipeline needed to supply water to the HDPP would be about 2.5 miles long, running from the point of inter-connection with the State Water Project aqueduct southward to the HDPP site. The water pipeline corridor appears to run roughly along the contact between the undifferentiated alluvium and the alluvial fan deposits. Museum records indicate that fossil materials have previously been recovered from the fan deposits located to the south and east of the water pipeline corridor. No exposed fossil materials were observed during the 1997 field surveys (HDPP 1997b)

Post-AFC Water Supply Well Field

After the AFC was filed, the Applicant indicated it was rescinding use of treated effluent from the regional wastewater treatment plant and was proposing to develop new water supply wells and a new pipeline. In late April 1998, the Applicant provided maps indicating the location of six new water supply wells and the proposed routes for pipelines to carry the water to the HDPP site. At the end of April, the Applicant completed a proposed water plan that referred to the possibility of additional wells and a possible storage structure but these were not further described or located (HDPP 1998*). Please refer to the **Water Resources** section of this PSA for more information.

An on-the-ground reconnaissance survey of the project area was conducted by a qualified professional paleontologist on April 4, 1998. The paleontologic resource consultant to the applicant surveyed an area 300 feet in diameter around each of the proposed well sites and within a one hundred foot corridor on either side of the pipeline corridor. Linear corridors were walked in transects spaced 100 feet apart along the preferred routes. Natural and manmade exposures were examined for fossils and to ground-proof the mapped geology of the project area (HDPP 1998*).

As proposed, the pipelines from the new well field would run under or alongside existing paved streets. Although disturbed, a large portion of the north/south segment of the pipeline route was exposed and appears to be underlain by older Quaternary alluvial deposits. Other portions of the pipeline route were less visible but where the route crosses a drainage, older alluvial deposits appeared to be covered by younger deposits. Two fragmentary scraps of fossil bone were observed but these were not regarded as significant and they did not warrant recording as fossil localities. They do, however, re-emphasize that there is a high potential for discovery of fossils in excavations associated with the HDPP (HDPP 1998*).

Potable Water and Sanitary Sewage Connections

As described in the AFC, the project's proposed potable water connection line will be about six inches in diameter and will run for about 500 feet along or under local streets. Information provided in the AFC indicated the pipeline would be buried in a trench that was approximately 2.5 feet wide and eight feet deep (AFC 1997c). Since this connection line route lies within the corridors proposed for the gas pipeline and the electric transmission line, please refer to the resource discussions in these sections for further information.

As described in the AFC, the proposed HDPP sanitary sewer line will be connected to the existing sewer facility located just to the east of the project site. Information on the diameter of the pipeline and the width and depth of the trench were not presented in the AFC. However, since the existing sewer connection is in the same area as the transmission line and gas pipeline corridors, please refer to the resource discussions in these sections for further information.

IMPACTS

Since project development and construction usually entail surface and sub-surface disturbance of the ground, the proposed HDPP project has the potential to adversely affect paleontologic resources. Impacts to paleontologic resources may result either directly or indirectly during the pre-construction, construction, and operation of the 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, or excavation. Indirect impacts are those which may result from increased erosion due to site clearance and preparation.

Based upon the California Environmental Quality Act (CEQA), the Warren-Alquist Act, and Energy Commission siting regulations, the Commission staff must evaluate the potential for significant impacts from a proposed project on significant paleontologic resources. The significance of any fossil materials recovered during project construction is determined by a qualified paleontologic resource specialist, based upon established criteria.

SIGNIFICANCE CRITERIA FOR PALEONTOLOGIC RESOURCES

Significant paleontologic resources are those that meet established scientific criteria which are generally accepted by professional paleontologists. Nearly all vertebrate fossils are considered to be significant, as well as many invertebrate fossils, footprints and other faunal impressions, and various types of floral impressions and root casts.

When a potential for discovery of paleontologic resources has been identified, there is a potential for project-related impacts to the resources. However, the potential for discovery does not measure the significance of individual fossils present, since it is impossible to accurately predict what individual fossils could be discovered. The significance of recovered fossil materials can only be determined after they have been collected, prepared, and studied by professional paleontologists.

The following criteria are considered by professional paleontologists when making a determination of significance for paleontologic materials recovered from areas of fossil-bearing sediments. This list is a combination of criteria published by Repenning (1980) and Petty (1978) and is not arranged in order of significance. Fossil resource materials may meet one or more of these criteria.

A paleontologic resource (specimen, sample, or deposit) shall be considered significant if it meets any of the following criteria:

- It represents a rare species or one that has not been recorded previously in the literature.
- It illustrates previously unknown sexual dimorphism, phenotypic variation, or an ontogenic series of a given taxon.
- It is from a locality that marks either a geographical or temporal range extension for given species.
- It is exceptional in that it represents an exhibit-quality specimen.
- It represents material that assists in refining the age assignment of an otherwise poorly dated litho-stratigraphic unit.
- It represents a concentration of vertebrate specimens in a bed or series of beds. The sample may include either associated skeletal material referable to an individual or an aggregate of specimens referable to more than one individual. In either case, the material yields potentially significant taphonomic information that can be utilized in paleontologic resource analyses.
- It provides important information of the evolutionary trends among organisms, relating living inhabitants of the earth to extinct organisms.
- It provides important information regarding development of biological communities or interaction between botanical and zoological biotas.
- It demonstrates unusual or spectacular circumstances in the history of life.
- It is in short supply and in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and is not found in other geographic locations.
- All vertebrate fossils are of scientific value.

United States Bureau of Land Management (BLM) Policy

Portions of the proposed natural gas pipeline route are located on lands managed by the US BLM. Section 8270.06 of the new US BLM Manual for the management of paleontologic resources states that paleontologic resources found on public lands are recognized by BLM as “constituting a fragile and non-renewable scientific record of the history of life on earth, and so represent an important and critical component of America’s natural heritage” (BLM 1998a). Section 8270.08(E)(1) states :

"Paleontologic resources constitute a fragile and non-renewable scientific record of the history of life on earth. Once damaged, destroyed, or improperly collected, their scientific, educational value may be greatly reduced or lost forever. In addition to their scientific, educational and recreational values, paleontologic resources can be used to inform land managers about inter-relationships between biological and geological components of ecosystems over long periods of time. It is the policy of BLM, therefore, to manage paleontologic resources for these values, and to mitigate adverse impacts to them"... (BLM 1998a).

POTENTIAL PROJECT-RELATED IMPACTS TO PALEONTOLOGIC RESOURCES

As described in the AFC, the potential for significant project impact to paleontologic resources is directly related to likelihood that such resources are present and whether they are actually encountered during project development activities. The pre-AFC literature search conducted for the HDPP project identified over 150 known, recorded fossil localities within a few miles of the proposed HDPP site and along the routes proposed for various project-related linear facilities. As a general rule, the more fossil localities reported from a specific sedimentary deposit, the greater the potential for future discovery in similar sediments, and the higher the sensitivity rating (HDPP 1997b).

The proposed HDPP project will be constructed in an area that is underlain by sediments known to have produced paleontologic resources. Based on this previous history, the project area is deemed to have a high potential to produce additional fossil materials during project construction. Often the potential for fossil materials to be found during project construction activities remains uncertain until the ground surface has been broken and excavation of sub-surface soils takes place.

Power Plant Site

Site clearance and grading associated with the power plant site preparation and the excavations and foundation development associated with power plant construction will potentially impact sedimentary rock units known to produce fossil materials. The extent of impact to paleontologic resources will depend on the extent of surface area to be disturbed during site preparation and the depth of excavation into previously undisturbed sedimentary deposits to build project foundations (HDPP 1997b).

The high potential for discovery of fossils in all the rock units present in the study area suggests that fossils are likely to be uncovered during excavations into the underlying alluvial deposits. Absent more specific geotechnical information, staff believes it is reasonably inferred from the information obtained from surveys and from the literature and record search, that excavations for building foundations, trenching for pipelines, and foundations for transmission line towers will likely encounter fossil-bearing alluvium. The varying extent and depth of excavations will result in different degrees of impacts on the paleontologic resources. The potential for impacts is directly related to the amount of excavation—the more extensive and the deeper the excavation, the greater the potential for impacts (HDPP 1997b).

Any project-related construction activities could result in the destruction of fossils, unless proper mitigation measures are undertaken. Such destruction of sensitive fossil materials would represent a significant impact on the region's paleontologic resources. Therefore staff has specified a number of conditions, which if fulfilled, would ensure reduction of impacts to paleontologic resources to a less than significant level (HDPP 1997b).

As long as no new surfaces are disturbed, day to day operation of the HDPP is not expected to have any significant impact on the region's paleontologic resources.

Electric Transmission Lines

The majority of the 7.2-mile route proposed for construction of the electric transmission lines is underlain by sedimentary rock units known to produce fossil materials. The proposed electric transmission line will encounter an inter-mingled mix of the three rock units identified along this route. A small portion of the route follows or crosses existing roadways where the underlying rock units are hidden by pavement or were disturbed during preparation for roadway construction; the major portion of the route crosses through open lands (HDPP 1997b).

The decision on whether and where to use lattice steel towers or tubular steel poles has not been made. Drawings of the transmission structures provided in the AFC were shown as "typical" or "conceptual". As described in the AFC, the applicant will likely use lattice towers in those areas where the new line parallels existing lines using lattice towers and then use tubular poles elsewhere along the proposed route. The AFC indicates that the specific location of each transmission structure is to be delineated in engineering studies that are to take place after project certification but prior to construction. Pending completion of detailed design studies, the applicant has assumed an average span length of 700 to 800 feet between transmission structures which would indicate approximately 50 transmission structures would be required for the proposed 7.2 mile route (AFC 1997c).

No surface evidence of fossil materials was observed in the transmission line corridors during pre-AFC surveys. Where not previously disturbed, each of the underlying sediments have a high potential to produce fossil materials. The sediments underlying the route are highly sensitive but the potential for impacts cannot be evaluated until the sub-surface soils are excavated for foundation footings and the soils are examined for fossil materials (HDPP 1997b).

The extent of impact from the construction of the transmission line also will depend on the type of transmission structure selected. Lattice towers would require excavation of four separate holes for tower footings but may not need to extend as deeply below the surface. Excavation for the foundation for a tubular steel pole will only require a single hole but it will be larger in diameter and extend deeper below the surface than footings for the lattice towers (HDPP 1997b). If greater stability is required at corner points or drainage crossings, the size of the holes needed for the towers or poles will increase in diameter and depth, and additional holes will be required to anchor the stabilization cables or guy wires.

The depth to undisturbed layers of the underlying sediments is unknown, so the potential for impacts cannot be fully evaluated until the ground is opened for augering or trenching. To ensure that no significant environmental impacts occur, staff have proposed mitigation measures which are to be implemented if sensitive paleontologic resources are encountered during pre-construction site preparation, or in such activities as coring, boring, auguring, excavation, and trenching during project construction. Project operation should not produce any impacts upon paleontologic resources as long as no ground disturbance occurs.

AFC Natural Gas Pipeline

Pipeline construction activities that have the potential to disturb paleontologic resources include: vehicle traffic used during surveys, staking and flagging of centerlines and right-of-way boundaries; brush clearing and grading; excavation of pipeline trenches; delivery and storage of pipe sections to multiple locations along the route; welding and stringing pipe together (bending as needed to fit ground contours); cranes lifting and placing pipe sections into the trenches; backfilling the trenches; and clean-up and restoration of the surface (HDPP 1997b).

The AFC indicates that the largest diameter pipeline needed to supply natural gas to the HDPP is 16 inches. To meet safety requirements, the pipeline would be buried in trenches approximately two feet wide and about six feet deep. The majority of the 2.75-mile route proposed for the natural gas pipeline is in an area underlain by sedimentary rock units known to produce fossil materials. Portions of the pipeline route are to be constructed alongside or under existing local streets that have been built over and through these sensitive sediments. Where not previously disturbed, each of these underlying sediments still has a high potential to produce fossil materials (HDPP 1997b).

The depth to undisturbed layers of the underlying sediments is unknown, so the potential for impacts cannot be fully evaluated until the ground is opened for trenching. Therefore, Staff have proposed mitigation measures which are to be implemented if evidence of paleontologic resources is encountered during pre-construction site preparation or in such activities as excavation and trenching during project construction.

Supplemental Natural Gas Pipeline

The finished right-of-way needed for the new 32-mile gas pipeline will be fifty feet wide. In addition to the pipeline, a Custody Transfer Station (tap Station), a Meter and Regulator Station, and, if needed, a Compressor Station will also be constructed. Each of these stations will occupy a surface area of no greater than 100 feet by 200 feet. In certain areas along the route where the pipeline crosses other utility lines, roads and washes, the pipe will be installed by boring under these features rather than trenching through them. The area of disturbance will be limited to 100 feet by 100 feet at each end of the boring (HDPP 1998*).

The trenches needed for a 30-inch pipe must be excavated to a depth of about seven feet, depending upon the thickness of the bedding material needed at the bottom of the trench, beneath the pipe. The width of the trench opening will be about 3.5 feet across but it may be opened wider, depending upon the contour of land, the stability of the soils, and the size and maneuverability of the pipeline sections being installed in the trench. The applicant states that the temporary excavations for the pipeline may be subject to caving due to the relatively sandy desert soils. The actual width of the ground surface disturbed during pipeline installation is directly related to the size of the equipment needed for installation. The applicant estimates that the width of surface disturbance during pipeline construction would be about 110 feet. The applicant indicates that no site-specific, design-level geotechnical studies have been done for the gas pipeline route and facilities. These studies are to be performed, post-certification and prior to construction (HDPP 1998*).

The majority of the 32-mile route proposed for the supplemental natural gas pipeline would be constructed in an area underlain by sedimentary rock units known to produce fossil materials. Portions of the pipeline route are to be constructed alongside existing streets or highways that have been built through these sensitive sediments. Where not previously disturbed, each of the underlying sediments still has a high potential to produce fossil materials (HDPP 1998*).

The depth to undisturbed layers of the underlying sediments is unknown, so the potential for impacts cannot be fully evaluated until the ground is opened for trenching. Therefore, Staff have proposed mitigation measures which are to be implemented if sensitive paleontologic resources are encountered during pre-construction site preparation or in such activities as excavation and trenching during project construction.

AFC Water Supply Pipeline

The AFC described the largest diameter of pipeline needed to supply water to the HDPP, as 24 inches and it would be buried in a trench that was approximately four feet wide and six feet deep (AFC 1997c). The majority of the 2.5-mile route proposed for the water supply pipeline is proposed for construction in an area underlain by sedimentary rock units known to produce fossil materials. Most of the pipeline is to be constructed through an area alongside or under existing local streets that have been built over and through these sensitive sediments. Where not previously disturbed, each of these underlying sediments still has a high potential to produce fossil materials (HDPP 1997b).

The depth to undisturbed layers of the underlying sediments is unknown, so the potential for impacts cannot be fully evaluated until the ground is opened for trenching. Therefore, staff have proposed mitigation measures which are to be implemented if sensitive paleontologic resources are encountered during pre-construction site preparation or in such activities as excavation and trenching during project construction.

Post-AFC Well Field and Pipeline

The well field and pipeline route are proposed for construction in an area underlain by sedimentary rock units known to produce fossil materials. The pipeline dimensions and the width and depth of the trench needed to contain it were not discussed in the data response. However, if the pipeline is comparable to that described in the AFC, the trenches would be four feet wide and six feet deep. Most of the pipeline is to be constructed through an area alongside or under existing local streets that have been built over and through these sensitive sediments. Evidence of fossil bone found during the surveys reaffirms the high potential for fossils to be encountered during construction where the soils has not been previously disturbed (HDPP 1998*).

The depth to undisturbed layers of the underlying sediments is unknown, so the potential for impacts cannot be fully evaluated until the ground is opened for trenching. Therefore, staff have proposed mitigation measures which are to be implemented if sensitive paleontologic resources are encountered during pre-construction site preparation or in such activities as excavation and trenching during project construction.

CUMULATIVE IMPACTS

Based upon previous paleontologic surveys and research, the desert areas of California have been inhabited by prehistoric and historic species for hundreds of thousands of years. While the total area affected by the HDPP project appears small in comparison to the vastness of the entire Mojave Desert, the sediments and fossil materials found in the project area provide valuable information on environmental conditions and adaptations to an earlier, riverain habitat. Proposed developments reaching wider and deeper into the Mojave Desert can contribute to the potential for loss of significant paleontologic resources. The level of cumulative impact will increase as development of the area expands, removing more exposures of these highly sensitive rock units.

With proper planning and appropriate mitigation, proposed developments can help to preserve valuable fossil resources and can also provide opportunities for increasing our understanding of the past environmental conditions and life-forms. Examination of excavations by a professional paleontologist will allow for the collection of the necessary information to interpret the geologic history of the region (HDPP 1997b). Our proposed conditions of certification will ensure that the HDPP does not contribute to any cumulative impact to paleontologic resources.

FACILITY CLOSURE

The anticipated lifetime of the HDPP power plant is expected to be in excess of thirty years. The Applicant has proposed preparation of a Decommissioning Plan and submittal to the Energy Commission for review and action, at least twelve months prior to the proposed decommissioning. At the time of closure all then-applicable LORS will be identified and the closure plan will address how these LORS will be complied with (HDPP 1997c). The information provided in the AFC did not specifically address the effects of project closure on paleontologic resources. If no additional ground disturbance occurs during closure activities, then no impacts to paleo resources would be expected. But, without the specific plan for closure, no conclusion can be drawn on the effects of project closure on paleontologic resources.

MITIGATION

Since project development and construction usually entail surface and sub-surface disturbance of the ground, the proposed HDPP has the potential to adversely affect paleontologic resources. Staff's objective is to ensure that there will be no adverse impacts to paleontologic resources during project development and construction. This goal can be achieved by avoiding, wherever possible, the disturbance of significant fossil resources.

Where avoidance is not possible, Staff has developed conditions for certification which incorporate a range of mitigation measures to reduce the adverse impacts associated with the construction of the HDPP on the region's paleontologic resources to a less than significant level. These conditions are derived from mitigation measures proposed by the applicant, the guidelines of the City of Victorville, those requested by the Curator of Earth Sciences for the San Bernardino County Museum (see Reynolds 1997a and b), the Bureau of Land Management, and the Society of Vertebrate Paleontologists. All of these mitigation measures have previously proven successful in protecting paleontologic resources, while allowing the timely completion of many projects in Southern California.

Among the typical mitigation requirements are: agency staff review and approval of the qualifications of the professional paleontologists proposed for project monitoring and mitigation efforts; recovery of any sensitive paleontologic materials prior to impact by project activities; recordation and analysis of all pertinent data and scientific information from the site(s) and any recovered fossil resources; curation in a qualified repository, of the data and materials recovered; preparation of recovered materials to the point of identification, and completion of an inventory of materials prepared for curation; preparation of a final report on data and fossil recovery efforts associated with project mitigation; and filing of pertinent maps, photos, and other information with the curated fossil materials.

APPLICANT'S PROPOSED MITIGATION MEASURES

The applicant's proposed mitigation measures are listed on pages 5.7-6 and 5.7-8 of the AFC. As stated in the AFC, the proposed measures were derived from the guidelines of the City of Victorville, the County of San Bernardino, and the SVP Guidelines.

SAN BERNARDINO COUNTY'S REQUIRED MITIGATION MEASURES

The County's required mitigation measures are set forth in several letters to the Commission from the Curator of Earth Sciences at the County Museum (SBCo 1997a).

The project proponent must retain a qualified vertebrate paleontologist to develop a paleontological resources impact mitigation program that conforms to the guidelines of San Bernardino County and the Society of Vertebrate Paleontologists. This program must include but not be limited to:

- Conduct (of) a pre-construction field assessment to locate fossils at surface exposures. Salvage of fossils from known localities, including processing a standard sample of matrix for recovery of small vertebrates, and trackway replication.

- Monitoring of excavation in areas likely to contain paleontologic resources, by a qualified vertebrate paleontologic monitor. The monitor should be equipped to salvage fossils as they are unearthed to avoid delays and to remove samples of sediments which are likely to contain the remains of small fossil vertebrates. The monitor must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens.

- Preparation of recovered specimens to a point of identification, including washing of sediments to recover small fossil vertebrates.

- Identification and curation of specimens into a museum repository with retrievable storage.
- Preparation of a report of findings with an appended, itemized inventory of specimens. The report and inventory, when submitted to the appropriate lead agency, signifies the completion of the program to mitigate impacts to paleontologic resources (SBCo 1997a).

CITY OF VICTORVILLE MITIGATION REQUIREMENTS

The City of Victorville has adopted the requirements of San Bernardino County as guidelines for the mitigation of potential project impacts to paleontologic resources (Victorville 199*).

US BUREAU OF LAND MANAGEMENT PROPOSED MITIGATION MEASURES

The US Bureau of Land Management has jurisdiction over portions of the proposed 32-mile natural gas pipeline. If this pipeline project is certified as part of the HDPP project, then the BLM area office in Barstow will take the lead over paleontologic resource mitigation requirements for the pipeline project. The Commission would be included in their oversight but the details of how this process would take place and what mitigation measures may be required are not yet available.

STAFF'S PROPOSED MITIGATION MEASURES

Commission staff concur with the mitigation measures proposed by the applicant in the AFC. Staff has suggested additional language to clarify the measures presented by the applicant and other participating agencies. The changes would extend the mitigation contingency planning to address the following aspects in greater detail: the selection criteria for the designated paleontologic resource specialist; the steps involved in the recovery, analysis, preparation and identification of fossil materials that are encountered during project construction; the inventory and curation of any fossil materials recovered; and the preparation and filing of reports on the paleo resource monitoring and mitigation activities. Staff have also drawn upon the requirements and criteria set forth in the mitigation and curation guidelines of the Society of Vertebrate Paleontologists and Section 8270 of the US Bureau of Land Management Policy and Procedure Manual, for paleontologic resources.

Project-Specific Mitigation Measures

Rather than setting forth project-specific measures here, staff's recommended mitigation requirements and guidelines have been incorporated into the proposed Conditions of Certification which follow the text of this staff analysis.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The project site is located in the southwestern portion of the Mojave Desert where Tertiary- and Quaternary-age sedimentary rock units are inter-mingled with and overlain by, thin layers of very recent alluvial deposits. The underlying older sedimentary deposits have been found to contain fossil materials of great interest and potential scientific value in understanding ancient life forms and environmental conditions. Data and specimen recovery at the project site and during mitigation activities along the routes for other project facilities have the potential to fill in some of the pieces to the geologic and tectonic history puzzle for this part of the Mojave Desert.

No project-specific geotechnical studies have been conducted for the project site or for the linear facility routes. The applicant does not propose to conduct these studies until after the project has been certified, prior to determining final project design. The final center lines and right-of-way boundaries for the linear routes have not been identified within the wider corridors described in the AFC. The applicant does not propose to delineate the final center lines and rights-of way limits until after certification of the project (HDPP 1997b).

The literature and the records of known fossil localities indicate there is a high potential for discovery of fossils in all the rock units in the project area. The presence of known fossil localities suggests that paleontologic resources may be present on the surface or may be uncovered during excavations into the underlying alluvial deposits. The potential for impacts is directly related to the amount of project-related surface and or sub-surface disturbance—the greater the disturbance, the greater the potential for impacts. Absent more specific project information, staff believes it is reasonably inferred from the fossil records, that excavations for project structural foundations, trenching for pipelines, and augring the foundations for transmission line towers will likely encounter fossil-bearing alluvium. The varying surface extent and depth of project-related excavations will result in different degrees of impacts on the paleontologic resources. (HDPP 1997b).

Staff recommends that the designated paleontologic resource specialist conduct a pre-construction survey of the linear routes after the project owner has identified the final centerlines and rights-of-way. Staff also recommends monitoring for fossil resources throughout the pre-construction and construction periods and the implementation of full mitigation wherever fossil resources are encountered. Monitoring and mitigation by a qualified paleontologoic resource specialist are essential to reduce the potential for project impacts to paleontologic resources to a less than significant level.

If the paleontologic resource mitigation measures proposed by the applicant and its consultants, by the San Bernardino County Museum, by the Bureau of Land Management, and by Staff are implemented in a timely and proper manner, the project is expected to be in compliance with the applicable LORS.

RECOMMENDATIONS

Staff recommends that the Commission adopt the following proposed conditions of certification to ensure adequate mitigation of potential impacts to paleontologic resources during the construction of the High Desert Power Project.

PROPOSED CONDITIONS OF CERTIFICATION

PAL-1 Project-related construction activities (defined as any construction-related vegetation clearance, ground disturbance and preparation, and site excavation activities), shall not begin until the designated paleontologic resources specialist approved by the California Energy Commission (Commission) Compliance Project Manager (CPM), is available to be on site.

The designated paleontologic resources specialist shall be responsible for implementing all the Conditions of Certification and for using qualified personnel to assist him or her in project-related field surveys; monitoring; fossil stabilization, removal, and transport; data collection and mapping; direction and implementation of mitigation procedures; matrix sampling, screen washing, and other micro-fossil recovery techniques; preparation and analysis of recovered fossils and data; identification and inventory of recovered fossils; preparation of recovered fossils for delivery and curation; and preparation and filing of required report(s).

After CPM approval of the Paleontologic Resources Monitoring and Mitigation Plan, described below in Condition PAL-4, the designated paleontologic resources specialist and team shall be available to implement the mitigation plan prior to, and throughout construction of the project.

<u>Protocol:</u> Prior to the start of project construction, the project owner shall provide the CPM with name(s) and statement of qualifications for its designated paleontologic resources specialist and mitigation team members. The resume(s) shall include the following information:

1) The resume for the designated paleontologic resource specialist shall demonstrate that the specialist meets the following minimum qualifications: a graduate degree in paleontology, geology or paleo resource management; at least three years of paleontologic resource mitigation and field experience in California, including at least one year's experience leading paleontologic resource field surveys; leading site mapping and data recording; marshalling and use of equipment necessary for fossil recovery, sampling, and screen washing; leading fossil recovery operations; preparing recovered materials for analysis and identification; recognizing the need for appropriate sampling and/or testing in the field and in the lab; directing the analyses of mapped and recovered fossil materials; completing the identification and inventory of recovered fossil materials; and the preparation of appropriate reports to be filed with the receiving curation repository, the UC Museum of Paleontology at UC Berkeley, all appropriate regional information center(s), and the Energy Commission.

2) The resume for the designated paleontologic resource specialist shall include a list of specific projects the specialist has previously worked on; the role and responsibilities of the specialist for each project listed; and the names and phone numbers of contacts familiar with the specialist's ork on these referenced projects.

3) If additional personnel will be assisting the designated paleontologic resources specialist in project-related field surveys, monitoring, data and fossil recovery, mapping, mitigation, fossil analysis, or report preparation, the project owner shall also provide names, addresses, and resumes for these paleo resource team members.

4) If the CPM determines that the qualifications of the proposed paleontologic resources specialist are not in concert with the above requirements, the project owner shall submit another individual's name and qualifications for consideration.

5) If the previously approved designated paleontologic resources specialist is replaced prior to completion of project mitigation, the project owner shall obtain CPM approval of the new designated paleontologic resources specialist by submitting the name and qualifications of the proposed replacement to the CPM, at least ten (10) days prior to the termination or release of the preceding designated paleontologic resources specialist. Should emergency replacement of the designated specialist become necessary, the project owner shall immediately notify the CPM to discuss the qualifications of its proposed replacement specialist.

Verification: At least ninety (90) days prior to the start of construction on the project, the project owner shall submit the name and resume for its designated paleontologic resources specialist, to the CPM for review and approval. The CPM shall provide written approval or disapproval of the proposed paleontologic resources specialist.

Thirty (30) days prior to start of construction, the project owner shall confirm in writing to the CPM that the previously approved, designated paleontologic resources specialist and the team of assistants are prepared to implement the monitoring and mitigation measures for paleo resources, as described in the CPM-approved Paleontologic Resources Monitoring and Mitigation Plan, prepared per Condition PAL-4, below.

At least ten (10) days prior to the termination or release of a designated paleontologic resource specialist, the project owner shall obtain CPM approval of the replacement specialist by submitting to the CPM the name and resume of the proposed new designated paleontologic resource specialist. Should emergency replacement of the designated specialist become necessary, the project owner shall immediately notify the CPM to discuss the qualifications of its proposed replacement specialist.

PAL-2 Prior to the start of project construction, the project owner shall survey and stake all areas expected to be affected by construction and operation of the proposed project and its associated linear facilities. The surveys and staking shall reflect the final project design and site layout and the final post miles, centerlines, and right-of-way boundaries for the linear facilities.

Verification: At least ninety (90) days prior to the start of construction, the project owner shall stake and flag the boundaries of all areas expected to be affected by construction and operation of the proposed project and its associated linear facilities. The staking of linear routes shall define the mile-posts, centerlines, and right-of-way boundaries. The project owner shall notify the CPM when the surveys and staking have been completed.

PAL-3 Prior to the start of project construction, the project owner shall provide the designated paleontologic resource specialist and the CPM with maps and drawings showing the final project design and site layout and the final alignment of all linear facilities, as surveyed and staked per Condition PAL-2, above. The routes for the linear facilities shall be provided on 7.5 minute quad maps, showing post mile markers, final center lines and right-of-way boundaries, and the location of all the various areas where surface disturbance may be associated with project-related access roads, storage yards, laydown sites, pull sites, pump or pressure stations, switchyards, electrical tower or pole footings, etc.

After reconnaissance surveys by the designated paleontologic resource specialist, the specialist may request, and the project owner shall provide, enlargements of portions of the 7.5 minute maps presented as a sequence of strip maps for the linear facility routes. The strip maps would show post mile markers and the detailed locations of proposed access roads, storage or laydown sites, tower or pole footings, and any other areas of disturbance associated with the construction and maintenance of linear facilities.

Verification: At least ninety (90) days prior to the start of construction on the project, the project owner shall provide the designated paleontologic resource specialist and the CPM with final drawings and site layouts for all project facilities and maps at appropriate scale(s) for all areas potentially affected by project construction.

PAL-4 Prior to the start of construction, the designated paleontologic resource specialist shall conduct a reconnaissance survey of the final project site and the final center lines and rights-of-way for the project linear facilities. Potentially sensitive areas identified during this reconnaissance shall be included in the Monitoring and Mitigation Plan prepared per Condition PAL-5, as well as appropriate monitoring and / or mitigation measures.

Verification: At least seventy-five (75) days prior to the start of construction the designated paleontologic resources specialist shall conduct a reconnaissance survey of the final project site and the final routes for the project-related linear facilities. The dates, survey methods, findings and recommendations shall be summarized in the Monitoring and Mitigation Plan prepared pursuant to Condition PAL-5.

PAL-5 Prior to the start of project construction, the designated paleontologic resource specialist shall prepare a draft Paleontologic Resources Monitoring and Mitigation Plan to identify general and specific measures to minimize potential impacts to sensitive paleontologic resources. The CPM will review and must approve in writing, the draft Paleontologic Resources Monitoring and Mitigation Plan. After CPM approval, the project owner’s designated paleontologic resource specialist and designated paleontologic resource team shall be available to implement the Monitoring and Mitigation Plan, as needed throughout project construction.

Protocol: The Paleontologic Resources Monitoring and Mitigation Plan shall include, but not be limited to, the following elements and measures:

1) A discussion of the sequence of project-related tasks, such as any final pre-construction surveys, fieldwork, flagging or staking; construction monitoring; mapping and data recovery; fossil preparation and recovery; preparation for analysis, identification, and inventory; preparation of preliminary and final reports, and preparation of materials for curation.

2) An identification of the person(s) expected to assist with each of the tasks identified in (a), above, and a discussion of the mitigation team leadership and organizational structure, and the inter-relationship of tasks and responsibilities.

3) Where sensitive areas are to be avoided during construction and/or operation, the designated paleontologic resource specialist shall identify measures such as flagging or fencing, to prohibit or otherwise restrict access to sensitive resource areas. The discussion should address how these measures will be implemented prior to the start of construction and how long they will be needed to protect the resources from project-related effects.

4) Where monitoring of project construction activities is deemed necessary by the designated paleontologic resource specialist, the specialist will determine the size or extent of the areas where monitoring is to occur and will establish a schedule for the monitor(s) to be present. If the designated specialist determines that the likelihood of encountering fossil resources in certain areas is slight, monitoring may be discontinued in that location.

5) In sediments with a high potential to contain fossil resources but no fossil evidence is observed on the surface or in the excavated spoils, the designated paleontologic resource specialist shall remove an adequate sample of the spoils and set them aside for further processing (such as screen washing and sorting) to determine if micro-fossil resources are present. Adequate samples shall be obtained from each underlying sedimentary deposit in each area affected by project-related construction activities.

6) If fossil-bearing sediments or fossil materials are encountered on the surface or are exposed during project-related grading, augering, and/or trenching, the designated paleontologic resource specialist shall have the authority to halt or redirect construction in the immediate vicinity of the find until he or she can determine the significance of the find. The designated paleontologic resources specialist shall act in accordance with the following procedures:

- The project owner, or its designated representative, shall inform the CPM within one working day of the discovery of any potentially significant paleontologic resources and discuss the specific measure(s) proposed to mitigate potential impacts to these resources.

- The designated paleontologic resource specialist, representatives of the project owner, and the CPM shall confer within five working days of the notification of the CPM, if necessary, to discuss any mitigation measures already implemented or proposed to be implemented and to discuss the disposition of any finds.

- All necessary and required data recovery and mitigation shall be completed as expeditiously as possible.

7) A discussion of the designated paleontologic resource specialist's access to equipment and supplies necessary for recovery of fossil materials and matrix samples, including screen washing equipment for recovery of micro-fossils. This should include information on the types and availability of specialized equipment and supplies needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits.

8) All paleontologic resource localities, rock units, and sediment and stratigraphic boundaries encountered shall be recorded (may include photos) and mapped; all vertebrate fossils and trackways, and all diagnostic invertebrate and plant fossils shall be stabilized, prepared and recovered for identification and analysis; adequate samples of potentially fossil-bearing matrix shall be collected and screen washed for sorting and analysis of micro-fossils; recovered fossil materials shall be analyzed and identified to the genus level whenever possible; and all recovered fossil materials shall be inventoried, prepared, and delivered for curation into a retrievable storage collection in a public repository or museum which meets the Society of Vertebrate Paleontologists (SVP) standards and requirements for the curation of paleontologic resources.

9) Identification of the institution that has agreed to receive any data and fossil materials recovered during project-related monitoring and mitigation work. Discussion of any requirements or specifications for materials delivered for curation and how they will be met. Also include the name and phone number of the contact person at the institution.

Verification: At least sixty (60) days prior to the start of construction on the project, the project owner shall provide the CPM with a copy of the draft Monitoring and Mitigation Plan prepared by the designated paleontologic resource specialist. The CPM shall provide written approval or disapproval of the proposed Paleontologic Resources Monitoring and Mitigation Plan within 15 days of receipt of the submittal. If the draft plan is not approved, the project owner, the designated paleontologic resources specialist, and the CPM shall meet to discuss comments and work out necessary changes.

PAL-6 Prior to the start of project construction, the designated paleontologic resources specialist shall prepare an employee training program. The project owner shall submit the paleo resources training program to the CPM for review and approval.

Protocol: The training program will discuss the potential to encounter fossil resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

The training shall also include the set of reporting procedures that workers are to follow if sensitive paleontologic resources are encountered during project activities. The training program will be presented by the designated paleo resource specialist and may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern.

Verification: At least thirty days (30) prior to the start of project construction, the project owner shall submit to the CPM (or designee) for review, comment, and written approval, the proposed employee training program and the set of reporting procedures the workers are to follow if paleontologic resources are encountered during project construction.

The CPM shall provide the project owner with written approval or disapproval of the employee training program and set of reporting procedures. If the draft employee training program and set of procedures are not approved, the project owner, the designated paleontologic resources specialist, and the CPM shall meet to discuss comments and work out necessary changes.

PAL-7 Prior to the start of construction, and throughout the project construction period as needed for all new employees, the project owner and the designated paleontologic resource specialist shall provide the CPM-approved training to all project managers, construction supervisors, and workers who operate ground disturbing equipment. The project owner and construction manager shall provide the workers with the CPM-approved set of procedures for reporting any sensitive paleontologic resources or deposits that may be discovered during project-related ground disturbance.

Verification: Prior to the start of construction, and throughout the project construction period as needed for all new employees, the project owner and the designated paleontologic resources specialist shall present the CPM-approved paleontologic resources training program. The training shall include a set of reporting procedures for paleo resources encountered during project activities. The project owner shall provide documentation to the CPM in the Monthly Compliance Report, that the employee training and the set of procedures have been provided to all project managers, construction supervisors, and to all workers. Documentation for training of additional new employees shall be provided in subsequent Monthly Compliance Reports, as appropriate.

PAL-8 Throughout the project construction period, the project owner shall provide the designated paleontologic resource specialist with a current schedule of anticipated weekly project activity and a map indicting the area(s) where construction activities will occur. The designated paleontologic resource specialist shall consult daily with the project superintendent or construction field manager to confirm the area(s) to be worked on the next day(s).

Throughout the pre-construction reconnaissance survey and construction monitoring and mitigation phases of the project, the designated paleontologic resources specialist shall keep a daily log of any fossil resource finds and the progress or status of the surveys, resource monitoring, mitigation, preparation, identification, and analytical work being conducted for the project. The designated resource specialist may informally discuss the paleo resource monitoring and mitigation activities with their Commission technical counterpart. In the Monthly Compliance Report, the project owner shall provide the CPM with a summary of the daily logs prepared by the designated paleontologic specialist.

In the Monthly Compliance Report, the project owner shall provide the CPM with a summary of the daily logs prepared by the designated paleontologic specialist.

Verification: Throughout the project construction period, the project owner shall include in the Monthly Compliance Reports to the CPM, a summary of the daily logs prepared by the designated paleontologic resources specialist.

PAL-9 The designated paleontologic resource specialist shall be present at all times to monitor construction-related grading, excavation, trenching, and/or augering in areas where potentially fossil-bearing sediments have been identified. These sediments include the Quaternary-age undifferentiated alluvium; the older alluvium, including occasional lake or pond deposits; the fanglomerate deposits; and the Tertiary-age rock units of the Tropico Group.

If the designated paleontologic resources specialist determines that full-time monitoring is not necessary in certain portions of the project area or along portions of the linear facility routes, the designated specialist shall notify the project owner of the changes. Mile post markers and boundary stakes placed by the project owner will be used to identify areas where monitoring is being reduced or is no longer deemed necessary.

The daily logs prepared by the designated paleontologic resource specialist shall indicate by post mile, where and when monitoring has taken place and where monitoring has been deemed unnecessary.

Verification: The project owner shall include in the Monthly Compliance Reports to the CPM, a summary of the daily logs prepared by the designated paleontologic resource specialist.

PAL-10 The project owner, through the designated paleontologic resource specialist, shall ensure the recovery, preparation for analysis, analysis, identification and inventory, the preparation for curation, and the delivery for curation of all significant paleontologic resource materials encountered and collected during pre-construction surveys and during the monitoring, data recovery, mapping, and mitigation activities related to the project.

Verification: The project owner shall maintain in its compliance files, copies of signed contracts or agreements with the designated paleontologic resource specialist and other qualified research specialists who will ensure the necessary data and fossil recovery, mapping, preparation for analysis, analysis, identification and inventory, and preparation for and delivery of all significant paleontologic resource materials collected during data recovery and mitigation for the project. The project owner shall maintain these files for a period of three years after completion and approval of the CPM-approved Final Paleontologic Resources Report and shall keep these files available for periodic audit by the CPM.

PAL-11 The project owner shall ensure preparation of a Preliminary Paleontologic Resources Report following completion of data recovery and site mitigation work. The preliminary report is to be prepared by the designated paleontologic resources specialist and the project owner shall submit the preliminary report to the CPM for review, comment, and written approval.

Protocol: The preliminary report shall include (but not be limited to) preliminary information on the survey report(s), methodology, and recommendations; locality records and maps; determinations of sensitivity and significance; data recovery and other mitigation activities; possible results and findings of any analysis to be conducted on recovered paleontologic resource materials and data; proposed research questions that may be answered or may have been raised by the data from the project; and an estimate of the time needed to complete the analysis of recovered fossil materials and prepare a final report.

If no fossil resources were recovered during project construction, the CPM-approved preliminary report shall also serve as the final report and shall be filed with appropriate entities, as described in conditions PAL-11 and PAL-12.

Verification: The designated paleontologic resources specialist shall prepare a preliminary report on paleontologic the resource monitoring and mitigation activities conducted for the project. The report shall be prepared within 90 days following completion of the data recovery and site mitigation work. The project owner shall submit a copy of the Preliminary Paleontologic Resources Report to the CPM for review, comment, and written approval.

PAL-12 The project owner shall ensure preparation of a Final Paleontologic Resources Report by the designated paleontologic resources specialist, if significant fossil resources are found and recovered during project-related surveys, monitoring and mitigation activities. The Final Paleontologic Resource Report shall be completed following completion of the analysis of the recovered fossil materials and related information. The project owner shall submit the final paleo report to the CPM for review, comment, and written approval.

Protocol: The final report shall include (but not be limited to) the survey report(s), methodology, and recommendations; locality records and maps; description and inventory list of recovered fossil materials; determinations of sensitivity and significance; summary of data recovery and other mitigation activities; results and findings of any special analyses conducted on recovered paleontologic resource materials and data; research questions answered or raised by the data from the project; and the name and location of the public institution receiving the recovered paleontologic resources for curation.

Verification: The Final Paleontologic Resources Report shall be prepared by the designated paleontologic resources specialist for the project, within 90 days following completion of the analysis of the recovered fossil materials and preparation of text and related information, such as maps, diagrams, tables, charts, photos, etc. The project owner shall submit a copy of the Final Paleontologic Resources Report to the CPM for review and written approval.

PAL-13 The project owner, through the designated paleontologic resources specialist, shall submit an original, or an original-quality, copy of the CPM-approved Final Paleontologic Resources Report to the public institution receiving the recovered data and materials for curation, to the state Museum of Paleontology at UC Berkeley, and appropriate regional information center(s). A legible copy of the final report shall be filed with the CPM, with a request for confidentiality, if needed to protect any sensitive resources or localities.

Protocol: The report copy sent to the entities identified above shall include the following (as applicable to the project findings set forth in the final report): clean and reproducible original copies of all text; originals of any topographic maps showing site and resource locations, boundaries of any underlying rock units and stratigraphy; original or clear copies of drawings of significant paleontologic resource materials found during pre-construction surveys, during project-related monitoring, data recovery, and mitigation; and photographs (including a set of negatives, if possible) of the locality(ies) and the various paleontologic resource materials recovered during project monitoring and mitigation and subjected to post-recovery analysis and evaluation.

Verification: The project owner shall maintain in its compliance files, copies of all documentation related to the filing of the original materials and the CPM-approved Final Paleontologic Resources Report with the public institution receiving the recovered data and materials for curation, the state Museum of Paleontology at UC Berkeley, and the appropriate paleontologic information repository(ies). If no significant paleontologic resources were recorded or recovered, then the CPM-approved Preliminary Paleontologic Resources Report serves as the final report and is filed with these same entities.

PAL-14 Following the filing of the CPM-approved Final Paleontologic Resource Report with the appropriate entities, the project owner shall deliver for curation all paleontologic resource materials and data collected during data recovery and mitigation for the project. The materials shall be delivered for curation into a public repository which meets Society for Vertebrate Paleontology (SVP) requirements for the curation of paleontologic resources.

Verification: All paleontologic resource materials shall be delivered for curation within thirty (30) days following the filing of the CPM-approved Final Paleontologic Resource Report. The project owner shall maintain in its project history or compliance files, copies of signed contracts or agreements with the museum(s), university(ies), or other appropriate public repository(ies) by which the project owner has provided for delivery for curation of all the paleontologic resource materials collected during data recovery and site mitigation for the project.

REFERENCES

HDPP (High Desert Power Project, LLC) 1997a. Application for Certification, High Desert Power Project (97-AFC-1). Submitted to the California Energy Commission, June 30, 1997.

HDPP (High Desert Power Project, LLC) 1997b. Revised Application for Certification, High Desert Power Project (97-AFC-1). Submitted to the California Energy Commission, November 17, 1997.

HDPP (High Desert Power Project, LLC) 1997c. Applicant's Response to Staff Data Requests of December 17, 1997 and High Desert Power Project LLC Request for Procedural Ruling. Submitted to the California Energy Commission, January 6, 1998.

HDPP (High Desert Power Project, LLC) 1998b. Data request responses for most of the 77 data requests and 11 discussion topics filed by the Commission staff on December 15, 1997. Submitted to the California Energy Commission, January 16, 1998.

Petty, Grissold E. 1978. Memorandum from the Associate Director of the US Bureau of Land Management, outlining the significance criteria for paleontologic resources.

Repenning, C. A. (Petty). 1980. Paleontologic Resource Evaluation, Naval Petroleum Reserve No. 1 (Elk Hills); prepared by Repenning at the US Geological Survey, Branch of Paleontology and Stratigraphy in Menlo Park; prepared for the Naval Facilities Engineering Command, San Bruno, California; 1980.

Society for Vertebrate Paleontology (SVP). 1995. Revised Draft Guidelines for Mitigation of Potential Impacts to Paleontologic Resources. October 1995.

Society of Vertebrate Paleontology (SVP). 1996. Measures for Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Procedures (Final). News Bulletin, Number 163; January 1996.

FACILITY DESIGN

Testimony of Steve Baker, Kisabuli, Bob Brand and Al McCuen

INTRODUCTION

The purpose of the Facility Design analysis is to verify that applicable laws, ordinances, regulations and standards (LORS) have been identified and that the project and ancillary facilities have been described in sufficient detail, including design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable LORS.

This analysis also examines whether special design features should be considered during final design to deal with conditions unique to the site which could influence public health and safety, environmental protection or the operational reliability of the project. This analysis further establishes conditions of certification to ensure that a design review and construction inspection process will be employed that carries out the intent of the LORS and any special design requirements.

FINDINGS REQUIRED

The Warren Alquist Act requires the commission to "prepare a written decision . . . which includes . . . (a) Specific provisions relating to the manner in which the proposed facility is to be designed, sited, and operated in order to protect environmental quality and assure public health and safety [and] (d)(1) Findings regarding the conformity of the proposed site and related facilities . . . with public safety standards . . . and with other relevant local, regional, state and federal standards, ordinances, or laws. . . (Pub. Resources Code, §25523).

SUBJECTS DISCUSSED

Subjects covered in this analysis include:

- identification of the LORS applicable to facility design;
- evaluation of the applicant's proposed design criteria, including the identification of those which are essential to ensuring protection of the environment and/or public health and safety;
- proposed modifications and additions to comply with applicable LORS; and
- conditions of certification (COCs) proposed by staff to ensure that the project will be designed and constructed to comply with all applicable LORS, and protect environmental quality and assure public health and safety.

SETTING

The High Desert Power Project (HDPP) will be located on a 25-acre site in a portion of Section 24, Township 6 North, Range 5 West, San Bernardino Base and

Meridian on the site of the Southern California International Airport (SCIA), formerly George Air Force Base, within the northwest corner of the city of Victorville. The project site is located in seismic zone, as delineated on Figure 16-2 of the 1998 California Building Code (CBC).

The applicant has identified two alternative natural gas-fired design configurations for the HDPP: a combined cycle design consisting of three combustion turbine generators (CTGs), three steam turbine generators (STGs), and three heat recovery steam generators (HRSGs) with a combined rating of 720 MW; and a combined cycle design consisting of two CTGs, two HRSGs and two STGs with a combined rating of 678 MW.

In addition to the major components described above, each project will incorporate exhaust stacks and step-up transformers, cooling towers, separate water and wastewater treatment facilities, selective catalytic reduction (SCR), and aqueous ammonia storage and handling equipment.

The applicant proposes to start construction in 1999. Project construction will take approximately 18 months for either of the combined cycle configurations.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable LORS proposed by the applicant are contained in the AFC, in Section 7 and Appendices C through H (HDDP 1997b).

ANALYSIS

The basis of this analysis is the applicant's proposed analysis methods, construction methods, a list of LORS, and design criteria, set forth in the AFC. Applicable engineering sections include:

Section 1.1 Project Location and site description
Section 1.3 Project construction and operation
Section 3 Project and facility description
Section 4 Proposed facility design
Section 5.2 Geology and Soils
Appendices

- Appendix C Civil Engineering Design Criteria
- Appendix D Structural Engineering Design Criteria
- Appendix E Mechanical Engineering Design Criteria
- Appendix F Electrical Engineering Design Criteria
- Appendix G Control Systems Engineering Design Criteria
- Appendix H Chemical Engineering Design Criteria

Responses to Staff’s Data Requests 32A and 32B (HDPP 1998g).

Some sections of the AFC are summarized below for completeness. For the sake of brevity, the detailed analysis and project design criteria have not been repeated here. Please see the applicable sections of the AFC for additional information.

SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage, and site access. Staff has assessed the criteria for designing and constructing linear support facilities such as a natural gas line and electric transmission line. The applicant proposes to use accepted industry standards (see AFC Appendix C for a list of the applicable industry standards), design practices, and construction methods in preparing and developing the site. Staff concludes that following the industry standard practices will allow the project to comply with the applicable site preparation and development LORS, and proposes conditions of certification (below) to ensure compliance.

MAJOR STRUCTURES, SYSTEMS AND EQUIPMENT

Staff defines major structures, systems and equipment as those structures and associated components or equipment that are necessary for power production and are costly to repair or replace; or that require a long lead time to repair or replace; or those used for the storage, containment, or handling of hazardous or toxic materials. Major structures and equipment are listed in the conditions of certification (below).

The AFC contains a list of the civil, structural, mechanical and electrical design criteria applicable to the project. If the applicant employs these criteria in designing power plant structures, systems, equipment, equipment supports and anchorage, then the project will likely comply with the applicable LORS. Staff believes that these LORS are essential to ensuring that the project is designed in a manner, which protects the environment and public health and safety.

Design Criteria for Major Structures

The AFC (HDPP 1997b, AFC § 7.0 and Appendices C and D) identifies applicable LORS, which include the 1994 Uniform Building Code (UBC). The applicant has not firmly committed to a construction start date for the HDPP. Actual design and construction of the project could begin immediately after certification, or could be delayed for a number of years thereafter (HDPP 1997b, AFC § 1.3.1).

The project should be designed and constructed to the latest edition of the CBC (and other applicable codes and standards) in effect at the time design and construction of the project actually commence. It is expected that the HDDP will be designed to the 1998 CBC. In the event the design of the HDDP is submitted to the Chief Building Official (CBO)[16] for review when the successor to the 1998 CBC is in effect, the 1998 CBC provisions identified herein shall be replaced with the applicable successor provisions.

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

Staff concludes that the HDDP will, in fact, be designed and constructed to the applicable facility design LORS. In order to provide assurance that this will occur as intended, staff proposes a condition of certification (GEN 1, below) to monitor compliance.

Dynamic Analysis

Structures, major equipment and large components of the facility can be structurally analyzed either statically or dynamically. While static analysis is often preferable due to its relative simplicity and cost effectiveness, it relies upon certain assumptions of regularity regarding the structural makeup of the item being analyzed. If the structure is regular, and not critical to safety or reliable plant operation, then static analysis may be adequate. If the structure is irregular, as are many power plant structures and components, or if the structure's integrity is critical to safety or reliable operation, then dynamic analysis may be in order.

Dynamic analysis is required to satisfy Section 1629.5 and Tables 16-L and 16-M (Configuration Requirements) of the 1998 CBC. The provisions of Sections 1629.8, 1629.9 and 1631 of the CBC should be used as a guide for design. Because of structural irregularity, the following major structures, equipment and components will be subjected to dynamic analysis requirements of the 1998 CBC: Combustion turbine generator (CTG) pedestal and foundation, steam turbine generator (STG) pedestal and foundation, heat recovery steam generator (HRSG) structure and foundation, exhaust stack and foundation, and cooling tower. The ground motion producing lateral response and design seismic forces may be assumed to act nonconcurently in the direction of each principal axis of the structure.

Other structures and components may also be candidates for dynamic analysis; see the list of major structures and equipment included in Proposed Condition of Certification GEN-2 below. In order to ensure that those structures, components and pieces of equipment requiring dynamic analysis to comply with the code actually undergo such analysis, staff proposes that the applicant and staff agree to a list of such items before design progresses. This requirement is incorporated in Proposed Condition of Certification STRUC-1 below.

Special Design Features

The design of nonbuilding structures shall use the load combination or factors specified in the 1998 CBC, Section 1612.2 or 1612.3. For nonbuilding structures designed using Section 1634.3, 1634.4 or 1634.5, the Reliability/Redundancy Factor, *p,* shall be taken as 1.0. The fundamental period of the structure shall be determined by rational methods such as by using method B in Section 1630.2.2 of the 1998 CBC. As applicable, design strengths and other detailed design criteria shall be obtained from appropriate sections of the 1998 CBC or their referenced standards.

MECHANICAL SYSTEMS

Mechanical features of the three-train combined cycle configuration include: three combined cycle generating units, each consisting of a gas turbine generator burning natural gas in dry low NOx combustors; a heat recovery steam generator (HRSG) equipped with a duct burner, burning natural gas; a steam turbine generator, condenser and cooling water system; a wet cooling tower; a turbine inlet air evaporative cooling system; water and wastewater treatment equipment; pressure vessels, piping systems and pumps; aqueous ammonia storage, handling and piping system; air compressors; fire protection systems; and heating, ventilating, air conditioning (HVAC), potable water, plumbing and sanitary sewage systems.

Mechanical features of the two-train combined cycle configuration are similar to the three-train project.

LORS and Mechanical Design Criteria

The application (HDPP 1997b, AFC Appendix E) lists and describes the mechanical codes, standards and design criteria that will be employed in project design documents, procurement specifications and contracts. Design work will be performed in accordance with the appropriate LORS. This list indicates that the applicant is aware of the codes, standards, and design criteria appropriate for such a project. Staff has proposed conditions of certification (below) to ensure compliance. This approach will assure the project's mechanical systems are designed to the appropriate codes and standards.

ELECTRICAL SYSTEMS

Major electrical features of the project include the generators, 13.8 kV system, 4160 volt switchgear, motors, 480 volt system, 230 kilovolt (kV) switchyard? (Uncertain -- will know more when SCE completes its studies, after the PSA, but before the FSA is published), protective relaying, cable trays and grounding system.

- <u>230 kV Substation</u>. The 230 kV substation will include switchyard protective relaying, metering and control panels, and capacitive coupling potential transformers. Synchronous relays will be added to all 230 kV breakers. The breaker configuration is uncertain at this time.

- <u>4,000-Volt Squirrel Cage Induction Motors</u>. Design and construction of 4,000-volt motors will be coordinated with the driven equipment requirements. All 4,000-volt motors will be totally enclosed fan cooled or built to National Electric Manufacturers Association (NEMA) WPII standards.

- <u>460-Volt Integral Motors</u>. Design and construction of each 460-volt integral motor will be coordinated with the driven equipment and the requirement of NEMA MG1 Standards.

- <u>Direct Current Machines</u>. All direct current machines will be designed and constructed for continuous operation and in accordance with the requirement of NEMA MG1.

- <u>Protective Relaying</u>. These relays will be designed to protect equipment in the auxiliary power supply system, generator terminal systems, 230 kV system, turbine-generator system, and the electrical loads powered from these systems.

- Grounding. The station grounding system will be an interconnected network of bare copper conductors and copper clad ground rods. The system will protect plant personnel and equipment from the hazards, which can occur during power system faults and lighting strikes. The station grounding grid will be designed to dissipate heat from ground current under the most severe conditions in areas of high ground fault current concentrations, with grid spacing such that safe voltage gradients are maintained.

- Cable Trays, Raceways and Conduits. The design and specifications for the cable trays, raceways and conduit systems used in supporting and protecting electrical cables will be in accordance with the provisions of the National Electric Code (NEC) and NEMA standards.

- Cathodic Protection System. During the detailed design phase of the project, the project owner will make a determination for the need for cathodic protection and other corrosion control measures for all plant structures, including the exterior surface of underground piping and bottoms of surface mounted steel tanks.

LORS and Electrical Design Criteria

The Application (HDPP 1997b, AFC Appendix F) lists and describes the electrical codes, standards and design criteria that will be employed in project design documents, procurement specifications and contracts. Design work will be performed in accordance with the appropriate LORS. This list indicates that the applicant is aware of the codes, standards, and design criteria appropriate for such a project. This approach will likely assure the project's electrical systems are designed to the appropriate codes and standards.

Staff concludes that the applicant will design the electrical systems in accordance with all LORS and in a manner which protects the environment and public health and safety by complying with the applicable LORS, the electrical design criteria (HDPP 1997b, AFC Appendix F), and the proposed conditions of certification.

LINEAR FACILITIES

Gas Pipeline Route and Affected Environment

The proposed 30-inch, 32-mile, high-pressure natural gas pipeline will be located completely within previously developed utility and transportation corridors.

From the HDDP project site, the pipeline would proceed north along Perimeter and Helendale roads to Colusa Road. It would then travel west along the south side of Colusa Road, crossing Highway 395 and proceed north along the west side of Highway 395. The pipeline would then tap into the Kern River and Pacific Gas and Electric pipeline approximately one quarter-mile south of Highway 58 and approximately one mile east of the intersection of Highways 395 and 58 (Kramer Junction). From the HDPP project site to the intersection of Helendale Road and Colusa Road, the proposed pipeline parallels the HDPP proposed water pipeline.

Seismicity and Faulting: The pipeline corridor is not within any Alquist-Priolo Hazard Act Special Studies Zones; these zones represent areas around faults classified by the State of California as active. The Mojave segment of the San Andreas Fault is the closet major fault and is about 22 miles southwest of the pipeline terminus on the HDPP project site.

Engineering: The new gas pipeline will consist of a welded steel pipe with an outside diameter of 30 inches. The pipeline will have a design pressure of 720 pounds per square inch gauge (psig), and the specified minimum yield of 42,000 psi. The gas pipeline will be owned by Southwest Gas Company and will be designed, constructed, operated, and maintained in accordance with the CPUC General Order (GO) 112, and the U. S. Department of Transportation (DOT) Minimum Federal Safety Standards specified in 49 CFR Part 192. Adherence to these standards will minimize potential hazards to the public from failure of the project components and will assure a high level of system reliability [Cal. Code Regs., Tit. 14 §1706 App B (i)]. Maintenance procedures will include on-ground leak detection surveys in accordance with GO 112 and 49 CFR 192.706. Cathodic protection will be installed along the pipeline to prevent or minimize corrosion of the pipeline.

Water Pipeline Route

Potable water will be provided by the Victor Valley Water District and will enter at the southeast corner of the site. Cooling water for either of the combined cycle configurations will be provided from one of two alternative sources: imported water from the State Water Project, and as a backup, ground water from existing or future wells to be drilled in the area. The project will not discharge wastewater. Instead the wastewater will be treated by a crystallization process in which distilled water will be produced and precipitated solids will be disposed of in a landfill.

Transmission Line Route

A new 7.2 mile 230 kV overhead electric transmission line will be built to interconnect the project to the Southern California Edison Company’s electrical transmission system at the Victor Substation. A new electric 230 kV switchyard will be constructed on the eastern end of the project site.

GEOLOGY

Staff evaluated the applicant's AFC geologic hazards discussions (HDPP 1997, AFC § 5.2) of the power plant site and linear corridors. Geologic phenomena that staff assessed for the project area include seismic shaking, ground rupture due to surface faulting, liquefaction, hydroconsolidation, subsidence, landsliding and design limitations due to subsurface mineral deposits. Soil erosion potential is described in the Soil and Water Resources section of the staff analysis.

The site is underlain by younger and older alluvial deposits consisting of stratified, massive and lenticular sand with lesser amounts of silt and clayey materials. These unconsolidated to weakly consolidated sediments are derived mainly from the San Gabriel and San Bernardino Mountains to the South of the site.

No known mineral resource deposits are located beneath the site and due to the nearly flat topography of the site, no landslide potential exists. Although the site is in the seismically active southern California region, no known or potentially active faults cross the site. The site is not in an Alquist-Priolo Special Studies Zone. Area subsidence is usually caused by water or oil extraction from wells in an area. No subsidence has been recorded in the area.

Seismic Shaking

The site is located in CBC Zone 4, the zone of greatest potential shaking. The project will be designed to the Zone 4 requirements or greater.

Liquefaction

Liquefaction of soils is a condition in which seismic shaking of relatively loose, cohesionless soils, with the water table less than about 50 feet from the surface, can result in loss of shear strength and near-surface ground failure with subsequent loss of foundation bearing strength and/or differential settlement. The water table in the site area is reportedly more than 100 to 150 feet below the surface; therefore, liquefaction potential would be absent.

Hydroconsolidation

Hydroconsolidation is the process by which certain earth materials decrease in volume upon the addition of water. Some of the soils at the power plant site and along the linear facilities may have the potential to consolidate due to the addition of water. A geotechnical study will be conducted during the design phase of this project, in which these areas will be identified and mitigated by excavation and replacement of such soils. As conditions of certification, a California Certified Engineering Geologist will be employed to prepare the CBC-required Engineering Geology Reports and will monitor construction to minimize the potential hazard of hydroconsolidation.

QA/QC PROCEDURES

The AFC describes a quality assurance and quality control (QA/QC) system, which conforms to typical industry practices. A quality assurance program will be followed which entails proper review and documentation of design work. Materials, equipment and services will be procured and inspected under approved quality control programs, using approved guidelines and following the appropriate codes and standards. Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this QA/QC program will likely ensure that the project is designed, procured, fabricated and installed in accordance with LORS.

COMPLIANCE MONITORING

Staff has developed conditions of certification (see section below titled "Proposed Conditions of Certification") to ensure that the design measures and LORS requirements are carried out in a manner that results in the protection of the environment and of public health and safety.

- These facility design conditions address the roles, responsibilities and qualifications of engineers responsible for the design and construction of the project. 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 Chief Building Official (CBO)[17]. These conditions require that no element of construction proceed without approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

FACILITY CLOSURE

Permanent Closure

The removal of the facility from service, or decommissioning, may range from "mothballing" to removal of all equipment and appurtenant facilities, depending on conditions at the time. Future conditions that may affect the decommissioning decision are largely unknown at this time. The applicant should provide the details of a permanent closure plan to San Bernardino County, the City of Victorville and the Energy Commission in the future, when the appropriate information will be available and the timing for the decommissioning will be more certain. Staff has proposed conditions of certification (GEN-9) to ensure compliance.

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, the applicant shall submit a decommissioning plan to the Energy Commission, San Bernardino County and the City of Victorville for review and approval prior to commencement of the decommissioning. The plan shall include the following:

- Discussion of the proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project.

- Discussion of all applicable LORS, all local/regional plans, and a discussion of the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans.

- Discussion of the activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities.

- A discussion of decommissioning alternatives, other than complete restoration.

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

CONCLUSIONS

- The laws, ordinances, regulations, and standards (LORS) which are identified in the Application for Certification (AFC) and supporting documents, and included herein, are those applicable to the project;

- Staff has evaluated the AFC, and the project LORS and design criteria in the record. Staff concludes that the design and construction of the project will comply with applicable LORS. If properly implemented, design criteria, including staff proposed modifications, will ensure that LORS are met during the project design and construction; and

- The conditions of certification proposed below will ensure that the proposed facilities are designed, constructed and operated in accordance with applicable LORS. This will occur through the use of design review, plan checking and field inspections, which are to be performed by the local CBO or other commission delegate agent. Staff will audit the CBO or delegate agent to ensure satisfactory performance.

RECOMMENDATIONS

If the commission certifies the project, staff recommends that:

- the project be designed and built to the most recently adopted edition of all applicable LORS in effect at the time that project design and procurement commences, including the 1998 CBC or later adopted edition or its successor standard;

- the conditions of certification proposed herein be adopted to ensure that the project is designed and constructed to protect environmental quality, assure public health and safety, and comply with applicable LORS; and

- the CBO review the final designs, conduct plan checking and perform field inspections during construction; and staff audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct and inspect the project in accordance with the California Building Code (CBC)[18] and all other applicable LORS in effect at the time initial design plans are submitted to the CBO for review and approval. The CBC in effect is that edition that has been adopted by the California Building Standards Commission, and published at least 180 days previously.

[18] All the Sections, Chapters, Appendices and Tables, unless otherwise stated, refer to Sections, Chapters, Appendices and Tables of the 1998 California Building Code (CBC).

In the event that the HDDP is designed to a successor edition to the 1998 CBC, the 1998 CBC provisions identified herein shall be replaced with the applicable successor provisions. <u>Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern.</u> Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

<u>Verification:</u> Within 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) after receipt of the Certificate of Occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation and inspection requirements of the applicable LORS and the Commission's Decision have been met for facility design. The project owner shall provide the CPM a copy of the Certificate of Occupancy within 30 days of receipt from the CBO [1998 CBC, Section 109 – Certificate of Occupancy.]

GEN-2 The project owner shall furnish to the California Energy Commission Compliance Project Manager (CPM) and to the CBO a schedule of facility design submittals, a Master Drawing List, and a Master Specifications List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major structures and equipment below). To facilitate audits by commission staff, the project owner shall provide designated packages to the CPM when requested.

<u>Major Structures</u>

Combustion Turbine Generator (CTG) Pedestal and Foundation
Steam Turbine Generator (STG) Pedestal and Foundation
CTG Enclosure Structure
STG Enclosure Structure
Inlet Air Filtration Equipment and Inlet Air Duct Support Structures
Heat Recovery Steam Generator (HRSG) Structure and Foundation
Exhaust Stack and Foundation
Field-Fabricated Tanks and Foundations
Shop-Fabricated Tanks and Foundations
Condenser Support Structure and Foundations
Natural Gas Compressor Structures and Foundations
Equipment Foundations (compressors, pumps, transformers)
Cooling Tower

<u>Major Equipment</u>

CTG
STG
HRSG including the Selective Catalytic Reduction (SCR) System
CTG Inlet Air Filter Structure
Shop-Fabricated Pressure Vessels
STG Condenser

Plume Abated Cooling Tower
Natural Gas Compressor
Main Step-up Transformers
Boiler Feed Pumps
Condensate Pumps

Verification: At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The project owner shall provide schedule updates in the Monthly Compliance Report.

GEN-3 The project owner shall make payments to the CBO for design review, plan check and construction inspection, equivalent to the fees listed in the 1998 CBC, Chapter 1, Section 107 and Table 1-A – Building Permit Fees; Appendix Chapter 33, Section 3310 and Table A-33-A – Grading Plan Review Fees, and Table A-33-B – Grading Permit Fees. If the City of Victorville or San Bernardino County has adjusted the CBC fees for design review, plan check and construction inspection, the project owner shall pay the adjusted fees.

Verification: The project owner shall make the required payments to the CBO at the time of submittal of the plans, design calculations, specifications, or soil reports. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next Monthly Compliance Report indicating that the applicable fee has been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California registered architect, structural engineer or civil engineer, as a resident engineer (RE), to be in general responsible charge of the project. [Building Standards Administrative Code (Cal. Code of Regs., Tit. 24, § 4-209 – Designation of Responsibilities).

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project respectively. A project may be divided into parts, provided each part is clearly defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part.

Protocol: The RE shall:

1. monitor construction progress to ensure compliance with LORS;
2. ensure that construction of all the facilities, conforms in every material respect, to the applicable LORS, approved plans, and specifications;

3. prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;

4. be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) of stamped drawings, plans, specifications and any other required documents;

5. be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and

6. be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests as not conforming to the approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work if the work does not conform to applicable requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the name, qualifications and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) are subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer who is either a structural engineer or a civil engineer who is fully competent and proficient in the design of power plant structures and equipment Supports; D) a mechanical engineer; and E) an electrical engineer. [California Business and Professions Code Section 6704 et seq., and Section 6730 and 6736. Requires state registration to practice as a civil engineer or structural engineer in California.]

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g. proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project. [1998 CBC, Section 104.2 – Powers and Duties of Building Official.]

If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Protocol: A: The civil engineer shall:

1. design (or be responsible for design), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads, and sanitary sewer systems; and

2. provide consultation to the RE during the construction phase of the project, and recommend changes in the design of the civil works facilities and changes in the construction procedures.

Protocol: B: The geotechnical engineer or civil engineer experienced and knowledgeable in the practice of soils engineering:

1. review all the engineering geology reports, and prepare final soils grading report;

2. prepare the soils engineering reports required by the 1998 CBC, Appendix Chapter 33, Section 3309.5 – Soils Engineering Report, and Section 3309.6 – Engineering Geology Report;

3. be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 1998 CBC, Appendix Chapter 33, Section 3317 – Grading Inspections;

4. recommend field changes to the civil engineer and RE;

5. review the geotechnical report, field exploration report, laboratory tests, and engineering analyses detailing the nature and extent of the site soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load; and

6. prepare reports on foundation investigation to comply with the 1998 CBC, Chapter 18, Section 1804 – Foundation Investigations.

This engineer shall be authorized to halt earthwork and to require changes; if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations. [1998 CBC, Section 104.2.4 – Stop orders.]

Protocol: C: The design engineer shall:

1. be directly responsible for the design of the proposed structures and equipment supports;

2. provide consultation to the RE during design and construction of the project;

3. monitor construction progress to ensure compliance with LORS;

4. evaluate and recommend necessary changes in design; and

5. prepare and sign all major building plans, specifications and calculations.

Protocol: D: The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO stating that the proposed final design plans, specifications, and calculations conform with all of the mechanical engineering design requirements set forth in the Energy Commission Decision.

Protocol: E: The electrical engineer shall:

1. be responsible for the electrical design of the project; and

2. sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 1998 CBC, Chapter 17, Section 1701 – Special Inspections and Section – 1701.5 Type of Work (requiring special inspection), Section 106.3.5 – Inspection and observation program.

Protocol: The Special Inspector shall:

1. be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;

2. observe the work assigned for conformance with the approved design drawings and specifications;

3. furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM; and,

4. submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable provisions of the applicable edition of the CBC.

A certified weld inspector [certified American Welding Society (AWS) and/or American Society of Mechanical Engineers (ASME) as applicable] shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

Verification: At least 15 days prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next Monthly Compliance Report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 The project owner shall keep the CBO informed regarding the status of construction. If any discrepancy between design and construction is discovered during construction, the project owner shall prepare and submit a non-conformance report (NCR) describing the nature of the discrepancy to the CBO. The NCRs shall reference this condition of certification, and applicable sections of the applicable edition of the CBC.

Verification: The project owner shall submit monthly construction progress reports to the CBO and CPM. The project owner shall transmit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. When the work and the "as-built" and "as graded" plans conform to the approved final plans, the project owner shall notify the CPM regarding the CBO's final approval. The marked up "as-built" drawings for the construction of structural and architectural work shall be submitted to the CBO. Changes approved by the CBO shall be identified on the "as-built" drawings. [1998 CBC, Section 108 – Inspections.]

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans.

GEN-9 The project owner shall file a closure/decommissioning plan with the City of Victorville, San Bernardino County and the CPM for review and approval at least 12 months (or other mutually agreed to time) prior to commencing the closure activities.

Protocol: The closure plan shall include a discussion of the following:

1. the proposed closure/decommissioning activities for the project and all appurtenant facilities constructed as part of the project;

2. all applicable LORS, all local/regional plans, and a discussion of the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;

3. activities necessary to restore the site if the decommissioning plan requires removal of all equipment and appurtenant facilities; and

4. closure/decommissioning alternatives, other than complete restoration of the site.

Verification: At least 12 months prior to closure or decommissioning activities, the project owner shall file a copy of the closure/decommissioning plan with the City of Victorville, San Bernardino County and the CPM for review and approval. Prior to the submittal of the closure plan, a meeting shall be held between the project owner and the CPM for discussing the specific contents of the plan.

GEO-1 Prior to the start of construction, the project owner shall assign to the project an engineering geologist(s), certified by the State of California, to carry out the duties required by the 1998 CBC, Appendix Chapter 33, Section 3309.4. The certified engineering geologist(s) assigned must be approved by the CPM (the functions of the engineering geologist can be performed by the responsible geotechnical engineer, if that person has the appropriate California license).

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction, the project owner shall submit to the CBO for approval, the name(s) and license number(s) of the certified engineering geologist(s) assigned to the project. The submittal should include a statement that CBO approval is needed. The CBO will approve or disapprove of the engineering geologist(s) and will notify the project owner and CPM of its findings within 15 days of receipt of the submittal.

If the engineering geologist(s) is subsequently replaced, the project owner shall submit for approval the name(s) and license number(s) of the newly assigned individual to the CBO and CPM. The CBO will approve or disapprove of the engineering geologist(s) and will notify the project owner and the CPM of the findings within 15 days of receipt of the notice of personnel change.

GEO-2 The assigned engineering geologist shall carry out the duties required by the 1998 CBC, Appendix Chapter 33, Section 3309.4 – Engineered Grading Requirement, and Section 3318.1 – Final Reports. Those duties are:

1. Prepare the <u>Engineering Geology Report.</u> This report shall accompany the Plans and Specifications when applying to the CBO for the grading permit.

2. Monitor geologic conditions during construction.

3. Prepare the Final Geologic Report.

Protocol: The Engineering Geology Report required by the 1998 CBC, Appendix Chapter 33, Section 3309.3 Grading Designation, and shall include an adequate description of the geology of the site, conclusions and recommendations regarding the effect of geologic conditions on the proposed development, and an opinion on the adequacy, for the intended use, of the site as affected by geologic factors.

The Final Geologic Report to be completed after completion of grading, as required by the 1998 CBC, Appendix Chapter 33, Section 3318.1, and shall contain the following: A final description of the geology of the site and any new information disclosed during the grading and the effect of same on recommendations incorporated in the approved grading plan. Engineering geologists shall submit a statement that, to the best of their knowledge, the work within their area of responsibility is in accordance with the approved Engineering Geology Report and applicable provisions of this chapter.

Verification: (1) Within 15 days after submittal of the application(s) for grading permit(s) to the CBO, the project owner shall submit a signed statement to the CPM stating that the Engineering Geology Report has been submitted to the CBO as a supplement to the plans and specifications and that the recommendations contained in the report are incorporated into the plans and specifications. (2) Within 90 days following completion of the final grading, the project owner shall submit copies of the Final Geologic Report required by the 1998 CBC, Appendix Chapter 33, Section 3318 Completion of Work, to the CPM and the CBO.

CIVIL-1 Prior to the start of site grading, the project owner shall submit to the CBO for review and approval the following:

1. design of the proposed drainage structures and the grading plan;
2. an erosion and sedimentation control plan;
3. related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. soils report as required by the 1998 CBC, Appendix Chapter 33, Section 3309.5 – Soils Engineering Report and Section 3309.6 – Engineering Geology Report.

Verification: At least 15 days prior to the start of site grading, the project owner shall submit the documents described above to the CBO for review and approval. In the next Monthly Compliance Report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible geotechnical engineer or civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area. [1998 CBC, Section 104.2.4 – Stop orders.]

Verification: The project owner shall notify the CPM, within five days, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within five days of the CBO's approval, the project owner shall provide to the CPM a copy of the CBO's approval to resume earthwork and construction in the affected areas.

CIVIL-3 The project owner shall perform inspections in accordance with the 1998 CBC, Section 108 – Inspections, Chapter 17, Section 1701.6 – Continuous and periodic special inspection and Appendix Chapter 33, Section 3317 – Grading inspection. All plant site-grading operations shall be subject to inspection by the CBO and the CPM.

If, in the course of inspection, it is discovered that the work is not being done in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The project owner shall prepare a written report detailing all discrepancies and non-compliance items, and the proposed corrective action, and send copies to the CBO and the CPM.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a non-conformance report (NCR), and the proposed corrective action. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs for the reporting month shall also be included in the following Monthly Compliance Report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage facilities, the project owner shall obtain the CBO's approval of the final "as-graded" grading plans, and final "as-built" plans for the erosion and sedimentation control facilities. [1998 CBC, Section 109 – Certificate of Occupancy.]

Verification: Within 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) of the completion of the erosion and sediment control mitigation and drainage facilities, the project owner shall submit to the CBO the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes. The project owner shall submit a copy of this report to the CPM in the next Monthly Compliance Report.

STRUC-1 Prior to the start of any increment of construction, the project owner shall submit to the CBO for review and approval the applicable designs, plans and drawings, and a list of those project structures, components and major equipment items that will undergo dynamic structural analysis. Designs, plans and drawings shall be those for:

1. major project structures;
2. major foundations, equipment supports and anchorage;
3. large field fabricated tanks;
4. turbine/generator pedestal; and
5. switchyard structures.

<u>Protocol:</u> The project owner shall:

1. obtain agreement with the CBO on the list of those structures, components and major equipment items to undergo dynamic structural analysis;

2. meet the pile design requirements of the 1998 CBC. Specifically, Section 1807 – General Requirements, Section 1808 – Specific Pile Requirements, and Section 1809 – Foundation Construction (in seismic zones 3 and 4);

3. obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (i.e., highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications, [1998 CBC, Section 108.4 – Approval Required];

4. submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures at least 90 days prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation, [1998 CBC, Section 106.4.2 – Retention of plans and Section 106.3.2 – Submittal documents.]; and

5. ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations and

specifications shall be signed and stamped by the responsible design engineer. [1998 CBC, Section 106.3.4 – Architect or engineer of record.]

<u>Verification:</u> At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of any increment of construction, the project owner shall submit to the CBO, with a copy to the CPM, the responsible design engineer's signed statement that the final design plans, specifications and calculations conform with all of the requirements set forth in the Commission's Decision.

If the CBO discovers non-conformance with the stated requirements, the project owner shall resubmit the corrected plans to the CBO within 20 days of receipt of the nonconforming submittal, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and are in conformance with the requirements set forth in the applicable LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following:

1. concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. concrete pour sign-off sheets;

3. bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number [ref: AWS]; and

5. reports covering other structure activities requiring special inspections shall be in accordance with the 1998 CBC, Chapter 17, Section 1701 – Special Inspections, Section 1701.5 – Type of Work (requiring special inspection), Section 1702 – Structural Observation and Section 1703 – Nondestructive Testing.

<u>Verification:</u> If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the condition(s) of certification and applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 1998 CBC, Chapter 1, Section 106.3.2 – Submittal documents, and Section 106.3.3 – Information on plans and specifications, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the Monthly Compliance Report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in Chapter 3, Table 3-E of the 1998 California Building Code (CBC) shall, at a minimum, be designed to comply with Occupancy Category 2 of the 1998 CBC. Chapter 16, Table 16–K of the 1998 CBC requires use of the following seismic design criteria: I = 1.25, I_p=1.5 and I_W=1.15.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of installation of the tanks or vessels containing the above specified quantities of highly toxic or explosive substances that would be hazardous to the safety of the general public if released, the project owner shall submit to the CBO for review and approval, final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following Monthly Compliance Report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-1 Prior to the start of any increment of piping construction, the project owner shall submit, for CBO review and approval, the proposed final design drawings, specifications and calculations for each plant piping system (exclude: domestic water, refrigeration systems, and small bore piping, i.e., piping and tubing with a diameter equal to or less than two and one-half inches). The submittal shall also include the applicable QA/QC procedures. The project owner shall design and install all piping, other than domestic water, refrigeration, and small bore piping to the applicable edition of the CBC. Upon completion of construction of any piping system, the project owner shall request the CBO's inspection approval of said construction. [1998 CBC, Section 106.3.2 – Submittal documents, Section 108.3 – Inspection Requests.]

Protocol: The responsible mechanical engineer shall submit a signed and stamped statement to the CBO when:

1. the proposed final design plans, specifications, and calculations conform with all of the piping requirements set forth in the Commission Decision; and

2. all of the other piping systems, except domestic water, refrigeration systems, and small bore piping, have been designed, fabricated, and installed in accordance with all applicable ordinances, regulations, laws and industry standards, including, as applicable:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code); and
- Specific City/County code.

The CBO may require the project owner, as necessary, to employ special inspectors to report directly to the CBO to monitor shop fabrication or equipment installation. [1998 CBC, Section 104.2.2 – Deputies.]

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of any increment of piping construction, the project owner shall submit to the CBO for approval, with a copy of the transmittal letter to the CPM, the proposed final design plans, specifications, calculations and quality control procedures for that increment of construction of piping systems, including a copy of the signed and stamped engineer's certification of conformance with the Commission Decision. The project owner shall transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health

Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by the applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of said installation.
[1998 CBC, Section 108.3 – Inspection Requests.]

The project owner shall:

1. ensure that all boilers and fired and unfired pressure vessels are designed, fabricated and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for review and approval, final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall send copies of the CBO plan check approvals to the CPM in the following Monthly Compliance Report. The project owner shall also transmit a copy of the CBO's and/or Cal-OSHA inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-3 Prior to the start of construction of any heating, ventilating, air conditioning (HVAC) or refrigeration system, the project owner shall submit to the CBO for review and approval the design plans, specifications, calculations, and quality control procedures for that system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the applicable edition of the CBC. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of said construction. The final plans, specifications and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings, and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS. [1998 CBC, Section 108.7 Other Inspections; Section 106.3.4 – Architect or engineer of record.]

At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable edition of the CBC, with a copy of the transmittal letter to the CPM.

The project owner shall send copies of CBO comments and approvals to the CPM in the next Monthly Compliance Report. The project owner shall transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-4 Prior to the start of each increment of plumbing construction, the project owner shall submit for CBO's approval the final design plans, specifications, calculations, and QA/QC procedures for all plumbing systems, potable water systems, drainage systems (including sanitary drain and waste), toilet rooms, building energy conservation systems, and temperature control and ventilation systems, including water and sewer connection permits issued by the local agency. Upon completion of any increment of construction, the project owner shall request the CBO's inspection approval of said construction. [1998 CBC, Section 108.3 – Inspection Requests, Section 108.4 – Approval Required.]

Protocol: The project owner shall design, fabricate, and install:

1. plumbing, potable water, all drainage systems, toilet rooms, in accordance with Title 24, California Code of Regulations, Division 5, Part 5, and the California Plumbing Code (or other relevant section(s) of the currently adopted California Plumbing Code and Title 24, California Code of Regulations); and

2. building energy conservation systems and temperature control and ventilation systems in accordance with Title 24, California Code of Regulations, Division 5, Chapter 2-53, Part 2.

The final plans, specifications, and calculations shall clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications, and calculations conform with all of the requirements set forth in the Commission Decision.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction of any of the above systems, the project owner shall submit to the CBO the final design plans, specifications and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable edition of the CBC, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

The project owner shall transmit a copy of the CBO's inspection approvals to the CPM in the next Monthly Compliance Report following completion of that increment of construction.

ELEC-1 For the 13.8 kV and lower systems, the project owner shall not begin any increment of electrical construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. [1998 CBC, Section 108.4 – Approval Required, and Section 108.3 – Inspection Requests.]

Protocol: The following activities shall be reported in the Monthly Compliance Report:

1. receipt or delay of major electrical equipment;
2. testing or energization of major electrical equipment; and
3. the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations, including a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

ELEC-2 The project owner shall submit to the CBO the required number of copies of items A and B for review and approval and one copy of item C: [CBC 1998, Section 106.3.2 – Submittal documents.]

A. Final plant design plans to include:
   1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems;
   2. system grounding drawings;
   3. general arrangement or conduit drawings; and
   4. other plans as required by the CBO.

B. Final plant calculations to establish:
   1. short-circuit ratings of plant equipment;

2. ampacity of feeder cables;
3. voltage drop in feeder cables;
4. system grounding requirements;
5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
6. system grounding requirements;
7. lighting energy calculations; and
8. other reasonable calculations as customarily required by the CBO.

C. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Commission Decision.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of electrical equipment installation, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations, for the items enumerated above, including a copy of the signed and stamped statement from the responsible electrical engineer certifying compliance with the applicable LORS. The project owner shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

REFERENCES

HDPP (High Desert Power Project) 1997b. Revised Application for Certification, High Desert Power Project (97-AFC-1). Submitted to the California Energy Commission, November 17, 1997.

HDPP (High Desert Power Project) 1998g. Response to Data Request #32. Submitted to the California Energy Commission, February 6, 1998.

California Department of Conservation, Division of Mines and Geology, Published by International Conference of Building Officials, Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada [to be used with the 1997 Uniform Building Code], Publication date listed in error as February, 1988. Actual publication date is February 1998.

Jennings, C.W., Fault Activity Map of California and Adjacent Areas, California Department of Conservation, Division of Mines and Geology, 1994.

POWER PLANT RELIABILITY

Testimony of Steve Baker

INTRODUCTION

PURPOSE OF THE ANALYSIS

In this analysis, staff addresses the reliability issues of the High Desert Power Project (HDPP) by determining whether the power plant is likely to be built to typical industry levels of power generation reliability. Such a level of reliability is selected as a benchmark because it would likely not degrade the overall reliability of the electric system it serves.

FINDINGS REQUIRED

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 Energy 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 recommends the Energy Commission make this finding when a project 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.

SCOPE OF THE ANALYSIS

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 levels of power generation reliability. The applicant has predicted a higher level of reliability for the power plant (see below) than that of similar plants.

ANALYSIS

CHANGES DUE TO THE COMPETITIVE ELECTRIC POWER MARKET

In the regulated monopoly electric industry of the past decades, the utility companies assured overall system reliability by, in part, maintaining a “reserve margin.” This amounted to having on call, at all times, sufficient generating capacity, in the form of standby power plants, to quickly handle unexpected outages of generating or transmission facilities. The utilities generally maintained a seven- to ten-percent reserve margin, meaning that sufficient capacity was on call to quickly replace from seven to ten percent of total system resources. This margin proved adequate, in part because of the reliability of the power plants that constituted the system.

Now, in the newly restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the California Independent System Operator (Cal-ISO), a newly-formed entity. How Cal-ISO will ensure system reliability has not yet been thoroughly developed; protocols are now being created and put in place that will, it is anticipated, allow sufficient reliability to be maintained under the competitive market system. “Must-run” power purchase agreements and “participating generator” agreements are two mechanisms currently being considered to ensure an adequate supply of reliable power (Mavis 1998, pers. comm.).

These mechanisms are apparently being devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, under free market competition, financial pressures may act to reduce the reliability of many power plants, both newly constructed and existing (McGraw-Hill 1994). It is possible that, if significant numbers of power plants exhibit individual reliability sufficiently lower than this historical level, the assumptions used by Cal-ISO to ensure system reliability will prove invalid, with potentially disappointing results. Until the restructured competitive electric power system has undergone a shakeout period, and the effects of varying power plant reliability are understood and compensated for, the Energy Commission should ensure that power plant owners continue to build and operate their projects to the level of reliability to which all in the industry have become accustomed.

POWER PLANT RELIABILITY

A reliable power plant is one that is available when called upon to operate. Achieving this reliability is accomplished by ensuring equipment availability, plant maintainability, fuel and water availability, and adequate resistance to natural hazards. Base load plants such as the High Desert Power Project are expected to provide uninterrupted service for very long durations.

Baseload operation places heavy demands on power plant equipment. Systems must be able to operate for extended periods (sometimes months on end) without shutting down for maintenance or repairs. This requirement is typically addressed by control of quality in machinery design, construction, and installation; and by sufficient redundancy of critical equipment.

Equipment Availability

Equipment availability will be ensured by use of appropriate quality assurance/quality control (QA/QC) programs during design, procurement, construction and operation of the plant; by procuring equipment from qualified vendors and suppliers; and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

QA/QC Program

The QA/QC program delineated by the applicant (HDPP 1997b, AFC § 3.7.4, AFC § 3.7.7 and AFC § 3.7.8) describes a program typical of the power industry. Project designs and procurement specifications will be checked by qualified reviewers, equipment and supplies will be purchased from qualified suppliers and will be inspected upon receipt, and construction and installation will be inspected and systems tested, all in accordance with the approved QA plan. Staff expects implementation of this program to yield typical reliability of design and construction.

Qualified Vendors and Suppliers

Vendors of plant equipment and materials will be selected from lists of qualified suppliers, those with known capabilities. To appear on the list of qualified suppliers, a vendor must show satisfactory personnel qualifications, production capability, past performance, and quality assurance programs (HDPP 1997b, AFC § 3.7.4, AFC § 3.7.7 and AFC § 3.7.8). Procured items will be subjected to an inspection and audit process that ensures the expected quality. This describes an industry standard approach to vendor selection, which staff expects to lead to the acquisition of quality, reliable equipment and materials.

Plant Maintainability

Equipment Redundancy

A generating facility called on to operate in baseload service for long periods of time, such as the High Desert Power Project, must be capable of being maintained while operating. A typical approach for achieving this is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide some redundancy of function (HDPP 1997b, AFC § 3.4 and AFC § 3.7.3). For example, the following plant components are provided in sets of two 100 percent capacity units:

- boiler feed pumps;
- condensate pumps;
- air compressors and dryers;
- demineralizers; and
- natural gas filters and separators.

The following components are provided in sets of two 50 percent capacity units:

- circulating water pumps.[19]

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19 Loss of a single 50 percent capacity circulating water pump typically allows the steam cycle portion of the plant to continue operating at about 65 percent capacity. Since the steam cycle accounts for only 1/3 of the output of a combined cycle plant, overall capacity with loss of one circulating water pump would drop only to about 88 percent of full load.

The computerized control and protective system for the gas turbine generator, steam turbine generator and HRSG, known as the Distributed Control System (DCS), will be adequately redundant. The DCS will be powered by an uninterruptible power supply (UPS) to ensure plant control under power failure conditions (HDPP 1997b, AFC § 3.4.3.2).

While many power plants exhibit even greater levels of equipment redundancy, the fact that the project consists of multiple parallel trains of turbine generators provides inherent reliability. Failure of a non-redundant component of one train should not cause the other trains to fail, allowing the plant to continue to generate (at reduced output). Thus, staff believes that the equipment redundancy described here represents a typical industry design approach for a power plant project such as this.

Maintenance Program

For any power plant, an effective maintenance program is a typical approach to reliability. Such a program will normally include the following components:

- a sound QA/QC program to guarantee that purchased equipment and replacement parts will perform as specified and will not fail prematurely;
- a sufficient inventory of spare parts and a restocking system which guarantees that the inventory will be replenished in a timely manner;
- well-trained maintenance personnel available on short notice to service equipment needing repair;
- the necessary tools, manuals and repair facilities with which to make the repairs quickly and properly; and
- short- and long-term maintenance planning and effective management of maintenance operations.

The applicant proposes to establish a plant maintenance program in accordance with equipment manufacturers' recommendations (HDPP 1997b, AFC § 3.7.1 and AFC § 3.7.3). In conjunction with an overall plant quality control program (HDPP 1997b, AFC § 3.7.7 and AFC § 3.7.8) that promises to follow standard industry practice, staff expects that this will allow the project to meet typical industry levels of acceptable reliability.

Fuel and Water Availability

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

Natural gas will be supplied to the project by a 2.75 mile-long, sixteen-inch diameter gas pipeline to be built by Southwest Gas Corporation (HDPP 1997b, AFC § 3.7.5), and by a 32 mile-long, 30-inch diameter gas pipeline, also to be built by Southwest (HDPP 1998). These pipelines connect with an intrastate pipeline that, in turn, can draw from interstate pipelines taking gas from Canada and the Southwest and Rocky Mountain states. Staff agrees with the applicant's prediction that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

Water will be used in the power plant chiefly for cooling tower makeup and to feed the gas turbine generators' evaporative inlet air coolers. Water will be supplied to the project from groundwater wells or imported from a large volume supplier. Staff has not yet completed the analyses necessary to determine if this represents an adequately reliable supply; the source of imported water is still being evaluated (see that portion of this document entitled **Soil and Water Resources**).

Once on the project site, a portion of the water will be treated in one of two fully redundant demineralizers before being used in the power plant.

Power Plant Reliability in Relation to Natural Hazards

Natural forces can threaten the reliable operation of a power plant. Flooding, high winds, tsunamis (tidal waves) and seiches (waves in inland bodies of water) will not likely represent a hazard for this project, but seismic shaking (earthquake) presents a real threat to reliable operation (see that portion of this document entitled **Facility Design**). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking, compared to older facilities, due to the fact that these LORS have been periodically upgraded. By virtue of being built to the latest LORS, this project will likely perform at least as well as, and perhaps better than, existing plants in the electric power system.

Given the historical performance of California power plants and the electrical system in seismic events, staff believes there is no special concern with power plant functional reliability affecting the electric system's reliability due to seismic events.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as many other related reliability data) are kept by the North American Electric Reliability Council (NERC). NERC continually polls utility companies throughout the North American continent for project reliability data through its Generating Availability Data System (GADS), and periodically summarizes and publishes the statistics on the Internet. NERC reports the following summary generating unit statistics for the years 1992 through 1996 (NERC 1997):

For Combined Cycle units (of all sizes)
Availability Factor = 90.48 percent

For all Gas Turbine units (of all sizes)
Availability Factor = 90.11 percent

The GE Frame 7FA gas turbine to be employed in the three-train combined cycle configuration has been on the market for several years now, and can be expected to exhibit typically high availability. The first Westinghouse 501G gas turbine has been in service since April 1997 (GTW 1997); by the time the High Desert Power Project two-train configuration could reach startup, several years of experience with this and subsequent 501G machines will have ensured typical high levels of availability.

The applicant's predictions of a plant availability factor of 95 percent for the combined cycle base load projects (HDPP 1997b, AFC § 1.2, AFC § 3.1 and AFC § 3.4), exceeds the NERC figure (90.48 percent) for similar plants throughout North America (see above). While the applicant's estimate of plant availability may be slightly optimistic, the stated procedures for assuring design, procurement and construction of a reliable power plant appear to be in step with standard industry practice, and staff believes they are likely to yield an adequately reliable plant.

CONCLUSION

The applicant predicts a power plant availability factor of 95 percent, which slightly exceeds the typical industry level of 90 percent for this type of plant. While this may be optimistic, based on a review of the proposal, staff concludes that the plant will be built and operated in a manner consistent with typical industry levels of operating reliability. Should the question of water supply reliability be satisfactorily answered, this should provide adequate reliability.

REFERENCES

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GTW (Gas Turbine World). 1997. "Takasago 330-MW combined cycle in testbed for steam-cooled 501G." *Gas Turbine World*, March-April 1997, pp. 15-18.

HDPP (High Desert Power Project, L.L.C.). 1997 b. Revised Application for Certification, High Desert Power Project (97-AFC-1). Submitted to the California Energy Commission, November 17, 1997.

HDPP 1998. Analysis of Proposed Natural Gas Pipeline. Submitted to the California Energy Commission, June 15, 1998.

McGraw-Hill (McGraw-Hill Energy Information Services Group). 1994. *Operational Experience in Competitive Electric Generation, an Executive Report*, 1994.

NERC (North American Electric Reliability Council). 1997. *1992-1996 Generating Availability Report*.

POWER PLANT EFFICIENCY

Testimony of Steve Baker

INTRODUCTION

PROJECT DESCRIPTION

The applicant proposes to construct and operate either a 720 MW combined cycle base load power plant, or a 678 MW combined cycle base load power plant (HDPP 1997b, AFC § 1.2). The 720 MW combined cycle configuration will consist of three 166 MW (nominal) F-class gas turbine generators provided by one of several manufacturers,[20] equipped with three heat recovery steam generators (HRSGs) and duct burners, and three 86 MW steam turbine generators. The 678 MW combined cycle configuration will consist of two 236 MW (nominal) Westinghouse 501G gas turbines equipped with two heat recovery steam generators (HRSGs) and duct burners, and two 112 MW steam turbine generators. Evaporative inlet air coolers will be installed on all of the gas turbines.

PURPOSE OF THE ANALYSIS

The Energy Commission makes findings as to whether energy use by the project will result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the project's consumption of energy creates a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impacts. In this analysis, staff addresses the issue of inefficient and unnecessary consumption of energy.

SCOPE OF THE ANALYSIS

In order to support the Energy Commission's findings, this analysis will:

- determine whether the facility will likely present any adverse impacts upon energy resources;
- determine whether these adverse impacts are significant; and if so,
- determine whether feasible mitigation measures or alternatives exist that would eliminate the adverse impacts, or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

FEDERAL

No federal laws apply to the efficiency of this project.

20 ASEA Brown Boveri (ABB), General Electric (GE), Siemens and Westinghouse all manufacture this class of gas turbine.

STATE

California Environmental Quality Act (CEQA)

CEQA requires that an environmental analysis be completed prior to determining whether to approve an application for certification of a power plant. This analysis must include an identification of the significant effects of a project on the environment, feasible mitigation measures, and alternatives to the project (Pub. Resources Code, § 21002.1).

CEQA Guidelines state that a "...project will normally have a significant effect on the environment if it will...[e]ncourage activities which result in the use of large amounts of fuel, water, or energy; [u]se fuel, water, or energy in a wasteful manner..." (Cal. Code Regs., tit. 14, § 15064, Appendix G). Further, the CEQA Guidelines' Environmental Checklist Form asks if the project will use "…substantial amounts of fuel or energy…[or present a] substantial increase in demand upon existing sources of energy, or require the development of new sources of energy..." (Cal. Code of Regs., tit. 14, § 15064, Appendix I). CEQA defines feasible as "...capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors." (Pub. Resources Code, § 21061.1)

ANALYSIS

ADVERSE IMPACTS ON ENERGY RESOURCES

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. This adverse impact is considered significant if it results in:

- the use of large amounts of fuel or energy;
- a substantial increase in demand upon existing sources of energy;
- a requirement for the development of new sources of energy; or
- the use of fuel or energy in a wasteful manner.

Use of Large Amounts of Fuel or Energy

Any power plant large enough to fall under Energy Commission siting jurisdiction will likely consume large amounts of energy. The High Desert project will burn natural gas fuel at a rate up to 2,251 million Btu per hour (HDPP 1997b, AFC Appendix A, Table A-10), or 197 million therms per year. This is a large amount of energy.

Substantial Increase in Demand Upon Existing Sources of Energy

The applicant describes its sources of supply of natural gas for the project (HDPP 1997b, AFC § 3.7.5). These sources have access to far more gas than would be required for a project of this size. It is therefore highly unlikely that the project will present a substantial increase in demand upon existing energy sources.

Require Development of New Sources of Energy

As described in the application (HDPP 1997b, AFC § 3.7.5), the sources of supply of natural gas for the project are vast. The project will clearly not require the development of any new energy sources.

Use of Fuel or Energy in a Wasteful Manner

Project fuel usage is a function of energy output (the amount of electrical energy generated) and the efficiency with which fuel is burned to produce that output. Project fuel efficiency is determined by the configuration of the power producing system, and by the selection of equipment to generate power.

Project Configuration

The applicant will build a baseload power plant, intended to supply large quantities of energy cheaply and efficiently for long periods of time. The plant will consist of combined cycle gas turbine/steam turbine power trains, machines are well suited to the large, steady loads met by this type of plant.

The project will be configured as a multiple-train combined cycle power plant, in which electricity is generated by gas turbines, and additionally by steam turbines that operate on heat energy recuperated from the gas turbines' exhaust. By recovering this heat, which would otherwise be lost up the exhaust stack, the efficiency of any combined cycle power plant is increased considerably from that of either gas turbines or steam turbines operating alone.

The number of turbines further contributes to efficiency at part load. Most electric generating units operate most efficiently at one particular level of output, typically at full load. Whenever output demand is less than full load, the unit must be throttled back. Rather than being forced to throttle back one large unit, with the consequent reduction in efficiency, the owner will have the option of shutting off one or more of the individual machines. The remaining turbines continue to run at full load; this allows the plant to generate at part load while maintaining optimum efficiency. By shutting down turbine-generator trains, the three-train plant can operate at one-third load, and the two-train plant at half load, while maintaining maximum efficiency.

Equipment Selection

F-Class Gas Turbines

Modern gas turbines embody the most fuel-efficient electric generating technology available today. The F-class gas turbine to be employed in the three-train combined cycle project represents one of the most efficient such machines available at this time. This class of turbine is currently offered by four manufacturers, all producing essentially equivalent machines (GTW 1997b):

- the ABB KA-24-1, nominally rated at 267 MW and 57.4 percent efficiency at ISO[21] conditions;
- the GE S107FA, rated at 262.6 MW and 56.0 percent efficiency;
- the Siemens GUD 1S.84.3A, rated at 260 MW and 57.0 percent efficiency; and,
- the Westinghouse 501F, rated at 268.1 MW and 56.9 percent efficiency.

One other possible machine is the Stewart & Stevenson CC4-6000, a set of four GE LM6000 aeroderivative[22] gas turbine generators, in combined cycle with a single steam turbine generator, rated at 225 MW and 54 percent efficiency (GTW 1997b). Because of the smaller generating capacity of these machines, a total of twelve gas turbines and three steam turbines would be required to meet the power output desired. Capital and maintenance costs of such an arrangement make it much less attractive than the F-class machines for this size facility, and there is no advantage in efficiency. Advanced gas turbines, such as the Kalina Cycle,[23] HAT cycle and CRGT,[24] are not commercially available at this time. The GE machine selected thus appears to be as efficient as any of the feasible options.

G-Class Gas Turbines

The G-class gas turbine to be employed in the two-train combined cycle project represents a slightly more efficient technology.[25] With the addition of a temperature-control coating to the turbine blades and vanes, and the use of steam instead of air to cool the combustor-to-turbine transition duct, the Westinghouse 501G is nominally rated at 345.3 MW and 58.0 percent efficiency at ISO conditions (GTW 1997b). This slightly exceeds the advertised F-class combined cycle efficiency at 56.0 percent.[26]

The aeroderivative LM6000 combined cycle described above, at 54 percent efficiency, cannot match this efficiency level. The 501G thus appears to be the most efficient option for this project configuration.

The applicant proposes to include gas turbine inlet air cooling. The two commonly used techniques are the evaporative cooler selected by the applicant, and the chiller. Both devices increase gas turbine power output by cooling the gas turbine inlet air. A chiller can offer greater power output than the evaporative cooler on hot,

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21 International Standards Organization (ISO) standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level).
22 Aeroderivative gas turbines are adapted for stationary use from aircraft jet engines.
23 The Kalina Cycle, in development at a test facility in Southern California, offers a slight improvement to the efficiency of the steam cycle portion of a combined cycle plant. No such plants have yet been built on a commercial scale.
24 The HAT, or Humid Air Turbine, is under development by United Technologies' Turbo Power and Marine Systems division, while the CRGT, or Chemically Recuperated Gas Turbine, is a design concept being developed by the California Energy Commission.
25 The first 501G machine, at Mitsubishi Heavy Industries' Takasago Works facility in Japan, began operation on April 7, 1997 (GTW 1997a).
26 GE had planned to offer a G-class machine, but recently decided not to, instead progressing to the even more efficient H-class machine. Although GE will now accept orders, no H-class machines have yet been built.

humid days. The project location, however, typically offers rather low relative humidity on the hot days during which inlet air cooling is most needed; the chiller thus holds no advantage. The evaporative cooler, however, holds three advantages over the chiller:

- Net efficiency of the combined cycle plant is typically greater with an evaporative cooler; the electrical load of a chiller reduces overall efficiency by increasing parasitic power loads.
- The low relative humidity at the project site on hot days allows the evaporative cooler to increase gas turbine performance at very low cost.
- Capital and operating costs are much lower for an evaporative cooler than for a chiller.

The evaporative cooler selected appears to be a reasonable choice for efficient operation.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The project, if operated as proposed, would generate either 720 MW of electric power at an average thermal efficiency of 54.2 percent (F-class three-train plant), or 678 MW of power at an average thermal efficiency of 55.1 percent (G-class two-train plant). While the project will consume large amounts of energy, it will do so not wastefully, but in a reasonably efficient manner. The project will neither cause a substantial increase in demand upon existing sources of energy, nor require the development of new energy sources. Staff therefore concludes that the proposed project will result in no significant adverse impacts upon energy resources.

RECOMMENDATION

From the standpoint of power plant efficiency, staff recommends that the project be certified as proposed.

REFERENCES

GTW (Gas Turbine World). 1991. "PSE&G turning FT4 peakers into FT8 combined cycle plant," *Gas Turbine World*, May-June 1991, pp. 17-24.

GTW (Gas Turbine World). 1997 a. "Takasago 330-MW combined cycle is testbed for steam-cooled 501G," *Gas Turbine World*, March-April 1997, pp. 15-18.

GTW (Gas Turbine World). 1997 b. *Gas Turbine World Performance Specs 1997-98*, Volume 17, December 1997.

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TRANSMISSION SYSTEM ENGINEERING

Testimony of Al McCuen

INTRODUCTION

Transmission System Engineering (TSE) analysis is conducted to provide a basis for the findings required in the Energy Commission's decision identified below. This final staff analysis provides an indication of whether the transmission facilities associated with the proposed project appropriately conform to all applicable laws, ordinances, regulations and standards (LORS) required for safe and reliable electric power transmission. The analysis also evaluates what, if any, system additions are needed as a result of interconnecting the project to maintain system reliability.

The California Independent System Operator (Cal-ISO) is responsible for ensuring system reliability and must determine both the standards necessary to achieve reliability and a proposed project's conformity with those standards when interconnecting to the system. The Energy Commission will rely on the Cal-ISO's determinations to make its finding related to conformity with applicable reliability standards, the need for additional transmission facilities, and environmental review of the whole of the project. In this case, staff's primary role is facilitation of the timely coordination of the Cal-ISO's process and results with the certification process and Energy Commission decision. The Cal-ISO's conclusions, recommendations and requirements developed in their review of the HDPP interconnection study have been considered in the Final Staff Analysis. The Cal-ISO will provide testimony in the Commission's hearings to assist the Commission in making findings related to system reliability.

Staff's analysis also evaluates outlet alternatives identified by the applicant and staff and provides conditions of certification to ensure that applicable LORS are complied with during the design, operation and potential closure of the project.

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

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), "Rules for Overhead Electric Line Construction", formulates uniform requirements for construction of overhead line. Compliance with this order will ensure adequate service and safety to persons engaged in the construction, maintenance, operation or use of overhead electric lines and to the public in general[27].

- CPUC Rule 21 provides standards for the parallel interconnection and operation of generating units connected to a participating transmission owner. These standards provide for safe and reliable operation of generating facilities and the participating transmission owner's facilities.

- Western Systems Coordinating Council (WSCC) Reliability Criteria provide the performance standards used in assessing the reliability of the interconnected system with continuity of service to loads as a first priority and preservation of interconnected operation as a secondary priority. The WSCC Reliability Criteria includes the Reliability Criteria For Transmission System Planning, Power Supply Design Criteria, and Minimum Operating Reliability Criteria. Analysis of the WSCC system is based to a large degree on WSCC Section 4 "Criteria for Transmission System Contingency Performance" which requires that the results of power flow and stability simulations verify established performance levels. Performance levels are defined by specifying the allowable variations in voltage, frequency and loading that may occur on systems other than the one in which a disturbance originated. Levels of performance range from no significant adverse effect outside a system area during a minor disturbance (loss of load or facility loadings outside emergency limits) to a performance level which only seeks to prevent system cascading and the subsequent blackout of islanded areas. While controlled loss of generation, load, or system separation is permitted in extreme circumstances, their uncontrolled loss is not permitted (WSCC 1997). Southern California Edison (Edison) developed its own criteria to maintain loads and resources in their service area (See Edison's Local Area Reliability and Planning Criteria).

- North American Electric Reliability Council (NERC) Planning Standards provide policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC's Criteria for Transmission System Contingency Performance. The NERC planning standards provide for acceptable system performance under normal and contingency conditions, however the NERC planning standards apply not only to interconnected system operation but also to Edison's service area (NERC 1997).

- Edison Local Area Reliability and Planning Criteria provides a basis for designing a reliable system, taking into account continuity of service as affected by the outages of system facilities and capital investment. Edison's Reliability and Planning Criteria establishes performance levels which must

[27] While GO-95 applies principally to investor owned utilities it is recognized as the industry standard for transmission facilities in California.

be met for “likely” and “unlikely” contingencies. A likely contingency assumes that one generating unit is out of service and that other outages of a generating unit, a transmission system component, or two transmission lines are out of service. An unlikely contingency assumes that one generating unit is out of service and then that multiple outages occur, e.g. loss of two circuits on a common transmission structure, the outage of two generators, etc. The performance levels which must be met for the two types of contingencies place an emphasis on not interrupting load especially a protracted interruption of major load (400 megawatts), not resulting in a cascading outage which affects other systems, meeting system component ratings, and meeting voltage criteria (HDPP 1997a, AFC page 3.5-6).

- Cal-ISO Scheduling Protocols and Dispatch Protocols require conformance with NERC, WSCC, and Edison Local Area Reliability and Planning Criteria and conformance with Edison’s parallel generation interconnection standards. These standards will be applied in assessing the system reliability implications of the High Desert Power Project. Also of major importance to the High Desert and other privately funded projects is the Cal-ISO Day/Hour Ahead Inter-zonal Congestion Management Scheduling Protocol (SP 10), the Transmission System Loss Management Scheduling Protocol (SP 4), and the Creation of the Real Time Merit Order Stack (SP 11). The Congestion Management Scheduling Protocol provides that dispatch not violate system criteria as market participants are requesting generation dispatch or the use of major interties. The Real Time Merit Order Stack is developed based on increasing energy bid prices so that the least cost bids are accepted early on and if congestion is anticipated the highest bids are not selected. The Transmission System Loss Management Scheduling Protocol uses the Cal-ISO power flow model to identify the effects on total transmission losses at each generating unit and scheduling point. Additional calculations are performed to determine if the participant will be paid more or less than, for instance, the generating units dispatched net power output (Cal-ISO 1997b, Cal-ISO 1997c).

SETTING

PROJECT DESCRIPTION

The High Desert Power Project, LLC (HDPP) is being developed, designed, constructed, operated, and maintained by the Constellation Power, Inc. of Baltimore, Maryland and Inland Energy of Newport Beach, California. The cogeneration plant will be located in an industrial park in the northeast corner of the Southern California International Airport, formerly the George Air Force Base. The site location is approximately six miles northwest of Victorville, California. The transmission system will consist of a 230 kilovolt switchyard, a 7.2 mile single-circuit 230 kilovolt transmission line outlet, and additions to the Victor substation (see TSE List of Technical Terms).

The applicant is proposing two power plant designs (HDPP 1997a, AFC page 3.1-1 and 3.6-2, Table 3.6-1):

- combined cycle (three units operating) with a net electrical output of 721 megawatts with an availability of 95 percent or higher

- combined cycle (two units operating) with a net electrical output of 679 megawatts with an availability of 95 percent or higher

A 230 kilovolt switchyard will be constructed at the project site. The combined cycle power plant with either three or two units operating will need a switchyard with eleven or eight 230 kilovolt circuit breakers, respectively (HDPP 1997a, AFC page 3.5-11).

A 230 kilovolt transmission line will be built from the power plant and interconnect with Edison's electrical transmission system at the Victor substation. The proposed route will exit the switchyard and proceed in a southeasterly direction down El Evado Road for approximately 1.8 miles. The line then parallels the Intermountain Power Project Direct Current line in a southerly direction for 0.7 miles at which point it crosses under the transmission line corridor and proceeds southerly for 0.6 miles until it crosses under the Los Angeles Department of Water and Power (LADWP) 500 kilovolt line. Approximately 0.2 miles south of this crossing the line will intersect and parallel Edison's 115 kilovolt line in a southwesterly direction for approximately 3.9 miles and terminate into the Victor substation (HDPP 1997a, AFC page 3.5-12).

The termination at Victor will consist of a new 230 kilovolt switchrack with three double-breaker line positions with breaker-and-a half design. The two existing 230/115 kilovolt transformer banks will be directly connected to the 230 kilovolt buses (HDPP 1998z, Figure 6). Under the interconnection agreement, Edison will likely design, procure equipment, and construct the Victor substation additions (HDPP 1997a, AFC page 3.5-18).

EXISTING FACILITIES AND RELATED SYSTEMS

The proposed site will be located in an area that contains 500, 287, 230, and 115 kilovolt facilities owned by Edison and LADWP. The facilities that directly pertain to the project are the Victor 115 kilovolt substation located west of the city of Victorville and the Victorville 500/287 kilovolt substation located northwest of Victorville, a termination alternative considered by the applicant. [See Project Description Figure 2, Local Setting, for location of the transmission lines in the project vicinity.]

ANALYSIS

INTERCONNECTION FACILITIES

The applicant proposes to interconnect the High Desert Power Project to the Victor substation with facilities consisting of a 230 kilovolt project switchyard, a single circuit 230 kilovolt transmission line, and additions at the Victor substation (HDPP

1997a, AFC page 3.5-10 through 3.5-18). The applicant's project is privately funded and poses no cost or feasibility risk to ratepayers. Staff believes that from a transmission system engineering perspective, absent unacceptable system reliability impacts or significant adverse environmental effects, it is the applicant's prerogative to select the switchyard, outlet, termination point and termination facilities so long as these facilities conform with the Cal-ISO and interconnecting facility owner's interconnection standards28.

Project Switchyard

There are two potential configurations for the project switchyard which depend on the selected power output. A standard breaker-and-one-half configuration will be used for both power output possibilities (HDPP 1997a, AFC Figure 3.4-1, 3.4-2, and 3.4-3). Eight circuit breakers would be used for the 678 megawatt level, eleven for the 720 megawatt level. These configurations are in accordance with standard utility practices for power plant switchyards. The applicant also considered alternative switchyard configurations (see Alternatives Section below).

Short circuit analyses are conducted as part of an interconnection study to assure that breaker ratings are sufficient to withstand high levels of current during a fault (such as when a line touches the ground). Symmetrical three phase short circuit duties were determined in the interconnection study to be within the existing breaker ratings (HDPP 1998z, page 15). The acceptability of the breaker ratings for assymetrical duties will be determined during the compliance phase (see Condition of Certification TSE-1b).

Outlet Line

The project to Victor 230 kilovolt line will be approximately 7.2 miles in length and will be a single circuit design with two 954 thousand circular mil conductors per phase. The project to Victor line will likely utilize lattice steel structures in those areas where it parallels existing lines and steel pole structures elsewhere in the route (HDPP 1997a, AFC page 3.5-12). Project Description Figure 2 - Local Setting shows the general route to the termination at the Victor substation. There are two points at which the line will cross under other lines in the area belonging to the LADWP or Intermountain Power Agency. These line crossings must be coordinated between the applicant and their owners (LADWP 1997a) and clearances established and maintained in accordance with the CPUC GO-95, Rules for Overhead Electric Line Construction29. Final design of the crossings is not anticipated until the design phase of the project which will likely occur after certification. Staff has proposed a condition of certification to assure conformance with GO-95 and their owner's standards (see TSE-1f).

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28 Environmental implications are not assessed in the Transmission System Engineering evaluation, but are addressed in detail in the other sections such as Biology. It is also to be noted that the Western Regional Transmission Association and the Cal-ISO have preliminarily determined that such facilities are the applicant's prerogative absent significant system reliability implications.
29 While the High Desert Power Project is not under the jurisdiction of the CPUC it is standard practice to comply with GO-95.

The applicant concluded that the proposed size of conductor (two 954 thousand circular mil) provides a capacity of approximately 800 megawatt (HDPP 1997a, AFC page 3.5-12). Staff rates30 the two 954 conductors at 1864 ampere (705 megawatts at 0.95 power factor) with a maximum conductor temperature of 90 degree centigrade and "worst case" ambient temperature of 110 degrees fahrenheit. This is slightly more than the maximum power plant output of 672 megawatts at 110 degrees fahrenheit for the combined cycle (three units operating) and 614 megawatts (two units operating)(HDPP 1997a, AFC page 3.6-2)31. At 104 degrees fahrenheit ambient temperature which is used by Edison to rate their conductors staff rates the conductors at 725 megawatts at a power factor of 0.95.. Staff concludes that the two 954 thousand circular mil conductors are adequate. An alternative double circuit outlet was also considered but rejected by the applicant (See Alternatives Section).

Victor Switchyard Termination

The Victor switchyard presently consists of a 115 kilovolt bus arranged such that there are, in essence, two "main" busses which connect nine 115 kilovolt lines, three stepdown transformers, and a 115 kilovolt capacitor bank. Since there are no 230 kilovolt busses at this switchyard, a new 230 kilovolt switchrack will be installed (HDPP 1998z). Staff considers the proposed configuration acceptable.

SYSTEM RELIABILITY

A system reliability evaluation consists principally of determining whether there could be thermal overloads, whether voltages are within criteria (not too high or low), and that the system is stable (the system should not oscillate excessively). Additional criteria may include assurance that there is sufficient reactive power available. The evaluation of these criteria must be conducted for credible "emergency" conditions that the system might sustain, such as the loss of a single or double circuit line, a transformer, or a combination of these facilities. Planning analysis is conducted sufficiently in advance of potential system changes -- such as the insertion of High Desert Power Project power into the system -- that necessary system facility additions or modifications can take place in time to prevent a criteria violation. The specific criteria used in the HDPP interconnection study to determine conformance was Edison's Local Area Reliability and Planning Criteria, the WSCC Reliability Criteria, and the NERC Planning Standards. Conformance with these criteria is required by the Cal-ISO[32.] System reliability implications of the High Desert Power Project and the need for additional facilities related to interconnecting the project has been determined by the Cal-ISO and presented in their letter dated October 8, 1998 (Cal-ISO 1998b) as results of their review of the Interconnection Study.

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30 Electric Power Research Institute, Transmission Line Workstation, Dynamic Ampacity Program. Wind speed of 4 foot per second, solar absorptivity of 1.0, emissivity of 0.82, ambient temperature of 110 degrees Fahrenheit, and 90 degree centigrade conductor temperature.

31 The power output at 112 degrees Fahrenheit was linearly decreased to 110 degrees Fahrenheit.

32 Cal-ISO Dispatch Protocol, DP 2.1, posted December 23, 1997.

Scope of Reliability Studies

SCE performed an interconnection study for the HDPP as requested by the applicant and in consideration of recommendations provided by the Cal-ISO. The study was conducted assuming an approximately 8 mile 230 kilovolt outlet line terminated at the SCE Victor substation. Output power was evaluated for 678 megawatts and 830 megawatts[33]. Two system conditions, 2001 heavy summer and 2002 light spring loading were analyzed. Scheduled generation essentially only included the "must run[34]" and "must take[35]" generating units. Imports on the California Oregon Intertie and Pacific DC Intertie were 4800 and 3200 megawatts, respectively. Loads north of Lugo were based on a one in five year heat wave and were 688 megawatts for the 2001 case and 60% of that for the light spring case. For both cases, in order to place significant stress on the system with insertion of the HDPP, maximum generation was assumed in the 115 kilovolt and 230 kilovolt systems north of the Lugo substation (HDPP 1998z, Figure 2). When the HDPP generation was added the import from the 500 kilovolt system to the SCE system was reduced by the same amount, 678 megawatts and 830 megawatts respectively.

Reliability Study Results

Base cases with no line or transformer outages but Coolwater units on line and off line were conducted to identify line or transformer loadings. Contingency analysis was performed for four N-1 cases and 7 N-2 cases for the 2002 light spring loading conditions. Three N-1 and four N-2 500 kilovolt cases were conducted for the summer peak loading conditions (HDPP 1998z, page 7). These cases included both line and transformer outages. Base cases and contingency cases were run for HDPP power outputs of 0, 678, and 830 megawatts.

Stability studies were conducted for the 2002 spring light loading conditions because these conditions are the most stressfull to the system when HDPP is operating. Studies were performed for the ten most critical contingencies identified in the load flow studies both with and without HDPP inserted into the system. A fault at the Victor substation 230 kilovolt bus with loss of HDPP to Victor outlet line was also simulated. Two N-2 cases were found to be unstable, however this is an existing problem[36] not attributable to HDPP (HDPP 1998z, Cal-ISO 1998b). Study results also indicate out of step tripping for five cases. Three cases appear to be due to existing conditions rather than the HDPP and two cases occur only with insertion of HDPP. These problems need to be addressed in SCE's Annual Planning Studies (Cal-ISO 1998b).

Short circuit studies were conducted for eight buses including both 230 kilovolt and 115 kilovolt in the area. The addition of HDPP does not cause the short circuit duty of any breakers to be exceeded (HDPP 1998z, page 15).

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[33] 830 megawatts was evaluated because initially one of the configuations included this magnitude which was subsequently withdrawn as an option.
[34] Must run generating units are those that are required to be on line to maintain acceptable reliability and system security.
[35] Must take generating units are those that must be scheduled due to contractual provisions, such as occur for Qualifying Facilites.
[36] These unstable conditions may be addressed in SCE's Planning Studies (Cal-ISO 1998b).

The HDPP principally affects the 230 kilovolt and 115 kilovolt systems from the Lugo substation to the north which are already heavily loaded. Existing remedial action schemes are already in place for these systems. The Lugo 500/230 kilovolt transformers are also affected by insertion of HDPP but there is little affect to the remainder of the SCE 500 kilovolt system. Under maximum generation north of Lugo and light load conditions, the HDPP slightly increases the potential need for the use of congestion management techniques by the Cal-ISO to reduce loading on the two Kramer-Lugo 230 kilovolt lines[37]. This is considered acceptable by the Cal-ISO.

Study results ultimately show that the only major transmission facilities (other than the HDPP switchyard and outlet line) required for interconnection of the HDPP is the installation of a 230 kilovolt bus at the existing Victor substation. This equipment is within the fence line. To maintain reliability criteria the HDPP must be added to two existing remedial action schemes and three new remedial action schemes must be developed (HDPP 1998z, table 1 pages 2 and 4). These schemes are in lieu of transmission upgrades which could accomplish the same result but at higher cost (Cal-ISO 1998z). These remedial action schemes will be developed to ramp down HDPP generation or trip units in a predetermined manner. These required schemes will be developed during the Cal-ISO/SCE facilities study process which would be initiated by a request from the applicant. TSE condition of certification TSE-1e requires the development of the remedial action schemes and coordination with Edison and the Cal-ISO.

ALTERNATIVES

Outlet Line

The applicant's proposed configuration is a single circuit 230 kilovolt line with two 954 thousand circular mil conductors. As previously discussed, this configuration has sufficient capacity for the 670, 720, or 832 megawatt net output plant configurations. The applicant's analysis of conductor sizes and the use of single or double circuit tower configurations are shown in AFC Appendix AA, Table AA-1, pages 1 through 6 of 6.

The applicant's evaluation of the cost effectiveness of a double and single circuit line is presented in AFC Appendix AA, pages 1 through 6 of 6. The applicant concluded that a single circuit line with two 954 thousand circular mil conductors was cost effective and that a double circuit line was not required for reliability implications38. Staff agrees. The reliability of the Edison system and WSCC interconnected system do not depend on the reliability of an outlet line, even for such a large power plant. Edison's Local Area , WSCC, Cal-ISO and NERC planning criteria and standards do not require a double circuit line. Indeed, the

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[37] Congestion management is a scheduling protocol which provides that dispatched generation and transmission loadings will not violate reliability criteria.

38 The applicant's response to CURE data request number 88 indicates that a single circuit line with two 954 thousand circular mil conductors is economic, taking into account all costs rather than just the single or double circuit and the two conductor sizes studied by the applicant.

Western Regional Transmission Association (WRTA) and Cal-ISO have indicated that the configuration and capacity of a generating unit outlet line connecting to a participating transmission owner's system, under the control of the Cal-ISO, is the prerogative of the applicant requesting interconnection. Staff does not agree with the applicant's economic analysis, however only the applicant (not the ratepayer) could be significantly affected by the conductor selection and staff finds the conductor size acceptable. While applicants have occasionally proposed double circuit lines at the Energy Commission and other regulatory agencies in California, they are rare. The cost for a small increase in generating plant reliability to sell power to the system has not historically justified the increased costs. Short outlet lines do not have sufficient outages to justify the increased costs of a double circuit line. Additionally, the system is designed and operated so that the outage of large generating units (for instance San Onofre at 1080 megawatts) can be accommodated with no violation of reliability criteria. Elaborate calculations are not needed to support a cost benefit conclusion; however, the interested reader could refer to the applicant's calculations contained in response to California Unions for Reliable Energy's (CURE) data request number 98. This calculation shows that even for an outage of 7 hours per year (rather than the statistical 7 hours each 12 years) a double circuit line is not cost effective. Staff concludes that the single circuit configuration is acceptable.

Termination Point and Facilities

The applicant performed extensive calculations on selection of a termination point for the project (HDPP 1997a, AFC pages 6.4-3 through 6.4-5, Appendix AA, Table AA-1-2 pages 1 and 2 of 2, Table AA-1-4 , pages 1 through 6 of 6, Table AA-1-5, pages 1 through 12 of 12; HDDP 1998l, response to CURE's data requests numbers 82, 84, 85, 86, 87, 88, 89, 90, 91, 92, 95, 99, 106). The results of the applicant's analysis indicate that the proposed termination at the Victor substation is least cost (CURE 1998b, data request 88) and meets the goals of the project to sell into the Power Exchange in accordance with the Tariffs, control procedures, and Cal-ISO standards. Staff finds the termination at Victor acceptable. There are no significant environmental or reliability impacts related to the applicant's termination at the Victor substation which would render it unacceptable.

FACILITY CLOSURE

INTRODUCTION

The parallel operation of generating stations is controlled , in part by CPUC Rule 21. This rule and standard utility practices for interconnecting a generating unit provide for the participating transmission owner to have control of breakers and disconnect switches where the outlet line terminates (the Victor substation) and generally control over the interconnected generators. Prior to construction and interconnection of a generating unit the participating transmission owner reviews and comments on the plans and specifications for the power plant and termination equipment that is important to safe and reliable parallel operation[39] and inspects the interconnection facilities. Contractual provisions may be developed to provide backup or other power service and codify procedures to be followed during parallel operation. Before generating stations are permitted to bid into the power exchange and be dispatched by the Cal-ISO, generator standards must be met and the generating station must commit to comply with instructions of the Cal-ISO dispatchers. All participating generators must sign a Participating Generator Agreement (Cal-ISO 1997b, Cal-ISO 1998c). Because of the need for effective communication and close coordination between the participating transmission owner to assure safety and system reliability, procedures for planned or unexpected facility closure and even abandonment must be developed.

The ability of the above LORS to reasonably assure safe and reliable conditions in the event of facility closure was evaluated for three scenarios:

PLANNED CLOSURE

This type of closure occurs in a planned, orderly manner such as at the end of its useful economic or mechanical life or due to gradual obsolescence. Under such circumstances the requirement for the owner to provide a closure plan 12 months prior to closure in conjunction with applicable LORS is considered sufficient to provide adequately for safety and reliability. For instance such planned closure provides time for the owner to coordinate with the participating transmission owner[40] to assure (as one example) that the participating transmission owner's system will not be closed into the outlet thus energizing the project switchyard. Alternatively the owner may coordinate with the participating transmission owner to maintain some power service via the outlet line to supply critical station service equipment[41].

UNEXPECTED TEMPORARY CLOSURE

This unplanned closure occurs when the facility is closed suddenly and/or unexpectedly for a short term due to unforeseen circumstances such as a natural or other disaster or emergency. During such a closure the facility cannot insert power into the utility system. Closures of this sort can be accommodated by establishment of an on site contingency plan (see General Conditions Including Compliance Monitoring and Closure Plan). Such a plan could establish automatic procedures which would assure for instance, that if the facility were left unattended the participating transmission owner would be aware of abandonment and would deenergize the outlet line and other electric power service to reduce the probability of shock hazards, fire and negative impacts on system reliability. Where public and worker safety and system reliability can be maintained, plans may include provision of power service from the participating transmission owner and other power service providers to accommodate important station service systems. Such systems may include power, control and communications necessary for fire detection and

[39] As an example the host utility has control over the generating unit breakers so that only when the host utility's line crews have completed maintenance, for instance and are clear of the line or other facilities could the unit reclose into the system.
[40] The host utility in this instance is Edison e.g., the system owner to which the project is interconnected.
[41] These are mere examples many more exist.

extinguishing, emergency lighting, uninteruptable electric power service, important pumps and others. Other important elements of facility closure are discussed in the General Conditions Including Compliance Monitoring and Closure Plan.

ABANDONMENT

This unplanned closure occurs when the facility is abandoned by the project owner. This is considered to be a permanent closure. The project owner claims no continuing responsibility for the facilities. An on site contingency plan which is in place and approved by the CPM prior to the beginning of commercial operation of the facilities will be developed to assure safety and reliability (see General Conditions Including Compliance Monitoring and Closure Plan). CPUC General Order 95, Rule 31.6 requires that “lines or portions of lines permanently abandoned shall be removed by their owners so that such lines shall not become a public nuisance or a hazard to life or property.” A condition of certification has been included herein to assure conformance in the event of closure of the HDPP. This rule applies to any permanent abandonment whether planned or not.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The power plant switchyard, outlet line and termination at the Victor substation are acceptable. The HDPP will, upon implementation of the recommended conditions of certification, comport with applicable LORS.

RECOMMENDATIONS

Staff recommends that the Commission adopt the recommended conditions of certification.

CONDITIONS OF CERTIFICATION

TSE-1 The project owner shall ensure that the design, construction and operation of the proposed transmission facilities will conform to requirements 1a through 1g listed below. The substitution of CPM approved “equivalent” equipment and equivalent switchyard configurations is acceptable.

a. The project 230 kilovolt switchyard shall include a breaker-and-a-half, breaker and bus configuration.

b. Breakers and bus shall be sized to comply with a short circuit analysis.

c. An approximately 7.2 mile single circuit 230 kilovolt line using lattice or steel pole construction with two 954 thousand circular mil conductors (or larger) shall be constructed to the Victor 230 kilovolt substation.

d. Termination facilities at the Victor 230 kilovolt substation shall comply with applicable Cal-ISO and Edison interconnection standards (CPUC Rule 21).
e. The HDPP shall be included in the existing Edison remedial action schemes and new remedial action schemes shall be developed in coordination with Edison and the Cal-ISO to meet Edison's Transmission Planning Criteria and Guidelines and the WSCC and NERC Reliability criteria and Planning standards.
f. The transmission facilities shall meet or exceed the requirements of CPUC GO-95; and

g. Outlet line crossings and areas where the outlet line parallels other transmission or distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.

Verification: At least 60 days prior to start of construction of transmission facilities, the project owner shall submit for approval to the CPM, electrical one-line diagrams signed and sealed by a registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements 1a through 1g above. Substitution of equipment and substation configurations shall be identified and justified by the project owner for CPM approval.

TSE-2 The project owner shall inform the CPM of any impending changes which may not conform to the requirements 1a through 1g of TSE-1, and have not received CPM approval, and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or switchyard configurations shall not begin without prior written approval of the changes by the CPM.

Verification: At least 60 days prior to construction of transmission facilities, the project owner shall inform the CPM of any impending changes which may not conform to requirements 1a through 1g of TSE-1 and request approval to implement such changes.

TSE-3 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction and any subsequent CPM approved changes thereto, to ensure conformance with CPUC GO-95 and CPUC Rule No. 21 and these conditions. In case of non-conformance, the project owner shall inform the CPM in writing within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after synchronization of the project, the project owner shall transmit to the CPM an engineering description(s), one-line drawings of the “as-built” facilities, and the results of the short circuit study signed and sealed by a registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95, CPUC Rule No. 21 and these conditions shall be concurrently provided.

REFERENCES

Cal-ISO (California Independent System Operator) 1997b. Cal- ISO Tariff Scheduling Protocol, Posted April 1998, Amends 1,4,5,6,7 incorporated.

Cal-ISO (California Independent System Operator) 1997c. Cal-ISO Dispatch Protocol, posted December 1997.

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TRANSMISSION SYSTEM ENGINEERING LIST OF TECHNICAL TERMS

ACSR	Aluminum cable steel reinforced. A composite conductor made up of a steel core surrounded by aluminum wire.
Ampacity	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
Ampere	The unit of current flowing in a conductor.
Bus	Conductors that serve as a common connection for two or more circuits.
Conductor	The part of the transmission line (wire) that carries the current.
Emergency	See Single Contingency.
Kcmil	Thousand circular mil. A unit of the conductor's cross-sectional area. Divide the area by 1,273 to obtained square inches.
Kilovolt	Thousand volts (kV). A unit of potential difference, voltage, between two conductors of a circuit or between a conductor and the ground.
Megavolt ampere	MVA. A unit of apparent power which equals the product of: line voltage (kV), current (amperes), and the square root of 3; divided by 1000.
Megawatt	MW. A unit of power equivalent to 1,341 horsepower.
Normal Operation	When all customers receive power they are entitled to without interruption and a 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.
Single Contingency	Also known as emergency or N-1 condition which occurs when one major transmission element (circuit transformer, circuit breaker, etc.) or one generator is out of service.
Thermal Rating/Capacity	See ampacity.
TSE	Transmission System Engineering

ALTERNATIVES

Testimony of Eileen Allen & Richard K. Buell

PURPOSE OF THE ALTERNATIVES ANALYSIS

Staff is required to examine the “feasibility of available site and facility alternatives to the applicant’s proposal which substantially lessen the significant adverse impacts of the proposal on the environment”. The purpose of staff’s alternatives analysis is to provide the Energy Commission with an analysis of a reasonable range of feasible alternative sites which could substantially reduce or avoid any potentially significant adverse impacts of the proposed project. (Cal. Code Regs., tit. 14, §15126(d)) (Cal. Code Regs., tit. 20, § 1765) This analysis identifies the potential significant impacts of the proposed project, and those sites, size and configuration alternatives that are capable of reducing or avoiding significant impacts.

ALTERNATIVE ANALYSIS CRITERIA

The “Guidelines for Implementation of the California Environmental Quality Act” (CEQA), Title 14, California Code of Regulations Section 15126(d), provide direction by requiring an evaluation of the comparative merits of “a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the project objectives...” In addition, the analysis must address the Ano project” alternative (Cal. Code Regs., tit. 14, э15126(d)).

The range of alternatives is governed by the Arule of reason” which requires consideration only of those alternatives necessary to permit informed decision-making and public participation. CEQA states that an environmental document does not have to consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative. (Cal. Code Regs., tit. 14, э 15125(d)(5)). However, if the range of alternatives is defined too narrowly, the analysis may be inadequate. (*City of Santee v. County of San Diego* (4th Dist. 1989) 214 Cal.App. 3d 1438).

ALTERNATIVES ANALYSIS METHODOLOGY

To prepare this alternatives analysis, the staff used the methodology summarized below:

- Identify the basic objectives of the project.
- Provide an overview of the project and potentially significant impacts.
- Identify and evaluate alternative electricity generation technologies and sites that meet the basic project objectives and potentially lessen or eliminate the significant impacts of the project proposal.
- Conduct a screening analysis to eliminate alternatives that are determined to be infeasible, don’t meet project objectives, or don’t lessen or avoid the significant impacts of the project.

- Once an alternative passes the basic screening analysis, the second step is to conduct an environmental evaluation of the alternative.
- The next step is to conduct a comparison of the alternative sites with the proposed project to determine whether the environmental impact of the alternative are the same, better or worse than the proposed project.
- Evaluate the impacts of not constructing the project to determine whether the Ano project" alternative is superior to the project as proposed.
- If the "no project" alternative is superior to the proposed project, identify the preferred environmental alternative.

HIGH DESERT POWER PLANT PROJECT (HDPP) OVERVIEW

BASIC PROJECT OBJECTIVES

After studying the High Desert Power Project (HDPP) Application for Certification (AFC), Energy Commission staff has determined the project's objectives to be:

- to build and operate a merchant power plant in the San Bernardino County region in order to generate and sell electric power in the newly deregulated power market;
- to locate near key infrastructure, such as transmission lines and natural gas pipelines, in order to maximize efficiency/minimize costs;
- to avoid the heavily constrained South Coast Air Quality Management District (South Coast AQMD) area due to increased risks of air permitting;
- to minimize project costs in order to achieve merchant plant financial viability; and
- to minimize project environmental impacts.

PROJECT DESCRIPTION

The proposed project is located on a 25 acre site on the site of the Southern California International Airport, formerly George Air Force Base, located within the northwest corner of the city of Victorville in San Bernardino County. The site is zoned for heavy industrial uses, with electric power plants being allowed in this zone. The site was formerly used for military and airport storage, and is currently unused. The nearest occupied residences are approximately 1.6 miles from the project site. The closest noise receptors, the Harold H. George School, the Shepard School, and the Southern California International Airport golf course, are approximately 1.25 miles from the project site.

The applicant has requested certification for two combined cycle configurations, one at 720 MW and the other at 678 MW. The 720 MW combined cycle option would require approximately 3,597 acre-feet of cooling water per year, and the 678 MW option would require approximately 3,102 acre-feet per year. The applicant has proposed two sources of cooling water: State Water Project water when available[42,]

42 The HDPP includes a proposed 2.5 mile water line to connect the project with the existing Mojave River Pipeline, which leads to the State Water Project aqueduct.

as the primary source; ground water from wells to be drilled in the project area, as the secondary source. A 7.2-mile transmission line route is proposed to connect the project with Southern California Edison's Victor substation, located southwest of Victorville. Two natural gas pipelines have been proposed: a 2.75-mile, 16-inch line and a 32-mile, 30-inch line, with both to be built by the Southwest Gas Company.

POTENTIALLY SIGNIFICANT ADVERSE IMPACTS

The environmental consequences of the proposal are discussed in detail in the individual sections of the SA. Staff believes that potentially significant impacts may occur in the air quality, water, biological and cultural resources technical areas. Without considering the second natural gas pipeline, the only remaining potentially significant unmitigated impacts relate to air quality and water resources. The proposed project may violate state ambient air quality standard for nitrogen dioxide (NO_2), and emissions may not be adequately offset to mitigate to their impacts.

Regarding water resources, we believe that the proposed project may have a significant impact on the ground water aquifer in the region, which is already in an overdraft situation. We have received information from the Victor Valley Water District (VVWD) and Mojave Water Agency (MWA) regarding their recommended preliminary conditions for approval of the water supplies for the High Desert Power Project. However, we have not received the Lahontan Regional Water Quality Control Board (RWQCB) preliminary conditions for approval of the wastewater discharge permit, necessary for injection of State Water Project (SWP) water into the ground water aquifer. The VVWD's approval of the applicant's water plan is contingent on injection of SWP water to mitigate overdraft impacts on the local ground water aquifer. Based on our last communication with the Lahontan RWQCB, we expect to receive their preliminary conditions in late January 1999. Thus, at this time we are unable to reach a conclusion on whether the project will result in significant impacts to water resources.

Regarding biological and cultural resources, in April 1998 the applicant proposed the second, 32-mile natural gas pipeline to connect the project with either the Pacific Gas & Electric or the Kern River Pipeline systems. We believe the second natural gas pipeline has a potential to result in significant environmental impacts to biological and cultural resources, if not properly mitigated. The second natural gas pipeline crosses habitat of both state and federal listed endangered species. The pipeline also crosses land containing cultural resources; one cultural resources site has been identified as being eligible for nomination for listing on the national register of historic places. The proposed pipeline route crosses federal lands under the jurisdiction of the U.S. Bureau of Land Management. By federal law, the U.S Bureau of Land Management and the U.S. Fish & Wildlife Service must determine the extent of impacts to biological and cultural resources on federal lands. The federal reviews are not yet complete. The federal agencies and the Energy Commission may or may not conclude that the second natural gas pipeline will result in significant unmitigated adverse impacts.

Relationship Of The Proposed Second Gas Pipeline To The Alternatives

The construction and operation of the second natural gas pipeline may significantly impact biological and cultural resources. Since the second natural gas pipeline is not necessary to make the project or any alternative project feasible, the most direct method of eliminating the environmental impacts may be the elimination of the second natural gas pipeline. There are two ways of conceptualizing elimination of the second natural gas pipeline: either as a mitigation measure or as a project alternative. In this analysis staff presents the elimination of the second natural gas pipeline as an alternative, since this makes it more readily comparable to other project alternatives which do not include a second natural gas pipeline (see below).

Any alternative project would likely be feasible without the second gas pipeline, and it is unclear whether any alternative considered in this analysis should incorporate a second natural gas pipeline. Moreover, even if the Energy Commission was to assume the existence of such a pipeline, there is insufficient information to conclude whether such a second pipeline at any of the sites would create significant cultural and biological resource impacts. Such impacts would be dependent on the length of the line and the specific location; none of which staff can estimate with any certainty. Therefore, the alternatives considered do not include a second natural gas pipeline.

ALTERNATIVES TO THE PROJECT

GENERATION TECHNOLOGY ALTERNATIVES

Public Resources Code section 25305(c) limits the scope of alternatives analysis during a siting case under specific conditions. This section states that conservation, load management, or other demand reducing measures reasonably expected to occur shall be explicitly examined in the Energy Commission's Electricity Report and shall not be considered as alternatives to a proposed facility during the siting process. Thus, such alternatives are not included in this SA.

We did compare various alternative technologies with the proposed project, scaled to meet the project's objectives. We examined the principal electricity generation technologies which do not burn fossil fuels such as natural gas. The technologies which could serve as alternatives to the proposed project are geothermal, solar, hydroelectricity, and wind. Each of these technologies could be attractive from an environmental perspective because of the absence or reduced level of air pollutant emissions. However, there are no geothermal resources sufficient to generate electricity in the Mojave Desert region. Solar, wind, and hydroelectricity resources require large land areas in order to generate 600-750 megawatts of electricity. Specifically, centralized solar projects using the parabolic trough technology require approximately 5 acres per megawatt; 600 megawatts would require approximately 3,000 acres, 120 times the amount of space taken by the proposed plant site and linear facilities. Photovoltaic arrays require similar acreage per megawatt. Centralized wind generation areas generally require 40-50 acres per megawatt, with

600 megawatts requiring 24,000 - 30,000 acres, more than 960 to 1,200 times the amount of space taken by the proposed plant site and linear facilities. Large hydroelectric facilities generating 600 megawatts would inundate at least 40,000 acres with water.

The alternative technologies discussed above have the potential for significant land use, biological and visual impacts. This is particularly true in the Mojave Desert region that has few industrial areas, a number of sensitive species and related habitat areas, and many scenic vistas. Consequently, staff does not believe that these are reasonable technology alternatives.

Staff also evaluated a smaller size alternative combined cycle configuration - a 240 MW combined cycle project, located at the HDPP site. This smaller project may not fully meet all of the applicant's objectives (e.g., to minimize project costs in order to achieve merchant plant financial viability). However, it would significantly reduce the amount of cooling water required for the project and would reduce the quantity of air emission reduction credits that would be required to permit the project. Consequently, we believe that it is a reasonable alternative to consider.

The applicant had originally proposed an 832 MW simple cycle configuration as an option in its proposed project. The applicant withdrew this configuration in mid-1998, at which time the staff added it as an alternative. Again, this alternative may not fully meet all of the applicant's objectives (e.g., to minimize project costs in order to achieve merchant plant financial viability). However, it would significantly reduce the amount of cooling water required for the project. Consequently, we believe that it is a reasonable alternative to consider.

Finally, staff evaluated the proposed project without the second natural gas pipeline. Again, this alternative may not fully meet all of the applicant's objectives (e.g., to minimize project costs in order to achieve merchant plant financial viability). However, it would avoid the impact associated with the second natural gas pipeline. Consequently, we believe that it is a reasonable alternative to consider.

ALTERNATIVE SITE SCREENING ANALYSIS

Alternative sites were identified through a review of the most recent siting cases in the Mojave Desert region and independent staff investigations. Staff contacted local governments, commercial/industrial real estate brokers, and agencies addressing military base closure. To date, no public comments or suggestions have been received on alternative sites. The sites staff identified were then subjected to a two step process. First, staff focused on site possibilities that would reduce or eliminate a potentially significant impact. Second, technical staff from each discipline (e.g., biology and air quality) was presented with the task of comparing each site against the proposed project site. For the purposes of this analysis, the proposed SCIA site and its related linear facilities were considered with all feasible measures available to mitigate the identified potential environmental impacts. Comparisons were based on whether an alternative site and its related linear facilities were better, the same or worse than the proposed project, in terms of each technical discipline. Staff used the following feasibility criteria when considering alternative sites:

- Considerations of whether the site alternative reduces or eliminates potential significant impacts in technical areas such as air quality and water supply.
- a minimum parcel size of 25 acres;
- local general plan and zoning designations suitable for electric power plants, or more generally, large industrial facilities;
- land use compatibility in terms of surrounding uses with similar characteristics such as noise level and visual profile;
- avoidance of sites with resource uses such as irrigated agriculture or sensitive species, and avoidance of areas with adjacent or surrounding residential development or nearby sensitive receptors such as schools and hospitals; and
- proximity to infrastructure such as water supply and natural gas pipelines.

Staff analyzed alternative sites in San Bernardino County. San Bernardino County is located in south eastern California and is bounded by the Counties of Kern and Los Angeles on the west; the County of Inyo on the north; the States of Nevada and Arizona on the east (partially delineated by the Colorado River); and the County of Riverside on the south. The primary land use in the Mojave Desert region is rural living with occasional grazing lands, scattered mining sites, and scattered urban development areas.

Staff also considered a site alternative in the South Coast air basin because of the possibility of more cooling water supply and air quality offset options in that area. The region examined by staff is shown in Alternatives Figure 1. This figure also shows the locations of the site alternatives which staff found feasible.

Staff initially evaluated eleven alternative sites for the proposed project. Eight were found to be infeasible, with this group discussed in Appendix C. Three sites out of the original eleven were considered feasible:

- Adelanto Industrial Park No.4, which was a site originally proposed for the HDPP in 1994; and
- The approved and partially built site for the never completed Luz Solar Electric Generating Station (SEGS) Unit 10 generation project in the Harper Lake region of San Bernardino County; and
- Approximately 25 acres within the unused land area at the Etiwanda Generating Station property in Rancho Cucamonga.

Each alternative site is located within San Bernardino County. The Adelanto alternative site is located in an area called the Victor Valley, and the Luz SEGS 10 site is located in an area called the Harper Lake vicinity. The Etiwanda property alternative site is located just south of a rolling foothill area leading to the San Gabriel Mountains.

ALTERNATIVES Figure 1
Site, Size, and Configuration Alternatives

ADELANTO SITE ALTERNATIVE

Project and Site Description

- The 26 acre site is located at the 42 acre Adelanto Industrial Park No.4 within the city of Adelanto (see **ALTERNATIVES** Figure 2).
- Zoning (Manufacturing/Industrial (M/I)) and General Plan designations are compatible with industrial use.
- Cooling water will be supplied by State Water Project water, and ground water using the same wells as those proposed for the HDPP at the Southern California International Airport.
- A new natural gas line approximately 3,280 feet long would be built by Southern California Gas Company to connect the project to its existing distribution line.
- The nearest residence is 0.25 mile to the northwest.

Advantages

- A project located at this alternative site would not include the second natural gas pipeline, and its associated potential impacts on biological, cultural, paleontological, and soil resources.
- The natural gas pipeline for the Adelanto alternative site would be only 0.6 miles long versus 2.75 miles for the HDPP.
- The connection to the State Water Project water, via the Mojave River Pipeline would be shorter at 0.5 mile, versus 2.5 for the HDPP.
- The transmission line would be slightly shorter at 6.4 miles, versus 7.2 for the HDPP.
- The transmission line would parallel existing lines for most of its length and would not be visible from any areas with high visual quality, whereas the transmission line in the golf course area of the SCIA would not be paralleling any existing lines.

Disadvantages

There is a residence approximately 90.25 mile to the northwest, versus the HDPP which has two schools 1.25 miles away, and the closest residence 1.6 miles away.

ALTERNATIVES Figure 2
Adelanto Site Alternative

LUZ SOLAR ELECTRIC GENERATING STATION UNIT 10

Project and Site Description

- The approximately 26 acre site is part of the approved, but never built Luz SEGS Unit 10 project 640-acre site in the Harper Lake region of San Bernardino County (see ALTERNATIVES Figure 3).

- The site is adjacent to the existing Luz SEGS Units 8 and 9, with primarily disturbed vegetation, and some native vegetation.

- The site is classified Rural Conservation and Rural Living in the San Bernardino County General Plan, which permits generation facilities in all designations and Official Land Use Districts, with site approval.

- Cooling water would be supplied by State Water Project water as the primary source, and wells at the Unit 10 site as the secondary source.

- A project at the Unit 10 site would connect to the existing SEGS Units 8 and 9 230 kV transmission line and an existing gas pipeline, with the transmission and gas connections each requiring no more than .5 mile.

- The nearest residence is approximately one mile to the southeast.

Advantages

- A project located at this alternative site would not include the second natural gas pipeline, and its associated potential impacts on biological, cultural, paleontological, and soil resources.

- Transmission lines related to this alternative site would parallel existing lines, giving it a visual advantage over the HDPP site which would require a section of new line standing alone.

Disadvantages

- Although a new project could connect into the existing 230 kV line at the Luz SEGS Unit 8 facility, adding 600-750 MW to the transmission system might lead to the need for building a 38-mile 230 kV line from the Kramer substation to the Victor substation.

- There is considerable undisturbed habitat for many wildlife species to the north of the alternative site, and a greater chance of impacts to the endangered desert tortoise on the rural roads in the area.

- Construction traffic could make Highway 58 in the Harper Lake region fairly congested at peak commute times, whereas construction traffic to the HDPP site would likely be dispersed over a greater network of roads.

ALTERNATIVES Figure 3
Luz Solar Electric Generating Station (SEGS) Unit 10 Site Alternative

- The closest residence, at one mile away would be more affected by noise, particularly at night, than the residences 1.6 miles from the HDPP site.

ETIWANDA PROPERTY SITE ALTERNATIVE

Project and Site Description

- The 25-acre site is located within Southern California Edison property surrounding the existing 1030 MW Etiwanda power plant in the City of Rancho Cucamonga (see ALTERNATIVES Figure 4).

- In the Fall of 1997, Edison sold some of its property, including the Etiwanda power plant to Houston Industries, and it retained the surrounding property including a transmission substation and numerous oil storage tanks.

- The alternative site is west of a former Kaiser steel plant and the California International Speedway developed by Kaiser Ventures, which is also planning a 1300 vehicle truck stop in the vicinity.

- Zoning (Heavy Industrial) and General Plan designations are compatible with industrial use.

- The nearest residence is approximately one mile away.

Advantages

- A project located at this alternative site would not include the second natural gas pipeline, and its associated potential impacts on biological, cultural, paleontological, and soil resources.

- Since this alternative site is adjacent to a transmission substation, and an existing gas pipeline, it will require very minimal (ie, approximately 100 yards) linear facilities.

- Reclaimed water for cooling is available from a treatment plant just south of the Etiwanda property site.

- This alternative site would be screened by an existing power plant and transmission substation, and it would not have a visually prominent transmission line.

Disadvantages

- The Etiwanda property is located in an urbanized area, with transportation routes already subject to heavy peak use.

Potential "Show-stopper"

- A 600-750 MW project located at this alternative site may not be able to obtain a construction permit because the expected PM10 impacts exceed

ALTERNATIVES Figure 4
Etiwanda Property Site Alternative

the significance level specified in South Coast Air Quality Management District (SCAQMD) Regulation X111, Rule 1303 (b)(1) Table A-2).

240 MW COMBINED CYCLE AT THE HDPP SITE

Project Description

- This smaller size project would be located at the HDPP site, with all of its characteristics except the 32-mile long second gas pipeline.

- We have assumed that the 720 MW design would be cut down to one 240 MW power train unit, with one stack at the same height.

Advantages

- This alternative would not include the second gas pipeline, with its associated potential impacts on biological, cultural, paleontological, and soil resources.

- Less cooling water would be required, with proportionately less State Water Project water and fewer wells needed.

- Emission levels and related offset requirements would be about one third of the proposed HDPP.

- Noise suppression measures would be less than that required for the larger HDPP project.

- Visual impacts would be less than those for the proposed project, since the power plant would be smaller, with only one stack.

Disadvantages

- This alternative lacks the equipment redundancy of the larger project with two (678 MW) or three (720 MW) power trains, thus if the single power train fails, the entire project would be shut down.

832 MW SIMPLE CYCLE AT THE HDPP SITE

Project Description

- This configuration alternative would be located at the HDPP site, with all of its characteristics except the 32-mile long second gas pipeline.

- This alternative would consist of five identical gas turbine generators, with a plot plan similar to that of the proposed HDPP.

- Emission levels would be similar to the HDPP.

Advantages

- The cooling water demand would be 250 acre-feet per year, compared with 3,102-3,597 acre-feet per year for the HDPP.
- This alternative would not include the second natural gas pipeline, and its associated impacts on biological, cultural, paleontological, and soil resources.
- This alternative would be the most reliable with five identical gas turbine generators; if one failed, four would still be available for power generation.

Disadvantages

- The five simple cycle power trains would generate more noise than the proposed two or three train configurations simply because there are more noise sources, and the exhaust cannot be muffled as effectively.
- This alternative would burn fuel less efficiently.

HIGH DESERT POWER PROJECT WITHOUT THE SECOND NATURAL GAS PIPELINE

Project and Site Description

- The project and site description is identical to that of the proposed project, except that it lacks the second natural gas pipeline.

Advantages

- This alternative would avoid the proposed project's potential impacts on biological, cultural, paleontological, and soil resources.

Disadvantages

- There are no disadvantages from the various environmental and engineering perspectives.

THE "NO PROJECT" ALTERNATIVE

CEQA Guidelines and Energy Commission regulations require consideration of the "no project" alternative. This alternative assumes that the project is not built. It is compared to the proposed project and determined to be superior, equivalent or inferior to it.

In the HDPP Application for Certification (AFC), the applicant concluded that the "no project" alternative is feasible. However, the AFC (HDPP 1997, p.6.1-1) stated that "if the HDPP is not built, the electricity which would have been generated by the HDPP would be supplied by other power plants". The AFC discussion concluded that if the HDPP were not built, that similar environmental impacts would result from power generation at either new or existing plants in other locations.

Staff recognizes that the "no project" alternative does not meet applicant’s stated objectives and the purpose of a merchant power plant. From this perspective the "no project" alternative would be undesirable for the applicant, but still feasible.

Staff believes that applicant’s concept that similar environmental impacts would be occurring elsewhere if the HDPP project were not built, ignores the potential impacts and limited mitigation options that are specific to the Mojave Desert region. Specifically, the applicant's proposal for a power plant and associated linear facilities in the Mojave Desert region presents potentially significant impacts for air quality, water resources, biological resources, and cultural resources which would not be found in other areas of the state. The Mojave region's lack of air emission offsets, and existing groundwater overdraft situation results in potentially significant project impacts. Furthermore, the project's proposed second natural gas pipeline results in potentially significant cultural and biological resource issues which are unique to the Mojave Desert region.

It is entirely conceivable that other new projects would have similar environmental control requirements. However, the environmental impacts could be less significant in a different region with different baseline conditions and possibly more mitigation. From the statewide perspective, other merchant power plant developers have discussed possibilities for at least 14 large (i.e., 300 MW or greater) projects with the Energy Commission staff. Therefore if the HDPP is not built, there is no shortage of alternatives for providing electricity and system reliability.

Not constructing and operating the proposed HDPP project would avoid all environmental impacts created by the project that are not mitigated to less than significant levels. Therefore, the "no project" alternative would be superior to the (unmitigated) proposed project in terms of environmental effects. Because of this determination, staff analyzed alternative sites that would reduce or avoid one or more of the potential environmental impacts from the proposed HDPP project and designated a preferred environmental alternative from the list of alternative sites.

THE “PREFERRED” ENVIRONMENTAL ALTERNATIVE

Given our conclusion that the “no project” alternative was found to be environmentally superior to the proposed project, a preferred environmental alternative determination was needed. This was done by assigning qualitative rating labels of “better”, “same”, or “worse” for comparing the various alternative options to the proposed project. When all of the technical disciplines are counted on an equal, unweighted basis, the Etiwanda property site alternative becomes a leading candidate for the preferred environmental alternative, since it had the highest number of “better” ratings. However, the potential show-stopper issue for air quality results in the Etiwanda site being potentially infeasible.

The aggregate conclusion shown in Alternatives Table 1 results from the staff rating assigned to each technical area comparing the potential impact of each alternative with the proposed project. However, the comparison in Table 1 does not consider whether the significant impacts identified for the proposed project are lessened or avoided. In addition, Table 1 does not indicate whether the relative merit of the alternatives for each technical area compared to the proposed project are significant.

Alternatives Table 2 compares the alternatives when that comparison is limited to the four areas with potential significant adverse impacts (i.e., air quality, water and soil resources, biological resources, and cultural resources). When the comparison is limited, a different result is obtained. Although the Proposed Project Without the Second Natural Gas Pipeline Alternative and Adelanto Site Alternative are same/better than the proposed project, they do not address air quality and water resources impacts. The Etiwanda Property Site Alternative, the 240 MW Combined Cycle Project Alternative, and 832 MW Simple Alternative are better than the proposed project. The 832 MW Simple Cycle Alternative is no better than the proposed project from the air quality perspective. Although a simple cycle project would operate differently because it would be used to meet peak load demands, the emissions on an overall basis would be similar. Since the 832 MW Simple Cycle Alternative does not address air quality impacts, staff does not believe it to be the preferred alternative. The Etiwanda Property Site Alternative addresses the significant impacts of the proposed project, but staff notes that it may not be able to obtain the necessary air quality permits. Thus, staff does not find the Etiwanda Property Site Alternative to be the preferred alternative. The 240 MW Combined Cycle Alternative would have lower emission levels, would require less water, and does not include the 32-mile gas pipeline which has potentially significant biological and cultural resource impacts. Since the 240 MW Combined Cycle Alternative address the potentially significant impacts of the proposed project, staff identifies this alternative as the environmentally preferred alternative.

CONCLUSION

CEQA requires the project alternatives analysis to focus on measures that would mitigate a project's potential significant impacts to less than significant levels. These impacts are in the air quality, and water, biological, and cultural resources areas. Our review of the five alternatives, indicates that each eliminates the biological and cultural resource impacts because they do not include the second gas pipeline.

The Etiwanda property alternative site has the potential for use of reclaimed water which would have less impact than the proposed project on water resources. With respect to air quality, the Etiwanda site in the SCAQMD may have more emission offsets available. However, this alternative has a potential fatal flaw, in that a project at this site might not be able to obtain a SCAQMD construction permit.

The strong point for the 832 MW simple cycle alternative at the HDPP site, is that its cooling water requirements are very low, which is significant given the Mojave River

ALTERNATIVES Table 1
Staff Comparison of Feasible Alternative Options

Alternative Site, Size, and Configuration Options	Adelanto Site	Luz SEGS Unit 10 Site	Etiwanda Property Site	240 MW Combined Cycle Project at SCIA Site	832 MW Simple Cycle at SCIA Site	Proposed Project without 2nd Natural Gas Pipeline
Air quality	same	same	worse[43]	better	same	better
Public health	same	better	better	better	same	same
Industrial safety and fire protection	same	same	same	same	same	same
Transmission line safety and nuisance	same	worse	better	same	same	same
Hazardous materials	same	same	worse	better	same	same
Waste management	same	same	same	same	same	same
Land use	same	same	same	same	same	same
Traffic and transportation	same	worse	worse	same	same	same
Noise	worse	worse	worse	better	worse	same
Visual resources	better	better	better	better	same	same
Cultural resources	better	better	better	better	better	better
Socioeconomic	same	same	same	same	same	same
Biology	better	same	better	better	better	better
Water resources	same	same	better	better	better	same
Soil resources	better	better	better	better	better	better
Paleontological resources	better	better	better	better	better	better
Facility design and geological hazards	same	worse	worse	same	same	same
Reliability	same	worse	worse	worse	better	same
Efficiency	same	same	same	same	worse	same
Transmission system engineering	better	worse	better	better	same	same
Aggregate total	**same**	**same /worse**	**better**[2]	**same**	**same**	**same**

S = same as the proposed HDPP project; B = better than; W = worse than.

ALTERNATIVES TABLE 2
Comparison Of Feasible Alternative Options
- Potential Significant Impact Focus

Alternative Site, size, and Configuration option	Adelanto Site	Luz SEGS Unit 10 Site	Etiwanda Property Site	240 MW Combined Cycle at SCIA Site	832 MW Simple Cycle at SCIA Site	Proposed Project without 2nd Natural Gas Pipeline
Air quality	same	same	worse[2]	better	same	same
Cultural resources	better	better	better	better	better	better
Biological resources	better	same	better	better	better	better
Water resources	same	same	better	better	better	same
Aggregate total	**same /better**	**same**	**better**[2]	**better**	**better**	**same /better**

[43] The potential air quality show-stopper may make the Etiwanda site infeasible.

Basin’s ongoing groundwater overdraft. However, its air quality emissions are similar to that of the proposed project.

The 240 MW combined cycle alternative at the HDPP site would use approximately one third of the water required for the proposed project, and have one third the level of emissions. This alternative is environmentally superior since its potential impacts are less than that of the proposed HDPP. Should the Energy Commission determine that the project results in significant unmitigated environmental impacts, staff believes that a 240 MW Combined Cycle project at the HDPP site represents a reasonable alternative to the applicant’s proposed project.

ATTACHMENT A - TECHNICAL ANALYSES

AIR QUALITY

INTRODUCTION

The purpose of this air quality alternatives analysis is to provide an approximate comparison of the air quality impacts of the two HDPP project configurations at the proposed site (Southern California International Airport - SCIA) and the alternative sites. In addition, staff provides qualitative comparisons of the air quality impacts of a 240 MW combined cycle facility, an 832 MW simple cycle facility, and an HDPP without the second gas pipeline alternative to the proposed HDPP. The HDPP proposed site, and the City of Adelanto and Luz SEGS Unit 10 (Harper Lake) alternative sites are located in the Mojave Desert Air Quality Management District (District); the Etiwanda power plant property site is located in the South Coast AQMD.

APPLICABLE LORS

With respect to air quality, the same federal and state LORS apply to the three alternative sites, and the alternative project configurations.

Local

South Coast Air Quality Management District

If the project is located at the Etiwanda power plant site, it will be subject to the rules and regulations of the South Coast AQMD. The project would be subject to Regulation XX, RECLAIM, for NO_x; other pollutants would be addressed under the New Source Review (NSR) requirements of Regulation XIII. New Source Review requirements include Best Available Control Technology, offsets by emission reduction credits, and air pollutant impact modeling that demonstrates that the project will not cause a significant increase in an air quality concentration above specified levels. The NO_x RECLAIM program requires the application of NO_x RECLAIM trading credits.

Mojave Desert Air Quality Management District (DISTRICT)

If the project is located at either the SCIA, the Luz SEGS Unit 10 or the City of Adelanto alternative site, it will be subject to the rules and regulations of the Mojave Desert AQMD, as identified and discussed in the **Air Quality** portion of this document.

AIR QUALITY IMPACTS

All three alternative sites - Adelanto, Luz SEGS Unit 10, and Etiwanda power plant property - are located in the same type of terrain as the proposed HDPP site. Therefore, the emission impacts from each configuration: the 720 MW Combined

Cycle; and the 678 MW Combined Cycle, would likely be similar at each alternative site.

Several issues affect an environmental comparison of the 832 MW simple cycle project to the proposed HDPP configurations. While the annual operating hours for the simple cycle will be less compared to the combined cycles, the annual NOx emissions will be approximately the same because the simple cycle NOx emission rate will likely be greater than that for the combined cycle. Additionally, there are 5 combustion turbines compared to three for the combined cycle configurations, and there will be more start-up/shut-down cycles for the simple cycle . Even if high temperature catalysts were developed for an SCR application on the simple cycle, the emission rate would probably still be greater than for the combined cycle turbines, resulting in similar annual NOx emissions totals for the various configurations.

For air pollutants besides NOx, the lower annual operating hours of the 832 MW simple cycle project may lower annual emissions compared to the combined cycle configurations. However, the likely frequent start-ups and shut-downs may produce emission spikes, on a short-term basis, that are higher than average short-term emissions profiles of the combined cycles configurations. Therefore, simple cycle configuration is no better or worse from an overall air quality impact of non-NOx pollutants.

As for the alternative 240 MW combined cycle project, assuming that the basic equipment and exhaust conditions are the same, the project emissions, and the emission impacts, would likely be about one third of the proposed HDPP.

With respect to the alternative of the proposed project without the second natural gas pipeline, it is somewhat better than the proposed project because the emissions associated with construction of the pipeline would be avoided.

BACT/LAER Requirements

BACT/LAER requirements are similar for combined cycle projects in Mojave Desert and South Coast air districts. Whether SCR would be cost effective, or even technologically feasible, for simple cycle configurations, would an issue of considerable debate during permitting of simple cycle projects at any of the sites. BACT/LAER requirements for the 240 MW scenarios are expected to be the same as for the proposed HDPP.

Offsets

Offset requirements would be the same if the project is located at Luz SEGS Unit 10 alternative site, the Adelanto alternative site, or the proposed site. Potential emission reduction credits (ERCs) available for offsets may be limited in the DISTRICT, so the project may experience some difficulty in obtaining offsets at each of these potential sites, and would likely have to obtain additional offsets from the South Coast air basin. Offsets may be more readily available in the South Coast air basin, so the project may not face as much difficulty in obtaining offsets if it is located at the Etiwanda power plant property alternative site. If the generating capacity is reduced to 240 MW, staff expects that offset requirements would be only 30 to 35 percent of those for the HDPP. Therefore, finding available ERCs to offset the project's emissions increases would probably be easier for a 240 MW facility.

Alternatives Air Quality Table 1
Comparison of Sites, Size, and Configuration Alternatives with the Proposed Project

ALTERNATIVE OPTIONS	COMPARISON TO THE PROPOSED PROJECT/SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	Same	same
Luz SEGS Unit 10 site	Same	same
Etiwanda power plant property site	Same	same
240 MW combined cycle project at SCIA	Better	better
832 MW simple cycle project at SCIA	Same	same
HDPP w/o 2nd gas pipeline	Same	same

Ability To Secure Construction Permits

The project, as proposed, may not be able to obtain a construction permit if it is located at the Etiwanda power plant property alternative site because the project PM10 emission impacts exceed the significance level specified in the South Coast AQMD Regulation XIII, Rule 1303(b)(1) Table A-2. The project, including the alternative 240 MW facility, is not expected to face such a restriction if it is located at any site in the Mojave Desert air basin.

CONCLUSIONS

Staff believes that the air quality impacts would be essentially the same for all the alternative sites, and the alternate 832 MW configuration at the HDPP site. The alternative of the proposed project without the second gas pipeline would be slightly better because of the reduced level of construction related emissions. Staff also believes that if the HDPP is down-sized to 240 MW, its emissions would be approximately one third of the emissions projected for the proposed HDPP. Therefore, the 240 MW combined cycle at SCIA option is better than the proposed project from the air quality perspective.

PURPOSE OF THE ANALYSIS

The purpose of the Public Health analysis is to compare the alternative sites, size and configuration alternatives, and HDPP without the second gas pipeline HDPP as proposed.

APPLICABLE LORS

With respect to public health, the same federal and state LORS would apply to the three alternative sites, and the alternative project size.

Local

The only applicable public health laws are the rules of the Mojave Desert Air quality Management District. These (1) ensure implementation of the requirements of Section 44300 et seq., of the Health and Safety Code regarding the potential health risks from operating a source of air pollutants and (2) prohibit the use of hexavalent chromium which is a carcinogen, in cooling towers constructed after September 23, 1991. The District ensures compliance with requirements of Section 44300 et seq., by requiring a health risk assessment as part of the application for authority to construct (ATC). The applicant (HDPP 1997) has stated their intention to comply with rule on chromium by using a phosphate-based alternative which is acceptable to staff.

PUBLIC HEALTH IMPACTS

The HDPP's potential public health impacts at the SCIA site are discussed in the Public Health section of this document. These health impacts are assessed with regard to the noncriteria pollutants, not the criteria pollutants, which are addressed in the Air Quality section. The purpose of this analysis is to compare the proposed SCIA site and two alternative sites with regard to the potential public health impacts from exposure to these noncriteria pollutants. It is additionally intended to compare the proposed project with 240 MW combined cycle and 832 simple cycle alternatives at the SCIA site, and the prposed project at the SCIA site without the second gas pipeline, with regard to their potential public health impacts. Such assessments will be made in terms of the potential for significant cancer and noncancer health effects.

For project-related noncancer effects, the potential for significance is assessed by comparing projected exposures levels with reference exposure levels established by Cal/EPA for the individual pollutants involved. When projected exposure levels are larger than the applicable reference level, significant effects would be considered likely. When smaller than the reference level, such effects would be considered unlikely. In the case of cancer-causing pollutants, it is generally presumed that a specific cancer risk is possible from every exposure associated with the source under consideration making the cancer end point more sensitive than the noncancer health effects in assessing the public health effects acceptability of emissions. The cancer risk to the maximally exposed individual is considered in such assessments as are way to assess the regulatory significance of the maximum cancer risk possible from that source. Another way in case of large populations is to assess the number of excess cancers possible per million individuals potentially exposed. This number is referred to as the project related cancer burden. An excess burden of one cancer in a million would be considered significant by staff.

The location of the maximally exposed individual will usually depend on factors such as wind patterns, elevation of the terrain (area), distance from the source and temperature. This means that the maximally exposed individual may not necessarily be found a the nearest location from the source. When the maximum possible cancer risk is at a level considered insignificant, any given site would best be compared with an alternative by comparing the populations in the areas of possible carcinogen exposure. The area with a smaller population would be considered more desirable than one with a larger population.

Adelanto Alternative Site

Alternatives Table 1, which compares the applicant's and staff's alternative sites, and staff's alternative size, to the applicant's proposed project, shows the Adelanto alternative site to be the same with regard to public health impacts, when compared with the SCIA site. This conclusion is based on the fact that both sites are zoned for industrial developments where similar distance-related regulations would presumably be applied with regard to the location of the nearest residence where the maximum, long-term exposure would occur. It is assumed from the population densities would be similar for industrial zone sites.

Luz SEGS Unit 10 Alternative Site

Table 1 shows the Luz SEGS Unit 10 alternative site where, because of the need for a large solar energy collection areas, a large buffer would likely exist between the facility and the nearest residence with the maximally exposed individual. This suggests that the cancer risk to the maximally exposed individual would be lower than at the proposed SCIA site, making it a better site from a public health stand point.

Etiwanda Power Plant Property

Table 1 shows the Etiwanda property to be better from a public health stand point when compared with the SCIA site. There appear to be many more locations around the site for industrial developments than at the proposed SCIA site. This suggests that there would likely be fewer residences around the Etiwanda property than the SCIA site. This suggests that fewer individuals would be exposed to pollutants from the power plant, making this a better site from the standpoint of total public exposure.

240 MW Combined Cycle At SCIA Alternative

Table 1 also shows that the alternative size 240 MW combined cycle project would be better from a public health stand point, when compared with the applicant's proposed project size options. The emissions levels from the 240 MW plant would be proportionately lower than from any of the configurations proposed. This would translate into a correspondingly lower cancer risk to the maximally exposed individual.

Alternatives Public Health Table 1
Comparison of Sites, Size, and Configuration Alternatives with the Proposed Project

ALTERNATIVE OPTIONS	COMPARISON TO THE PROPOSED PROJECT/SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	same	same
Luz SEGS Unit 10 site	better	better
Etiwanda power plant property site	better	better
240 MW combined cycle project at SCIA	better	better
832 MW simple cycle project at SCIA	same	same
HDPP w/o 2nd gas pipeline	same	same

832 MW Simple Cycle At SCIA Alternative

Table 1 shows that this alternative is the same as the proposed project, given that it has the same location and sensitive receptors, and a similar level of emissions.

High Desert Power Project Without The Second Gas Pipeline

Table 1 shows that this alternative is the same as the proposed project from the public health perspective, in that the second gas pipeline is not expected to result in public health impacts.

CONCLUSION

Staff concludes that the Adelanto alternative site , the 832 MW simple cycle at SCIA configuration alternative, and the HDPP without the second gas pipeline alternative would be the same as the proposed project from a public health stand point. The Luz SEGS Unit 10 and Etiwanda property alternative sites are better than the proposed project because there are fewer residences and individuals in these areas. Operation of the 240 MW combined cycle project would be better than the proposed project, given the lower level of emissions.

INDUSTRIAL SAFETY AND FIRE PROTECTION

PURPOSE OF THE ANALYSIS

The purpose of the Industrial Safety and Fire Protection analysis is to compare the alternative sites ,alternative project sizes, and the HDPP without the second gas pipeline, to the HDPP as proposed

APPLICABLE LORS

With respect to Industrial Safety and Fire Protection, the same federal and state LORS and industrial standards apply to the three alternative sites, and the alternative project size.

Federal

- 29 U.S.C.Section 651 et seq. (Occupational Safety and Health Act of 1970)
- 29 C.F.R. Sections 1910.1 - 1910-1500 (Occupational Safety and Health Administration Safety and Health regulations)
- 29 C.F.R. Sections 1952.170 - 1952.175 (Approval of California's plan for enforcement of its own Safety and Health , in lieu of most of the federal requirements found in sections 1910.1 requirements - 1910.1500)

State

- Labor Code Section 142.3 (Authorizing the Occupational Safety and Health Board to establish safety and health standards)
- Labor Code Section 6300 et seq. (Establishing the responsibilities of the Division of Occupational Safety and Health)
- Title 8, California Code of Regulations, Section 450 et seq. (Applicable requirements of the Division of Industrial Safety, including Unfired Pressure Vessel Safety Orders, Construction Safety Orders, Electrical Safety Orders, and General Industry Safety Orders)

Industry Standards

- Uniform Building Code (UFC) contains provisions necessary for fire prevention and information about fire safety, special occupancy uses, special processes, and explosive, flammable, combustible and hazardous materials.
- Uniform Fire Code Standards is a companion publication to the UFC and contains standards of the American Society for Testing and Materials, and of the National Fire Protection Association.
- California Building Code (Cal. Code Regs., tit 24, э 501 et seq.) is designed to provide minimum standards to safeguard human life, health, property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy.

INDUSTRIAL SAFETY AND FIRE PROTECTION IMPACTS

The HDPP's potential Industrial Safety and Fire Protection impacts for the SCIA site are discussed in the Industrial Safety and Fire Protection section of this document. The purpose of this discussion is to evaluate potential Industrial Safety and Fire Protection impacts associated with the alternative sites, and the alternative size project.

Staff determined that all the alternative sites are equal. All of the sites will require the same Safety and Health Programs (Refer to Worker Safety and Fire Protection SA); are under the same California Occupational Health and Safety District Office; and all of the sites have adequate fire protection. The 240 MW combined cycle and 832 MW simple cycle options at the SCIA site, and the HDDP without the second gas pipeline option, would also require these programs; and also have adequate fire protection.

CONCLUSION

Staff has concluded that locating the project at any of the alternative sites or developing the 240 MW, 832 MW, or HDPP without the second gas pipeline options at the SCIA site, would not result in any significant differences in Industrial Safety and Fire Protection.

Alternatives Industrial Safety and Fire Protection Table 1
Comparison of Alternative Sites
and Alternative Size with the SCIA Site

ALTERNATIVE OPTIONS	COMPARISON TO THE PROPOSED PROJECT/SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	same	same
Luz SEGS Unit 10 site	same	same
Etiwanda power plant property site	same	same
240 MW combined cycle project at SCIA	same	same
832 MW simple cycle project at SCIA	same	same
HDPP w/o 2nd gas pipeline	same	same

TRANSMISSION LINE SAFETY AND NUISANCE

PURPOSE OF THE ANALYSIS

The purpose of the Transmission Line Safety and Nuisance analysis is to compare the alternative sites ,alternative project sizes, and the HDPP without the second gas pipeline to the HDPP as proposed.

APPLICABLE LORS

With respect to transmission line safety and nuisance, the same federal and state LORS apply to the three alternative sites, and the alternative project size.

Local

There are no local laws or regulations specifically aimed at the aspects of line design and operation with a bearing on the safety and nuisance impacts of concern in this analysis.

TRANSMISSION LINE SAFETY AND NUISANCE IMPACTS

The HDPP's potential transmission line safety and nuisance impacts for the SCIA site are discussed in the Transmission Line Safety and Nuisance section of this document.   According to current CPUC regulations, transmission lines are to be designed and operated according to the field-reducing specifications applicable in the service area involved.   As noted by the applicant on page 4.2-11 of the AFC, the applicable guidelines in this case are those of Southern California Edison in whose service area the project will be located. Since the line would be designed and operated the same way at both the proposed and the alternative sites under consideration, the only difference between these sites, from the standpoint of possible human impacts, would lie in the number of individuals potentially experiencing the safety and nuisance impacts at issue.   The number of such individuals would directly depend on the length of the line, which could then be used for the impacts comparisons in this analysis.

Adelanto Alternative Site

As noted in the Project Description section, a new 6.4 mile 230 kV overhead, single circuit transmission line would be built to connect the project to the Southern California Edison Company's electrical transmission system at the existing Victor Substation, if the project were to be built at the Adelanto site. A new 230 kV switchyard would also be built at the southern end of the project site.

Since the transmission line for the project at the Adelanto site would be 6.4 miles as compared to 7.2 miles at the SCIA site, the Adelanto site is better than the SCIA site with regard to the number of individuals potentially experiencing the safety and nuisance effects of the line, as shown in Alternatives Table 1.

Luz SEGS Unit 10 Alternative Site

As noted in the Project Description section, a new 230 kV line of approximately 13 miles will have to be built for the project if it were to be located at the Luz SEGS Unit 10 site, making the SCIA site better than the Luz SEGS site, with regard to possible transmission safety and nuisance impacts, as indicated in Alternatives Table 1.

Etiwanda Power Plant Property

As noted in the Project Description section, a transmission line of approximately 100 yards will have to be built for the project if it were located at the Etiwanda site. This shows the Etiwanda site to be better than the proposed SCIA site with regard to potential transmission safety and nuisance impacts, as shown in Alternatives Table 1.

240 MW Combined Cycle And 832 MW Simple Cycle At SCIA

A 240 MW combined cycle project and an 832 MW simple cycle project at the SCIA site, would require a 230 kV transmission line to be constructed and operated the same way as the line proposed for the project at the SCIA site. The potential impacts of such a line would likely be similar to those associated with the project as proposed. This fact is reflected in the notation in Alternatives Table 1.

High Desert Power Project Without The Second Gas Pipeline

This alternative would be the same as that of the proposed project, since gas pipelines do not have an effect on transmission line safety and nuisance.

Alternatives T-Line Safety and Nuisance Table 1
Comparison of Alternative Sites
and Alternative Size with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	better	better
Luz SEGS Unit 10 site	worse	worse
Etiwanda property site	better	better
240 MW combined cycle at SCIA	same	same
832 MW simple cycle at SCIA	same	same
HDPP w/o 2^{nd} gas pipeline	same	same

CONCLUSION

From the standpoint of transmission line safety and nuisance, the proposed project would be better if located at the Adelanto and Etiwanda sites than at the proposed SCIA site. It would however be worse at the Luz SEGS Unit 10 site. The related safety and nuisance impacts would be the same for the project, whether sized as proposed or alternatively with a 240 MW combined cycle, an 832 MW simple cycle, or the HDPP project without the second gas pipeline, at the SCIA site.

INTRODUCTION

The purpose of this hazardous materials analysis is to compare the alternative sites, alternative project size and configuration, and the HDPP without the second gas pipeline to the HDPP as proposed.

APPLICABLE LORS

With respect to hazardous material handling, the same federal, state and local LORS apply to the three alternative sites, and the alternative project size and configuration.

HAZARDOUS MATERIAL HANDLING IMPACTS

The proposed HDPP's potential hazardous material impacts for the SCIA site are discussed in the Hazardous Material Handling portion of this document. Staff evaluated the alternative projects based on their seismic suitability, public receptor proximity and hazardous materials handled. These evaluations resulted in a professional judgement on whether or not these alternative projects represent a significant difference in the potential impact on public health and safety as compared to the proposed projects.

Adelanto Alternative Site

The Adelanto site is slightly better than the SCIA site due to the fact that there appear to be no public receptors near the fence line. The SCIA site has potential public receptors at the fence line. This would mean that there would be a reduction in potential impacts on public health and safety at the Adelanto site as compared to the SCIA site. However, in staff's opinion, this is not a significant reduction in risk. Therefore, staff does not consider this to be a better site than the SCIA site.

Luz SEGS Unit 10 Site

The Luz SEGS Unit 10 site is similar to the SCIA site, due to the fact that there are public receptors near the fence line (i.e., the LUZ SEGS facility employees). This means that there is no significant change in the risk to public health and safety as compared to the SCIA site.

Etiwanda Site

The Etiwanda site is worse than the SCIA site, due to the presence of public receptors, major highways and a hospital near the facility fence line. Also, the SCIA site has only a potential to have public receptors at the fence line, while the Etiwanda site currently has public receptors at the fence line.

240 MW Combined Cycle Project

The alternative 240 MW combined cycle project is slightly better when compared with the applicant's proposed projects. This is due to the fact that this smaller project would require less ammonia to be used on site and fewer deliveries. Fewer deliveries means fewer chances of an accident during deliveries. However, staff does not consider this to be a significant reduction in risk to the public health and safety. Therefore, staff does not consider this to be a better alternative than the proposed projects.

832 MW Simple Cycle Project

The alternative 832 MW simple cycle peaking project would be significantly better than the proposed projects if it does not use an SCR to control NO_x emissions. With no SCR, there is no need to store or use ammonia on site. Therefore there is no risk to the public from exposure to accidental ammonia release. However, at this time it is not clear whether or not this alternative will be required to use SCR. Therefore, staff does not consider this to be a better alternative than the proposed projects.

High Desert Power Project Without The Second Gas Pipeline

From the hazardous materials perspective, this alternative would be the same as the proposed project, since gas pipelines are not expected to result in any hazardous materials impacts.

ALTERNATIVES - HazMat TABLE 1
Summary of Comparison of Alternative Projects
to the SCIA Proposed Project

ALTERNATIVE PROJECTS	COMPARISON TO THE PROPOSED PROJECT AT THE SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto Site	Same	same
Luz SEGS Unit 10 Site	Same	same
Etiwanda Site	Worse	worse
240 MW Combined Cycle at SCIA	Same	same
832 MW Simple Cycle at SCIA with SCR	Same	same
HDPP w/o 2nd Gas Pipeline	Same	same

CONCLUSION

Staff concludes that the Etiwanda site alternative poses a significantly greater risk to the public health and safety than the SCIA site. Also, staff concludes that the 832 MW peaking project alternative, without SCR, is better because it eliminates virtually all risk to the public health and safety from the hazardous materials perspective, as compared to the proposed projects. Finally, staff concludes that the other four alternatives (Adelanto site, Luz SEGS Unit 10 site, 240 MW project ,832 MW Project with SCR, and the HDPP without the second gas pipeline) have no significant difference in the risks to the public health and safety as compared to the proposed projects.

PURPOSE OF THE ANALYSIS

The purpose of the waste management analysis is to compare the alternative sites, alternative project sizes, and HDPP without the second gas pipeline, to the HDPP as proposed.

APPLICABLE LORS

With respect to waste management, the same federal and state LORS apply to the three alternative sites, and the alternative project size.

Local

Pursuant to Senate Bill 1082 of 1993 (Health and Safety Code Chapter 6.11) the Secretary for Environmental Protection established a unified hazardous waste and hazardous materials management regulatory program (Unified Program).

San Bernardino County Environmental Health is the Certified Unified Program Agency (CUPA) for the area that consolidates, coordinates, and makes consistent the administrative requirements, permits, inspection activities, enforcement activities, and hazardous waste and hazardous materials fees.

WASTE MANAGEMENT IMPACTS

The HDPP's potential waste management impacts for the SCIA site are discussed in the waste management section of this document. The purpose of this discussion is to evaluate potential waste management impacts associated with the alternative sites, the size and configuration alternatives, and the alternative of the HDPP without the second gas pipeline.

Construction

Wastes generated during construction will include those related to site preparation as well as actual facility construction. The types and quantities of wastes generated from construction of the facility itself are not likely to vary according to the site chosen, as long as the design of the project does not change significantly. However, wastes generated as a result of site preparation activities would vary according to the quantity and type of contaminants which could exist at the alternative sites. Potential sources of contamination could include unauthorized dumping, spills from hazardous materials containers being transported over or temporarily parked at the site, and migration of chemicals from nearby leaking tanks or waste sites. Conclusions regarding the existence of contamination at any alternative site can not be made in the absence of site-specific sampling and analysis data. Quite commonly, for instance, leaking underground storage tanks may be found near a site, and contaminants may migrate onto the site itself. Until a site is investigated specifically for contamination, the amount of hazardous or nonhazardous waste which may be generated during site preparation cannot be estimated with confidence. Thus, from this regard, all alternative sites must be considered equal to the proposed site. It should be noted, though, that the primary barrier to remediating a contaminated site is likely to be economic rather than technical, meaning that any site chosen could be cleaned up prior to use.

Operation

The amounts and types of hazardous and nonhazardous wastes generated during facility operation are strictly a function of facility design, and not location. Similarly, the landfill to be chosen for waste disposal is likely to be a function of project design, which is assumed to be the same for all project locations. Therefore, the choice of an alternative site would not affect waste generation or management practices.

CONCLUSION

Staff has concluded that each of the alternative options would not result in any significant differences in waste management practices or related environmental impacts.

ALTERNATIVES WASTE MANAGEMENT Table 1
Comparison of Alternative Sites
and Alternative Size with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	same	same
Luz SEGS Unit 10 site	same	same
Etiwanda property site	same	same
240 MW combined cycle at SCIA	same	same
832 MW simple cycle at SCIA	same	same
HDPP w/o 2nd gas pipeline	same	same

LAND USE

PURPOSE OF THE ANALYSIS

The purpose of the land use analysis is to compare the alternative sites, alternative project configuration, alternative project size, and HDPP project without the second gas pipeline, to the HDPP as proposed.

APPLICABLE LORS

With respect to land use, each of the alternative sites is subject to a different combination of federal, state, and local LORS. To clarify which LORS are associated with each alternative site, the following list of federal and state LORS apply to any of the three alternative sized projects at this site. For the alternative size and alternative configuration options, the LORS that are applicable to the proposed project, are applicable to these alternatives at the SCIA site.

Federal

US Bureau of Land Management

- National Environmental Policy Act (NEPA): Title 42 United States Code, э 4321-4327; requires federal agencies to consider potential environmental impacts of projects with federal involvement and to consider appropriate mitigation measures.
- Federal Land Policy and Management Act (FLPMA): Title 43 United States Code, Chapter 35, Sub-Chapter VI, Sections 1781-1782; requires the Secretary of Interior to retain and maintain public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric water resource, and archeological values [Section 1781(a)(8)]. The Secretary, with respect to the public lands, shall promulgate rules and regulations to carry out the purposes of this Act and of other laws applicable to public lands [Section 1740].
- The United States Bureau of Land Management, California Desert Conservation Plan; dated 1980, with revisions through 1998; provides development standards, and requirements associated with BLM administered lands in the project area as required by 43 USC 1781.
- BLM-43 USC 1737, et seq. This section of the federal code addresses approval of operations and rights-of-way on federal land.

Local

San Bernardino County

The Goal Element of the San Bernardino County General Plan which is applicable to the project alternatives section of this report is:

- Goal D-45 Plan for compatible and harmonious arrangement of land uses in urban areas by providing a type and mix of functionally well-integrated land uses which meet general social and economic needs.
- The San Bernardino County General Plan designates generalized uses for land areas of the County and specific policies for development.
- The San Bernardino County, Joint Utility Management Plan (JUMP),1973. The JUMP provides standards for regulating the location and development of utilities in the County.

City of Rancho Cucamonga

- City of Rancho Cucamonga General Plan and Zoning Code

City of Adelanto

- City of Adelanto General Plan and Zoning Code

LAND USE IMPACTS

The land use assessment for the HDPP focused on two main issues: the conformity of the project with applicable land use plans, goals, policies and ordinances; and the potential of the proposed project to be compatible with existing and planned land uses in the vicinity of the alternative sites. The HDPP's potential land use impacts for the SCIA site are discussed in the Land Use section of this document. The purpose of this discussion is to evaluate potential land use impacts associated with the alternative sites, and the alternative size and alternative configuration projects.

Adelanto Alternative Site

Alternatives Table 1, which compares the applicant's and staff's alternative sites, and staff's alternative size, to the applicant's proposed project, shows the Adelanto alternative site to be generally the same for land use impacts, when compared with the SCIA site.

Staff finds the Adelanto alternative site consistent with the general plan and zoning regulations, and compatible with surrounding land uses (industrial park).

Luz SEGS Unit 10 Alternative Site

Table 1 shows the Luz SEGS Unit 10 alternative site to be generally the same, for land use impacts, when compared with the SCIA site. For the SCIA and LUZ SEGS Unit 10 alternative sites, additional federal LORS apply since the routes for some of the linear facilities of the HDPP project would cross land managed by the US military and/or the US Bureau of Land Management.

Staff finds the Luz SEGS Unit 10 site consistent with the general plan and zoning regulations, and compatible with the surrounding land uses(solar generating plant No.9 adjacent to alternative site).

Etiwanda Power Plant Property

Table 1 shows the Etiwanda property to be generally the same, for land use impacts, when compared with the SCIA site. Staff finds the Etiwanda power plant alternative consistent with the general plan and zoning regulations, and compatible with the surrounding land uses (Etiwanda Generating Station and other industrial uses adjacent to alternative site).

240 MW Combined Cycle And 832 MW Simple Cycle At SCIA

Table 1 also shows that the alternative size 240 MW combined cycle and the 832 MW simple cycle are virtually the same, for land use impacts, when compared with the applicant's proposed project size options. The smaller sized alternative and the alternative configuration projects at the SCIA site, would be subject to the same LORS as the proposed project at the SCIA site.

Staff finds the alternative size proposal consistent with the City of Victorville Comprehensive General Plan, the Southern California International Airport (SCIA) Community Plan Element, the SCIA Specific Plan, the City of Victorville Zoning Ordinances and Municipal Code, the US Air Force lease, the Victor Valley Development Authority's Redevelopment Plan, the Comprehensive Airport Land Use Plan (CALUP), and all other pertinent land use goals and policies.

High Desert Power Project Without The Second Gas Pipeline

This alternative is the same as the proposed project with respect to land use impacts.

Alternatives-Land Use Table 1
Comparison of Alternative Sites
and Alternative Size with the SCIA Site

ALTERNATIVE SITE/SIZE	PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	same	same
Luz SEGS Unit 10 site	same	same
Etiwanda property site	same	same
240 MW combined cycle at SCIA	same	same
832 MW simple cycle at SCIA	same	same
HDPP w/o 2nd gas pipeline	same	same

CONCLUSION

In the area of Land Use, staff has concluded that the alternative project sites, the alternative size, alternative configuration, and the HDPP project without the second gas pipeline alternative option will not result in any significant adverse land use impacts based on a preliminary site assessment. Staff assumes that for the proposed site, the issue of Runway 21's designation will be determined, and the stack heights will be addressed to the satisfaction of staff. The various alternative sites, and alternative size configuration, and HDPP without second pipeline options do not conflict with existing land uses on site and surrounding land uses which generally are industrial in nature. In all cases, the alternative sites, alternative size and configuration, and HDPP without second pipeline options are consistent with the various general plans and zoning regulations of the various city and/or county jurisdictions.

TRAFFIC AND TRANSPORTATION

PURPOSE OF THE ANALYSIS

The purpose of the Traffic and Transportation analysis is to compare the alternative sites , alternative project size, configuration, and HDPP without second gas pipeline options to the HDPP as proposed. Within the range of facility sizes and locations being considered, the key for traffic and transportation is existing traffic conditions. For all the alternatives, as with the proposed project, 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. In addition, while the transportation of equipment which will exceed the load size and limits of certain roadways will require special permits, the procedures and processes for obtaining such permits are fairly straightforward.

APPLICABLE LORS

With respect to Traffic and Transportation, the same federal and state LORS apply to the three alternative sites, and the alternative project size.

Local

City of Victorville

Victorville General Plan

Circulation Element: Adopted in October 1988, inclusion of this Element is required by Section 650000, et seq., of the California Public Resources Code. It establishes objectives, policies, and implementation programs through which a local community may manage its transportation system. It includes the following LORS:

Victorville-1:Policy 1.6: “Preserve roadway capacity to minimize the number of travel lanes needed to provide acceptable levels of service.”;

Victorville-2: Policy 3.3: “Link funding and construction of circulation improvements to development, and regulate development by intensity, type and location to ensure the provision of Level of Service (LOS) ‘C’ operation.”;

Victorville-5: Policy 3.9: “Provide for and encourage the use of alternatives to single occupancy through the following techniques...”.

City of Adelanto

Rights-of-Way H-1 establishes all major rights-of-way according to the requirements of the buildout projections of the General Plan.

County of San Bernardino

The Circulation Element of the General Plan provides for the approval of development proposals only when they are consistent with the County's objective of maintaining a Level of Service (LOS) C on highways and intersections affected by the development.

San Bernardino Associated Governments

Congestion Management Program: Proposition 111, enacted in 1990 by the people of the State of California, mandated that each county with an urbanized area of greater than 50,000 people, prepare, adopt, and implement a Congestion Management Program (CMP) to facilitate the movement of people and goods on roadways designated as being of regional significance. The Program, adopted in 1992, and revised in 1993 and 1995, has designated State Highway 18, Interstate 15, and U.S. Highway 395 as roadways of regional significance. Where a segment or intersection level of service (LOS) on any of the designated roadways falls below the established standard, a plan to address and correct identified deficiencies, is to be adopted and implemented by the Congestion Management Agency (CMA). The San Bernardino Associated Governments has been designated as the CMA.

SANBAG-1: Policy 2.3.1: "Establish level of service E or the current level, whichever is farthest from LOS A, as the LOS standard for intersections or segments on the CMP system of roadways.

If the current LOS is F, then a 10 percent or more degradation in the quantitative measure used to determine the LOS (such as delay, V/C ratio, or travel speed) will comprise a deficiency, which must be addressed by a deficiency plan.";

SANBAG-2: Policy 4.1.1: "Identify and quantify the direct and cumulative impacts of proposed land use decisions on the regional transportation system.";

SANBAG-3: Policy 4.1.3: "Develop and implement a program which apportions fairly the responsibility for mitigation of deficiencies on the CMP system among local jurisdictions and State agencies.";

SANBAG-4: Policy 4.4.1: "Identify the transportation impacts of significant land use changes, regardless of jurisdictional location or political boundaries.";

SANBAG-5: Policy 5.1.2: "Facilitate and provide incentives for non-auto travel.";

SANBAG-6: Policy 5.2.1: "Provide incentives for reducing vehicle trips.".

TRAFFIC AND TRANSPORTATION IMPACTS

The HDPP's potential traffic and transportation impacts for the SCIA site are discussed in the Traffic and Transportation section of this document. The purpose of this discussion is to evaluate potential traffic and transportation impacts associated with the alternative sites, and the alternative size, configuration, and HDPP without the second gas pipeline options.

Adelanto Alternative Site

Alternatives Table 1, which compares the applicant's and staff's alternative sites, and staff's alternative size, to the applicant's proposed project, shows the Adelanto alternative site to be essentially the same for traffic and transportation impacts, when compared with the SCIA site. Construction worker commute would pose the most significant potential problem as in the SCIA site. It is likely that workers will come from all four urban areas within 50 miles of this project site: Barstow, San Bernardino, Palmdale/Lancaster, and Victorville/Adelanto/Apple Valley/Hesperia. Given a likely dispersion of traffic over the major roadways, construction related traffic impacts are not likely to cause a degradation of peak hour levels of service, nor create a significant impact on existing roadway conditions.

Luz SEGS Unit 10 Alternative Site

Table 1 shows the Luz SEGS Unit 10 alternative site to be the slightly worse, for traffic and transportation impacts, when compared with the SCIA site. Construction commute traffic would pose the major potential significant impact. The major routes used to the project site would be State Route 395 and State Route 58. Prior to the Harper Lake Road turnoff, all the construction commute traffic would be focused on State Route 58. While that route has been improved over the recent years from a two lane to a four lane highway, peak construction traffic has the potential to alter the level of service experienced on this portion of State Route 58. The impact would be dependent upon actual peak traffic flows and the nexus with construction workforce time periods. For local traffic, the realignment of Harper Lake Road and installation of appropriate signals and gates for the railroad crossing would work to foster traffic flow. At the same time, the existing workforce at the various solar energy facilities which use Harper Lake Road could be significantly affected by construction commute traffic, again with some consideration to actual work periods.

Etiwanda Power Plant Property

Table 1 shows the Etiwanda property to be worse for traffic and transportation impacts, when compared with the SCIA site. The major regional access routes to the Etiwanda Power Plant property are Interstate 15 and Interstate 10. The property is located in a fairly urbanized area, with transportation routes already subject to heavy peak use. Even with the typical construction work flow occurring slightly before peak morning periods and peak afternoon traffic flows, additional commute traffic would exacerbate existing conditions.

240 MW Combined Cycle At SCIA Site Alternative

Table 1 also shows that the alternative size 240 MW combined cycle project is the same for traffic and transportation impacts, when compared with the applicant's proposed project size options. While in general the construction of a smaller facility will require a lower construction workforce, the lessening of traffic and transportation impacts will not substantially change or lessen the impacts from the proposed project which staff has found to not be significant. The workforce is still likely to come from all four urban areas within 50 miles of the project site: Barstow, San

Bernardino, Palmdale/Lancaster, and Victorville/Adelanto/Apple Valley/Hesperia. In addition, most roadways within the study area, particularly those likely to carry the greatest traffic load resulting from the project, are operating a level of service C or better. Since much of this data is 1995 data, and reflects traffic patterns existing prior to the closure of George Air Force Base (AFB), staff believes that the roadway system is capable of accommodating much greater numbers of vehicles than the baseline data would indicate.

832 MW Simple Cycle At SCIA Site Alternative

Table 1 shows that the 832 MW simple cycle alternative is the same for traffic and transportation impacts when compared with the proposed project. The 832 MW option would require a similar construction workforce, when compared with that for the proposed project.

High Desert Power Project Without The Second Gas Pipeline

This alternative would be the same as the proposed project from the traffic and transportation perspective. The second pipeline does not cross any major roads. and it would result in insignificant construction related traffic.Therefore, the lack of the pipeline would result in insignificant differences in construction related traffic.

Alternatives Traffic and Transportation Table 1
Comparison of Alternative Sites
and Alternative Size with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	Same	same
Luz SEGS Unit 10 site	Worse	worse
Etiwanda property site	Worse	worse
240 MW combined cycle at SCIA	Same	same
832 MW simple cycle at SCIA	Same	same
HDPP w/o the 2nd gas pipeline	Same	same

CONCLUSION

The Adelanto, 240 MW, 832 MW, and HDPP without the second gas pipeline alternatives, result in essentially the same type of traffic and transportation impacts as the proposed project because the location is the same and the workforces would be similar. The Etiwanda and Luz SEGS IX alternatives would be worse because construction related traffic would be added to road networks that are more congested than that surrounding the proposed project.

SOCIOECONOMIC RESOURCES

PURPOSE OF THE ANALYSIS

The purpose of the Socioeconomic Resources analysis is to compare the alternative sites ,alternative project size, and HDPP without the second gas pipeline option, to the HDPP as proposed.

APPLICABLE LORS

Very rarely do LORS apply to the area of Socioeconomic Resources. In most counties and cities, upon application for a building permit, the developer is required to pay developer impact fees. These fees are paid by the developer to the local agency prior to issuance of a certificate of occupancy or a building permit and contribute towards funding public improvements, infrastructure, and services within the local agency. Development impact fees for industrial projects are assessed based on the project's square footage. The proposed project is located in the City of Victorville, which has two ordinances that pertain to developer fees. It is assumed that San Bernardino County, the City of Rancho Cucamonga, and the City of Adelanto would have similar ordinances.

SOCIOECONOMIC IMPACTS

The HDPP's potential socioeconomic impacts for the SCIA site are discussed in the Socioeconomic Resources section of this document. The purpose of this discussion is to evaluate potential socioeconomic impacts associated with the alternative sites, and the alternative size project.

Adelanto Alternative Site

Table 1, which compares the applicant's and staff's alternative sites, and staff's alternative size, to the applicant's proposed project, shows the Adelanto alternative site to be the same for socioeconomic impacts, when compared with the SCIA site. The site was the original site when the High Desert project was first proposed in 1994. As both project sites share similar demographics and are within San Bernardino County, the potential impacts of this site including the environmental justice analysis, would be comparatively the same as those of the HDPP.

Luz SEGS Unit 10 Alternative Site

Table 1 shows the Luz SEGS Unit 10 alternative site to be the same for socioeconomic impacts, when compared with the SCIA site, if the construction workforce is hired from the surrounding region and commutes to the site on a daily basis. The Luz SEGS Unit 10 alternative site is located in a sparsely populated region of San Bernardino County. Any project-related population changes would have significant impacts on the small communities of Kramer Junction and Harper Lake. If the construction workforce is hired from the surrounding region and commutes to the site on a daily basis, the potential impacts of this site would be the same as the HDPP.

Etiwanda Power Plant Property

Table 1 shows the Etiwanda property to be the same for socioeconomic impacts, when compared with the SCIA site. A socioeconomic impact analysis evaluates environmental justice, the effects of project-related population changes on local schools, medical and protective services, public utilities and other public services, and on the fiscal and physical capability of local governmental agencies to meet the needs of project-related changes in population. The potential impacts of this site would be the same as the HDPP. In addition, the site is consistent with the Rancho Cucamonga General Plan, which locates it within Sub-Area 15 of Rancho Cucamonga's "Industrial Area". It is zoned Heavy Industrial, which permits uses such as power plants.

240 MW Project Size And 832 MW Simple Cycle At SCIA

Table 1 also shows that the 240 MW combined cycle and the 832 MW simple cycle projects at the SCIA site, are the same for socioeconomic impacts, when compared with the HDPP. Since the location of the is the same as that of the HDPP, the potential impacts of this project would be the same as those of the HDPP.

High Desert Power Project Without The Second Gas Pipeline

Table 1 also shows that the alternative of the HDPP project without the second gas pipeline would be the same from the socioeconomic impacts perspective, since there would not be any significant differences in the project construction workforce.and related population impacts.

Alternatives Socioeconomic Resources Table 1
Comparison of Alternative Sites
and Alternative Size with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	Same	same
Luz SEGS Unit 10 site	Same	same
Etiwanda property site	Same	same
240 MW combined cycle at SCIA	Same	same
832 MW simple cycle at SCIA	Same	same
HDPP w/o 2nd gas pipeline	Same	same

CONCLUSION

No difference exists for any of the alternatives when compared to the proposed site. Because a socioeconomic impact analysis evaluates environmental justice and the effects of project-related population changes on a regional basis, all alternatives would result in about the same impacts, regardless of location within San Bernardino County.

PURPOSE OF THE ANALYSIS

The purpose of the biological resources analysis is to compare the alternative sites, alternative project sizes, and the HDPP without the second gas pipeline, to the HDPP as proposed.

APPLICABLE LORS

With respect to biological resources, the same federal and state LORS apply to the three alternative sites, and the alternative project size.

Local

San Bernardino County

Title 8 of the San Bernardino County Code specifies that Joshua tree removal be by permit only. Joshua trees proposed for removal must be transplanted or stockpiled for future transplantation.

City of Victorville

The Victorville Municipal code, Chapter 1333, requires a permit from the Director of Parks and Recreation prior to the destruction or removal of Joshua trees.

BIOLOGICAL RESOURCES IMPACTS

The HDPP's potential biological resources impacts for the SCIA site are discussed in the biological resources section of this document. The purpose of this discussion is to evaluate potential biological resources impacts associated with the alternative sites, the alternative size projects, and the HDPP without the second gas pipeline.

Adelanto Alternative Site

Alternatives Table 1, which compares the applicant's and staff's alternative sites, and staff's alternative sizes, to the applicant's proposed project, shows the Adelanto alternative site to be better with respect to biological resources impacts, when compared with the SCIA site. Although the footprint of the power plant itself will likely cause little difference in the level of impact associated with construction and operation of the project due to the industrial character of the setting in which the power plant will be sited in either case, the appurtenant linear facilities such as the transmission line, State Water Project water supply pipeline, and, in particular, a 32-mile long second natural gas pipeline associated with the SCIA site will have relatively different potential impacts on biological resources including habitat than for the Adelanto project.

The transmission lines associated with the two sites are of similar length, but the habitat in general for the Adelanto site is probably of slightly higher quality because of the apparent lower level of disturbance. Even though the Adelanto area is obviously subdivided (many named dirt roads have been established), little development has occurred in comparison to the SCIA project area. Additionally, the habitat through which the transmission line traverses for the Adelanto project transitions into natural habitat to the west, whereas the habitat through which the transmission line associated with the SCIA project is somewhat surrounded by urbanized land, though there is some habitat, but of lower quality.

The water supply pipeline to the State Water Project interconnection is considerably shorter for the Adelanto site than the SCIA site, one half mile versus two and one half miles, respectively. Also, the SCIA pipeline would be routed through relative high quality desert tortoise habitat. It is uncertain whether the habitat quality for desert tortoise in the Adelanto project area is of high quality, but the short length of the water pipeline would create less impacts.

A second natural gas pipeline is being proposed for the HDPP at SCIA. It will be 32-miles long and pass through desert tortoise critical habitat. This route also has the potential to impact habitat of Mohave ground squirrels, which are state listed. In addition, this pipeline will be oversized with respect to power plant needs, resulting in growth inducing effects along the State Highway 395 corridor north from Adelanto to Kramer Junction (at State Highway 58). A second natural gas pipeline is not proposed for the project alternative at the Adelanto site.

Luz SEGS Unit 10 Alternative Site

Table 1 shows the Luz SEGS Unit 10 alternative site to be the same for biological resources impacts, when compared with the SCIA site. The Luz SEGS 10 site is disturbed to the extent that there are abandoned structures on the site in the form of turbine building and solar panel foundations, but there is considerable undisturbed habitat for many wildlife species around most of the site to the north. It borders the Luz SEGS Unit 8 and Unit 9 sites to the south which form a barrier to ingress from terrestrial animals because they are completely surrounded by tortoise-proof fencing. This makes the SEGS 10 site somewhat less valuable to wildlife in general, but in comparison to the SCIA site, the surrounding habitat to the north is of high enough value and contiguous to the SEGS 10 site making it a less desirable site.

In addition, a 37-mile long transmission line might have to be constructed from Kramer Junction to the Victor substation which would cross important desert tortoise and Mohave ground squirrel habitat. The level of impact associated with this possible transmission line is expected to be much less that for the 32-mile long second natural gas pipeline associated with the HDPP proposed alternatives because more disturbance of habitat would take place during trenching and backfilling for the pipeline, thus making the proposed project at somewhat poorer in this respect.

Another negative for the SEGS 10 site is that construction and operational service vehicles will have to travel over a road that has not been fully protected (fenced) to prevent desert tortoise road kills. This mitigation was required for the SEGS 8 and 9 projects. It is uncertain when this action will be completed. Increasing power plant related traffic along this road has potential to increase impacts on desert tortoise, especially when compared to the SCIA site which has access over more well established urban roadways. The remoteness of the SEGS 10 site makes it less desirable because it would allow the HDPP to intrude into relatively undeveloped natural open space and associated valuable wildlife habitat. Siting of solar power plants such as the SEGS may require solar insolation levels only optimal in the SEGS 10 area, but the HDPP does not have this sort of limitation with respect to its fuel source. Because it runs on natural gas alone, it probably can be sited anywhere as opposed to a solar power plant. The overwhelming positive aspect of the SEGS 10 site is that the natural gas supply pipeline is already in place and no second natural gas pipeline is proposed. The potential impacts from construction and operation of a second natural gas pipeline far outweigh the potential impacts associated with the SEGS 10 alternative site described above.

Etiwanda Power Plant Property

Table 1 shows the Etiwanda property to be better with respect to biological resources impacts when compared with the SCIA site. The site is undeveloped, but somewhat disturbed land surrounded by a highly industrialized area. On a broader scale, it is completely bounded and/or surrounded by major city streets, and freeways within a quarter of a mile. The land is ruderal in nature with many weedy herbaceous plants growing throughout the unoccupied spaces and has the remains of an abandoned grape vineyard encompassing about 40 acres. The few trees that are present consist of ornamentals located around the property along some of the streets.

The land provides habitat capable of supporting small mammals such as rodents, rabbits and possibly coyotes. Bird species such as red-tailed hawks, western meadowlarks, mourning doves, and scrub jays probably utilize this area. On a comparative basis, this site is better than the SCIA site for the HDPP because the appurtenant linear facilities are available within a matter of yards rather than miles. Very little in the way of construction for these facilities will be needed, thus impacts on biological resources that occupy the area will be minimal. Loss of this habitat and the biota associated with it will be considerably less important than losses that would occur primarily due to the construction of the linear facilities, the second natural gas pipeline in particular, associated with the SCIA site.

240 MW Project Size Alternative

Table 1 also shows that the alternative size 240 MW combined cycle project is better, for biological resources impacts, when compared with the applicant's proposed project size options. The foot print of the power plant site, even though it may be some what smaller, is proposed for a site that is highly disturbed with most of the vegetation already cleared off due to other activities of the former air base. Whether or not the reduced need for wells will significantly reduce the potential effects of ground water depletion on riparian habitat near the Mojave River is uncertain at this time. The other linear facilities will most likely create the same level of impacts on biological resources except for the second natural gas pipeline. The potential impacts associated with the construction and operation of a second natural gas pipeline, even though mitigated, will be significant when compared to a project without a second natural gas pipeline, which is not absolutely required for a viable project. Therefore, this alternative is considered better than either of the HDPP proposed alternatives.

832 MW Simple Cycle Project Alternative

Table 1 also shows that the alternative size 832 MW simple cycle project is better, for biological resources impacts, when compared with the applicant's proposed project size options. Reduced need for water will likely lessen the potential effects of ground water depletion on riparian habitat near the Mojave River. In addition The potential impacts associated with the construction and operation of a second natural gas pipeline, even though mitigated, will be significant when compared to a project without a second natural gas pipeline, which is not a part of this alternative. Therefore, this alternative is considered better than either of the HDPP proposed alternatives.

High Desert Power Project Without The Second Gas Pipeline

Table 1 also shows that the HDPP without the second gas pipeline alternative is better than the proposed project because it eliminates the pipeline's potential impacts on desert tortoise critical habitat, and the habitat of the state listed Mohave ground squirrel.

Alternatives Biological Resources Table 1
Comparison of Alternative Sites
and Alternative Sizes with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	better	better
Luz SEGS Unit 10 site	same	same
Etiwanda property site	better	better
240 MW combined cycle project	better	better
832 MW simple cycle project	better	better
HDPP w/o 2nd gas pipeline	better	better

CONCLUSION

From a biological resources perspective, the best alternative for the project is the Etiwanda site. The Adelanto site is somewhat better. The Luz SEGS 10 site is considered the same, but not by much, while the 240 MW combined cycle,832 MW simple cycle , and the HDPP without the second gas pipeline alternative options are considered without doubt better, because they avoid the pipeline's potential impacts.

PURPOSE OF THE ANALYSIS

The purpose of the Soil & Water Resources analysis is to compare the alternative sites ,alternative project sizes,and HDPP without the second gas pipeline to the HDPP as proposed.

APPLICABLE LORS

With respect to Soil & Water Resources, the same federal and state LORS apply to the three alternative sites, and the alternative project size. No local LORS relating to water resources were identified. LORS pertaining to soil resources, specifically those dealing with grading and erosion control, vary given the local jurisdiction.

SOIL & WATER RESOURCES IMPACTS

The HDPP's potential for soil and water resource impacts for the SCIA site are discussed in the Soil and Water Resources section of this document. The purpose of this discussion is to evaluate potential soil and water resource impacts associated with the alternative sites, the alternative size project.s, and the HDPP without the second gas pipeline alternative.

Adelanto Alternative Site

Alternatives Table 1, which compares the applicant's and staff's alternative sites, and staff's alternative size, to the applicant's proposed project, shows the Adelanto alternative site to be the same for water resources impacts, when compared with the SCIA site. The City of Adelanto is entirely dependent on groundwater for water supply. Since it is not likely that the city's existing wells would be able to supply the proposed project, staff assumed that the new wells would be located where the proposed project's wells are (Bookman-Edmonston 1998; Hampson & Associates 1994). In addition, State Water Project water would be equally accessible for this alternative. Therefore, staff concludes that this alternative for water resources, is the same as the proposed project. Staff's evaluation of the proposed alternatives with respect to water resources is based upon the fact that those proposals that use less water or can use non-potable water, are superior to the proposed project. For staff's evaluation of the alternatives with respect to soil resources, the proposals that disturb less land than the proposed project, are considered superior.

Alternatives Table 2, which compares the applicant's and staff's alternative sites to the applicant's proposed project, shows the Adelanto alternative site to be better for soil erosion impacts. The alternatives lacks the second gas pipeline that is part of the proposed project. Although all soil erosion impacts can be reduced to an insignificant level through implementation of mitigation measures, avoiding miles of disturbance associated with the second gas pipeline makes this alternative better than the proposed project.

Luz SEGS Unit 10 Alternative Site

Table 1 shows the Luz SEGS Unit 10 alternative site to be the same for water resource impacts, when compared with the SCIA site. This alternative is located within the Harper Lake Basin, a portion of the larger Mojave River Basin. Groundwater levels within the basin have been steadily dropping, with declines of approximately 50 to 80 feet in many areas since the early 1950s (Mojave Water Agency 1997). Although the amount of acreage in cultivation has declined in recent years, groundwater levels have continued to drop. A project entirely relying on groundwater at the LUZ Segs Unit 10 site would be worse than the proposed project. Staff assumes however, that a project located at this site would use State Water Project water to replace depleted groundwater.

Table 2 shows that this alternative site to be better than the proposed project because this alternative also avoids soil disturbance associated with construction of the second natural gas pipeline.

Etiwanda Power Plant Property

Table 1 shows the Etiwanda property to be better for water resource impacts, when compared with the SCIA site. The water supply for the existing Etiwanda power plant is a combination of groundwater and Colorado River water (SCE 1997). The existing power plant pumps groundwater from the Upper Santa Ana River Basin, a portion of the adjudicated Chino Groundwater Basin. The facility is entitled to 1,000 acre feet of groundwater per year. Some additional groundwater is used by the facility through temporary transfers of groundwater entitlements from other existing users within the basin. During the winter, the existing plant also uses Colorado River water through the Metropolitan Water District's (MWD) distribution system (SCE 1997). Wastewater from the existing Etiwanda facility is discharged into an industrial wastewater line.

As noted above, the Chino Basin is adjudicated. As with the Mojave Basin adjudication, new groundwater pumping would need to pay replenishment (makeup) costs. Pumping an estimated 4,000 acre feet of groundwater per year may not be a problem according to staff of the Chino Basin Watermaster due to the decline in agricultural water demand within the basin (Stewart 1998). In addition, other sources of water are available, including imported State Water Project and Colorado River water. In addition, the Chino Basin Water District is attempting to meet industrial and other non-potable water needs through wastewater recycling. Tertiary treated wastewater is available from a wastewater treatment plant just south of the Etiwanda site. Use of groundwater at the Etiwanda site may be better than at the proposed site and probably no worse. Further evaluation is necessary to say for sure. This alternative site does, however, appear to have the potential to use reclaimed water, which would be superior to the proposed site.

Table 2 shows the Etiwanda site to be better than the proposed project for soil erosion because the necessary linear facilities, gas, water and transmission lines are already present.

240 MW Combined Cycle At SCIA

Table 1 also shows that the alternative size 240 MW combined cycle project is better for water resource impacts, when compared with the applicant's proposed project size options. An alternative facility this size is assumed to require approximately 2,000 acre feet of water per year. While this smaller size does not negate the need for a new wellfield and associated impacts, the reduction in the overall water demand of the project is beneficial given the overdraft present within the area. Table 2 shows this alternative is better than the proposed project because it will not require the soil disturbance associated with construction of the second natural gas pipeline.

832 MW Simple Cycle At SCIA

Table 1 shows this alternative is better than the proposed project because the water demand would be 250 acre feet per year, significantly less than the proposed project. This reduced water demand may negate the need for a new wellfield and associated facilities required by the proposed project as well as the benefits associated with reduced groundwater pumping. Table 2 shows this alternative to be better than the proposed project because it lacks the soil disturbance associated with construction of the second natural gas pipeline.

High Desert Power Project Without The Second Gas Pipeline

Table 1 shows this alternative to be the same as the proposed project from the water resources perspective, since the pipeline would not affect water resources. Table 2 shows this alternative to be better than the proposed project from the soil resources perspective, because it avoids the soil disturbance associated with construction of the second gas pipeline.

Alternatives Water Resources Table 1
Comparison of Alternative Sites,
Size, and Configuration Alternatives with the SCIA Site

ALTERNATIVE SITE/SIZE/ TECHNOLOGY	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	same	same
Luz SEGS Unit 10 site	same	same
Etiwanda property site	same	same
240 MW combined cycle project	better	better
832 MW simple cycle project	better	better
HDPP w/o 2nd gas pipeline	same	same

Alternatives Soil Resources Table 2
Comparison of Alternative Sites, Size and Configuration Alternatives with the SCIA Site
Soil Resources

ALTERNATIVE SITE/SIZE/ TECHNOLOGY	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto Site	better	better
Luz SEGS Unit 10 site	better	better
Etiwanda property site	better	better
240 MW combined cycle at SCIA	better	better
832 MW simple cycle at SCIA	better	better
HDPP w/o 2nd gas pipeline	better	better

CONCLUSION

For water resources, the Adelanto and Luz SEGs Unit 10 alternative sites, and the HDPP without the second gas pipeline are considered to be the same as the proposed project. The Etiwanda site may be better due to the potential availability of reclaimed and imported water. The 240 MW combined cycle alternative is also considered better than the proposed project because of the significant reduction in project water demand. The 832 MW simple cycle is better, because it has no cooling water requirements.

For soil resources, all the alternatives to the proposed project are considered better than the proposed project because they all lack the associated soil disturbance associated with the second natural gas pipeline.

PALEONTOLOGIC RESOURCES

PURPOSE OF THE ANALYSIS

The purpose of the paleontologic resources analysis is to compare the alternative sites ,alternative project sizes, and the HDPP without the second gas pipeline, to the HDPP as proposed. The proposed HDPP includes a power generation plant; a 7.2 mile electrical transmission line and associated access roads; a 2.75 mile natural gas pipeline; a new well field for pumping groundwater; a 2.5 mile and a 6.5 mile water supply pipeline; and a second, 32-mile gas pipeline with associated access roads.

APPLICABLE LORS

With respect to paleontologic resources, the same federal and state LORS apply to the three alternative sites, and the alternative project size. However, each alternative site is located within the jurisdictional boundaries of a different local entity so different sets of local LORS would apply to project development at each alternative site.

Local

San Bernardino County

San Bernardino County has a well-developed set of policies, guidelines and requirements for the identification and protection of paleontologic resources. Project developers are informed of county requirements when they file for a permit for a new project. These LORS would apply to use of the LUZ SEGS Unit 10 site and portions of the linear routes for the SCIA and Adelanto alternative sites.

City of Rancho Cucamonga

Except for implementation of CEQA, the City of Rancho Cucamonga does not have any specific requirements for paleontologic resources. The city has general plan goals and policies that would apply to the use of the Etiwanda site, since the proposed site and associated linear facilities are all assumed to be located within the city boundaries.

City of Adelanto

Staff has been unsuccessful in making contact with city planning staff to discuss possible city plans, goals, or policies relative to the identification and protection of paleontologic resources. Under state law, the city must address CEQA requirements which do address paleontologic resources. Any plans, goals, or policies the city may have would apply to the use of the Adelanto alternative site and those portions of associated linear facilities that would be constructed within the city boundaries.

PALEONTOLOGICAL RESOURCE IMPACTS

The HDPP's potential to impact paleontologic resource at the SCIA site are discussed in the paleontologic resources section of this Preliminary Staff Assessment (PSA). The purpose of this discussion is to evaluate potential paleontologic resource impacts associated with the alternative sites, and the alternative size project.

To summarize: The San Bernardino Valley and major portions of the Mojave Desert, are underlain by sedimentary deposits that may be hundreds to thousands of feet thick in some areas. In the Mojave, the older sediments date back thousands of years to times when gigantic inland lakes covered the modern-day desert areas. In the San Bernardino Valley areas, the older sediments were deposited over thousands of years of run-off from the surrounding mountains. On the modern-day surface, overlying the older sediments, are more recent alluvial deposits created by active rivers and streams. The periodic flooding also causes some degree of re-arrangement and inter-mixing within the sediments. The underlying older sediments are known to contain significant fossil resources but the depth of these fossil-bearing sediments beneath the surface is variable. Often the potential for encountering fossil materials during project construction remains uncertain until excavation of sub-surface soils takes place.

The purpose of this discussion is to evaluate potential paleontologic resource impacts associated with use of the alternative options. Use of any one of the alternative options would require construction of at least one project-related linear facility, i.e., a transmission line, natural gas supply line, water supply and/or water discharge routes. The alternative sites and their possible associated linear facilities are described in more detail in *[Section to be determined later]*. Note: the routings of the linear facilities are "best estimates" made by project management staff and may not be the actual routes that would used. In making a comparison of potential impacts associated with linear project facilities, staff has assumed that construction of an electric transmission line for a project has the potential to disturb a lesser amount of ground than an excavation of trenches for pipelines. However, for any of the alternatives discussed, the comparisons are very generalized since the records and maps of known paleontologic resource localities have not been reviewed to determine their proximity to the alternative sites and facilities.

Adelanto Alternative Site

Alternatives Table 1, which compares the applicant's and staff's alternative sites, and staff's alternative sized project, to the applicant's proposed project, shows the Adelanto alternative site to be better for paleontologic resource impacts, when compared with the SCIA site. This preliminary conclusion is based on the assumption that a lesser amount of surface area would be disturbed for construction of linear facilities needed for the Adelanto alternative. The second gas pipeline proposed for the HDPP alternative would require thirty-two miles of disturbance and trenching through areas that contain over one hundred known paleontologic resource localities. Even if the thirty-two mile, second gas pipeline were eliminated from the HDPP project, the Adelanto alternative would remain comparatively better than the proposed SCIA site because the initial gas pipeline route is nearly three miles long. The gas pipeline needed for the Adelanto site would be less than a mile long and would not affect any known paleontologic resource localities.

The length of the electric transmission line needed for the SCIA alternative is a little over seven miles, while the length of the line needed for the Adelanto alternative is nearly six and a half miles long. Paleontologic resource localities are known to be present within or adjacent to both of these routes, so the potential for impacts is virtually the same. For comparative purposes, the slightly longer distance needed for the SCIA site would make it slightly worse than the Adelanto alternative.

Luz SEGS Unit 10 Alternative Site

Table 1 shows the Luz SEGS Unit 10 alternative site to be better for paleontologic resource impacts, when compared with the SCIA site. This preliminary conclusion is based on the assumption that a lesser amount of surface area would be disturbed for construction of linear facilities needed for the LUZ SEGS Unit 10 alternative. The second gas pipeline proposed for the SCIA alternative would require thirty-two miles of disturbance and trenching through areas known to contain significant paleontologic resource localities. The gas pipeline needed for the LUZ SEGS Unit 10 site would be less than a half mile long and would cross through an area that has been disturbed by previous roadway, gas pipeline, and power plant construction.

Due to the possible need for a new transmission line from the Kramer Substation to the Victor Substation, use of the LUZ SEGS Unit 10 alternative may require construction of over forty miles of electric transmission line and associated access roads, compared to the seven miles needed for the SCIA alternative. The ability for an electrical transmission line to span across a sensitive paleontologic resource locality would off-set, to some degree, the comparative differences between the length of the these transmission facilities. If the thirty-two mile, second gas pipeline were eliminated from the HDPP project, then the LUZ SEGS Unit 10 alternative would become comparatively worse than the proposed SCIA site because of the longer transmission line routes.

Etiwanda Power Plant Property

Table 1 shows the Etiwanda property to be potentially better, for paleontologic resource impacts, when compared with the SCIA site. This preliminary conclusion is based on the assumption that a lesser amount of surface area would be disturbed for construction of linear facilities needed for the Etiwanda alternative. Over seven miles of transmission line would be required to serve the SCIA site, while only a few hundred yards would be needed at the Etiwanda site. The second gas pipeline proposed for the SCIA alternative would require thirty-two miles of disturbance and trenching through areas known to contain significant paleontologic resource localities. If the thirty-two mile, second gas pipeline were eliminated from the HDPP project, then the Etiwanda alternative would remain comparatively better than the proposed SCIA site. Use of the Etiwanda alternative would require less than a mile of new gas pipeline, a relatively short water pipeline (within the site), and only a few hundred yards of new transmission lines.

240 MW Combined Cycle And 832 MW Simple Cycle

Table 1 also shows that the 240 MW combined cycle project and the 832 MW simple cycle project alternatives are better for paleontologic resource impacts, when compared with the applicant's proposed project, because they avoid the potential impacts of the second gas pipeline.

High Desert Power Project Without The Second Gas Pipeline

Table 1 also shows that the HDPP without the second gas pipeline is better than the proposed project because the lack of the pipeline leads to avoidance of potential impacts to paleontological resources.

Alternatives Paleontologic Resources Table 1
Comparison of Alternative Sites
and Alternative Size with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	better	better
Luz SEGS Unit 10 site	better	better
Etiwanda property site	better	better
240 MW combined cycle at SCIA	better	better
832 MW simple cycle at SCIA	better	better
HDPP w/o 2nd gas pipeline	better	better

CONCLUSION

The potential for project impacts to paleontologic resources is directly related to the amount of surface and sub-surface disturbance of the ground under the project site and the project-related facilities. The potential for project impacts to these resources is also directly related to the likelihood they are present in (or under) areas that would be affected by project construction and operation.

Power plant construction is usually confined to the project site and typically requires some degree of grading and excavation during construction. Construction and operation of electric transmission lines require grading and excavation of soils for tower or pole footings. Construction of water, wastewater, and natural gas pipelines requires excavation and trenching to varying depths for placement of the pipe. Pipelines may also require horizontal drilling or boring to go under certain surface features. If sediments likely to contain fossils are present in the project area, the greater the area of surface and sub-surface disturbance, the greater the potential for impacts to paleontologic resources.

With respect to potential impacts to paleontologic resources, the Adelanto, LUZ SEGS Unit 10, the Etiwanda, and HDPP without the second gas pipeline alternatives are potentially better when compared to the proposed project. The transmission line routes for the LUZ SEGS Unit 10 alternative are about forty-three miles longer than that proposed for the SCIA site and there would be some degree of disturbance associated with access roads needed for portions of the transmission line routes. But, compared to construction of the transmission lines, the proposed thirty-two mile gas pipeline route associated with the proposed project has a much greater potential to impact significant paleontologic resources.

There are over one hundred known, recorded paleontologic resource localities along the proposed thirty-two mile route for the gas line. Since pipeline construction requires excavation of trenches for the entire distance of the route, the potential for paleontologic resources to be encountered and disturbed is greatly increased, when compared to construction of electric transmission lines that can span across sensitive resource sites if necessary.

If the second gas pipeline alternative were to be eliminated from the proposed project, the LUZ SEGS Unit 10 alternative would become comparatively worse than the proposed SCIA site. The LUZ SEGS Unit 10 may require construction of thirty-seven miles of new transmission line and access roads, compared to the 7.2 mile transmission line needed for the SCIA alternative. The Etiwanda alternative would remain better than the SCIA, even if the thirty-two mile gas pipeline were eliminated. And, if reclaimed water were piped to the Etiwanda site, this alternative would still be slightly better than the SCIA alternative without the thirty-two mile pipeline, since the water pipelines to the SCIA alternative site total nearly nine miles and they would be located in an area known to have a high sensitivity for paleontologic resources.

PURPOSE OF THE ANALYSIS

The purpose of the Facility Design alternatives site analysis is to compare the alternative sites, alternative project sizes, and the HDPP without the second gas pipeline alternative to the HDPP as proposed. The analysis will examine the geologic constraints for each of the alternative options and compare the results to the proposed project. All the three alternative sites and the SCIA site are located in seismic zone 4.

APPLICABLE LORS

With respect to Facility Design, and particularly geologic hazards, the same federal and state LORS apply to the three alternative sites, and the alternative project size. The three alternative sites will be subject to the 1997 Uniform Building Code (UBC).

Local

San Bernardino County

- San Bernardino County Code - Title 6, Building and Safety, 1994 and Title 8, Development Code, 1997.

- San Bernardino County Ordinance # 3627. Adopts the 1994 UBC as the legal building standard.

City of Rancho Cucamonga

- City of Rancho Cucamonga Ordinance # 2516. Adopts, with minor modifications, the 1994 UBC as the legal building standards.

City of Adelanto

- City of Adelanto Ordinance # 312. Adopts, with modifications, the 1994 UBC as the legal building standard.

FACILITIES DESIGN IMPACTS

Adelanto Site

This alternative site is located about five miles west of the proposed SCIA site. The site has similar geologic/foundation and seismic conditions to the SCIA site.

Luz 10 Site

This site has similar geologic/foundation conditions to the SCIA site. Seismic conditions, however, are worse. The 1997 Uniform Building Code (UBC) provisions require that sites within 15 kilometers (km) of an "A" fault zone or within 10 km of a

"B" fault zone, as shown on Active Fault Near-Source Zones maps, must meet a higher design standard than sites beyond those zones. "A" and "B" faults are categorized by the rate of recorded movement over geologic time. The LUZ 10 site is within five km of the Lenwood-Lockhart-Old Woman Springs Fault, an "A" fault.

Etiwanda Site

This site is located in an area that has an existing power plant. The power plant appears to have satisfactory geologic/foundation conditions. However, the site is within ten km of an "A" fault, an Active Fault Near-Source Zone, and would require a higher design standard than the SCIA site.

240 MW Combined Cycle and 832 Simple Cycle At SCIA

These alternatives project would not affect Facility Design site constraints.

High Desert Power Project Without The Second Gas Pipeline

This alternative would be the same as the proposed project from the facility design perspective. The key factor in comparing this alternative to the proposed project is consideration of whether the proposed pipeline would be crossing any active earthquake faults. The proposed second gas pipeline does not cross any active faults that we are currently aware of, therefore it does not make a difference from the facility design perspective.

Alternatives Table 1
Comparison of Alternative Sites and
Alternative Size with the SCIA Site and Size

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	same	same
Luz SEGS Unit 10 site	worse	worse
Etiwanda property site	worse	worse
240 MW combined cycle at SCIA	same	same
832 MW simple cycle at SCIA	same	same
HDPP w/o 2nd gas pipeline	same	same

CONCLUSION

For the area of Facility Design analysis, geologic constraints for the HDPP proposed site and the Adelanto site are virtually the same, however, the LUZ Unit 10 and the Etiwanda sites are worse due to higher seismic hazards. The HDPP without the second gas pipeline alternative is the same as the proposed project. The size or configuration of the project has no bearing in comparison to the applicant's proposed project.

PURPOSE OF THE ANALYSIS

The purpose of this analysis is to compare the alternative sites, alternative combined cycle and alternative simple cycle plant configuration, and the HDPP without the second gas pipeline, to the HDPP as proposed. Please refer to the Project Description for the proposed project at the SCIA site.

APPLICABLE LORS

Federal and State

With respect to noise, the same federal and state LORS that apply to the proposed project at the SCIA site, apply to the three alternative sites, to the alternative project size,the alternative peaking plant configuration, and to the HDPP without the second gas pipeline alternative

Local

The Adelanto alternative site falls under the jurisdiction of the City of Adelanto General Plan Noise Element. The Etiwanda Power Plant Property alternative site falls under the jurisdiction of the applicable LORS of the City of Rancho Cucamonga. The Luz SEGS Unit 10 alternative site falls under the jurisdiction of the County of San Bernardino Development Code. While these LORS differ from each other, and some are more stringent than the City of Victorville General Plan Noise Element that governs noise emissions of the proposed project, none is more stringent than staff's suggested significance criterion (see the Noise section of this document):

- The project shall not add noise to the environment that raises the noise level, measured at the nearest property line of the nearest sensitive receptor, more than 5 dBA (L_{eq}).

NOISE IMPACTS

The HDPP's potential noise impacts for the SCIA site are discussed in the Noise section of this document. The purpose of this discussion is to evaluate potential noise impacts associated with the alternative sites, and with the alternative size project and alternative peaking plant configuration.

Adelanto Alternative Site

Alternatives - Noise: Table 1, which compares the applicant's and staff's alternative sites, and staff's alternative size project, to the applicant's proposed project, shows the Adelanto alternative site to be worse for noise impacts when compared with the SCIA site. Since staff has assumed equivalent noise exposure criteria for all sites (see Local LORS, above), sites can be ranked by the distance to the nearest sensitive receptor(s). Nearer receptors require the expenditure of more effort to make the project adequately quiet. The nearest sensitive receptor to the Adelanto site is a residence approximately 1/4 mile to the northwest (HDPP Preliminary AFC, August 3, 1995, Noise, page 5-108). This is considerably closer than the schools located 1 1/4 miles south of the proposed site and, unlike the schools, would be impacted by project noise during the nighttime hours, when people are more sensitive to noise. In fact, it may prove infeasible to meet staff's suggested significance criterion at such a nearby receptor. Staff thus ranks the Adelanto site worse than the proposed site.

Luz SEGS Unit 10 Alternative Site

Alternatives - Noise: Table 1 shows the Luz SEGS Unit 10 alternative site to be worse for noise impacts when compared with the SCIA site. The nearest sensitive receptor is a residence approximately one mile southeast along Harper Lake Road (Luz SEGS 9 & 10 FSA, Noise, page Noise-1). This is nearer than the schools at the SCIA site and, unlike the schools, would be impacted by project noise during the nighttime hours, when people are more sensitive to noise. Staff thus rates the Luz SEGS 10 alternative site worse than the proposed site.

Etiwanda Alternative Site

Alternatives - Noise: Table 1 shows the Etiwanda property to be worse for noise impacts when compared with the SCIA site. The nearest sensitive receptor is a residence approximately one mile northeast (Southern California Edison Company's Proposal for Divestiture, CPUC Application No. 96-11-046, May 23, 1997, p. 2.21). This is nearer than the schools at the SCIA site and, unlike the schools, would be impacted by project noise during the nighttime hours, when people are more sensitive to noise. Staff thus rates the Etiwanda alternative site worse than the proposed site.

240 MW Combined Cycle At SCIA Alternative

Alternatives - Noise: Table 1 shows that the alternative smaller size 240 MW combined cycle project is better for noise impacts, when compared with the applicant's proposed project size options. The 240 MW alternative is simply one-third of the proposed 720 MW combined cycle configuration, consisting of a single power train composed of an F-class gas turbine generator, a heat recovery steam generator (HRSG), and a steam turbine generator with condenser and cooling system.

Noise from multiple sources is not directly additive; for example, the perceived noise from three identical power trains would be less than three times as great as from one such train. Multiple identical noise sources will nevertheless produce more noise than a single source. Of course, various mitigation measures can be, and are, employed to ensure that the total noise emissions from a power plant fall within legally mandated limits. The larger the power plant, with more power trains, the more such mitigation must be employed. This can include installing quieter equipment, enclosing the equipment in sound-attenuating enclosures or buildings, applying sound-deadening insulation, installing mufflers on steam vents, and redesigning such noise sources as cooling towers to reduce noise emissions. Since less effort would be required to bring the smaller size alternative into compliance with noise limits, staff rates it better than the proposed project.

832 MW Simple Cycle At SCIA Alternative

Alternatives - Noise: Table 1 shows that the simple cycle power plant configuration is worse for noise impacts, when compared with the applicant's proposed project configurations. The five simple cycle trains, when all are operating, will generate more noise than the two- or three-train configurations simply because there are more noise sources. Further, since the simple cycle machines do not exhaust through HRSGs, the exhaust from these turbines will not be muffled as effectively. Therefore, the peaking plant configuration will likely generate more noise than either of the combined cycle configurations. Employment of appropriate mitigation measures, as discussed above for the 240 MW alternative, can bring even the peaking plant into compliance with all applicable noise LORS. However, since less effort would be required to bring either of the proposed project configurations into compliance with noise limits, staff rates the peaking plant configuration worse than the proposed project.

High Desert Power Project Without The Second Gas Pipeline

This alternative would be the same as the proposed project from the noise perspective. It would avoid the proposed project's pipeline excavation and construction noise, but this noise would be temporary and insignificant.

Alternatives - Noise: Table 1
Comparison of Alternative Sites,
Alternative Size and Peaking Plant with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	worse	worse
Luz SEGS Unit 10 site	worse	worse
Etiwanda property site	worse	worse
240 MW combined cycle at SCIA	better	Better
832 MW simple cycle at SCIA	worse	worse
HDPP w/o 2nd gas pipeline	same	same

CONCLUSION

The salient factor in comparing the alternative sites, from the standpoint of noise, is the noise levels to which the nearest sensitive receptors are subjected. In all these cases, those receptors are residences. Since noise criteria are assumed to be identical for all the sites, the same limits apply to the noise levels to which these residences may be exposed. Thus, the determining factor becomes the distance from the project to the nearest residence. The nearer this residence, the more difficult will be the task of designing, constructing and operating the power plant to maintain noise levels at the receptor within permissible limits. All three alternative sites feature residences nearer than to the proposed site, rendering them less desirable from the standpoint of achieving the required low noise levels.

The smaller size alternative would produce less noise than either of the proposed configurations, rendering it preferable from a noise standpoint. The simple cycle peaking plant configuration, on the other hand, would produce more noise than either of the proposed configurations, rendering it less desirable from a noise standpoint. Regardless of the amount of noise produced, however, the project can be designed, built and operated to comply fully with all noise LORS and criteria.

PURPOSE OF THE ANALYSIS

The purpose of the visual resources analysis is to compare the alternative sites, alternative project size, alternative configuration, and the HDPP without the second gas pipeline to the HDPP as proposed.

APPLICABLE LORS

With respect to visual resources, the same federal and state LORS apply to the three alternative sites and the alternative size project.

Local

The viewshed (area from which the project may be seen) for the proposed project at the SCIA site and for the alternative size project comprises portions of three jurisdictions: unincorporated portions of San Bernardino County to the east and north of the project site, including the town of Oro Grande and National Trails Highway (historic Route 66) to the east; portions of the City of Adelanto to the north and west; and portions of the City of Victorville, including the site itself and areas to the south and southeast. The viewshed for the Adelanto site is within the City of Adelanto. The viewshed for the Etiwanda site is within the City of Rancho Cucamonga.

County of San Bernardino

General Plan, Open Space/Recreation/Scenic Resources Element

The County of San Bernardino General Plan contains extensive policies regarding scenic resources, some of which could apply to the project. In broad terms, the County Open Space/Recreation/Scenic Element goals call for preservation and protection of outstanding scenic resources of the County (Goal 8.D.) through its policies. Policies applicable to the project area include:

o Policy OR-50. This policy identifies the following features found in the general study area as potential scenic resources:

a) i) A roadway, vista point, or area which provides a vista of undisturbed natural areas; [fix format]

ii) Includes a unique or unusual feature which comprises an important or dominant portion of the viewshed...; and,

iii) Offers a distant vista which provides relief from less attractive views of nearby features (such as views of mountain backdrops from urban areas.)

b) Views of major mountain ranges, specifically including views of mountain ranges from urban or desert areas; historic or culturally significant structures; regional parks and their local access routes; any portion of the regional trail system.

Policy OR-58. Designated County Scenic Highways

The National Trails Highway located east of the project site is a designated County Scenic Highway. County Scenic Highway designation primarily entails controlling development within the 200-foot Scenic Corridor on each side of the designated route, such as restriction of signs or other roadside development. In addition, Policy OR-51 calls for a County review of projects to prevent obstruction of scenic views and to encourage compatibility with the surrounding landscape from scenic areas, trails, and highways.

City of Victorville

General Plan

The project site, located in the Southern California International Airport (SCIA) (formerly George Air Force Base), was recently annexed into the City of Victorville and is, therefore, covered under its General Plan. The City of Victorville is currently in the process of updating the City's General Plan. The update is currently in draft form and has not yet been adopted. The visual resources study makes reference to applicable land uses under the 1997 draft plan, which describes land uses at the SCIA in the SCIA Community Plan Element of the General Plan. There are no specific scenic resource policies in the SCIA Community Plan Element. The SCIA Element has, however, been used in this analysis as a source of future planned land uses at the SCIA in order to determine the location of potentially sensitive receptors.

SCIA Specific Plan

The SCIA Specific Plan was prepared by the City of Victorville and describes allowable land uses within the SCIA. The Specific Plan includes no specific scenic policies.

Municipal Code Zoning Ordinance

Chapter 18.44: M-2 - Heavy Industrial District of the Victorville Municipal Code Zoning Ordinance (City of Victorville, 1997) applies to electric generating plants such as the project. This chapter requires that a view obscuring wall or fence be erected and maintained at a height six feet above open spaces used for storage of materials abutting property used for public purposes or when it is in the opinion of the director of planning erection of said fence is necessary due to surrounding land uses (Section 18.44.080).

VVEDA Redevelopment Plan (RDP)

Portions of the Victor Valley, including the SCIA site, were included within a regional redevelopment plan operating under a Joint Powers Authority (JPA). The JPA is comprised of the County of San Bernardino, the Cities of Victorville and Hesperia, and The Town of Apple Valley. Land uses permitted under the RDP are those permitted by the applicable General Plans of the respective JPA jurisdictions. In the case of the proposed project, the City of Victorville is the JPA jurisdiction. The Final Program Environmental Impact Report (FPEIR) for the Victor Valley Redevelopment Project, which evaluated potential environmental effects, found that light and glare from street lights, reflective building materials, and vehicle headlights resulting from implementation of the plan had the potential to cause significant adverse impacts in the study area. As a result of these findings, the FPEIR presented mitigation measures, to direct outdoor lighting from commercial and industrial uses away from existing and planned residential units, and various measures to reduce the amount and impact of outdoor night lighting, for consideration under subsequent project approvals. Though not binding, these mitigation measures indicated the level of local concern with possible glare and night lighting impacts that could come with development of the Victor Valley.

City of Adelanto

No visual resource policies were identified in the City of Adelanto General Plan.

City of Rancho Cucamonga

The City of Rancho Cucamonga's General Plan (1996) designates the uses allowable in particular parts of the city. The Zoning Code (1996) is consistent with the General Plan in regard to these designations.

VISUAL RESOURCES IMPACTS

The HDPP's potential visual resource impacts for the SCIA are discussed in the visual resources section of this document. The purpose of this discussion is to evaluate potential visual resource impacts associated with the alternative sites, and the alternative size projects, and the HDPP without the second gas pipeline.

Adelanto Alternative Site

ALTERNATIVES Table 1, which compares the applicant's and staff's alternative sites, and staff's alternative size, to the applicant's proposed project, shows the Adelanto site to be better for visual resources impacts, when compared with the SCIA site. Visual quality is low for the Adelanto site because of the existing industrial development. Some portions of the SCIA viewshed have high visual quality. The Adelanto site is in an industrial park, adjacent to existing light industrial facilities. These existing facilities are visible from residences in the viewshed, whereas residences in some portions of the the SCIA viewshed do not have views of the existing development on the SCIA property. Both sites have rural residences in their viewsheds, at middleground distances, so viewer sensitivity is the same for both sites and viewer exposure is similar. Visibility is higher at the Adelanto site for the residences in the viewshed because the terrain there is flat, while the viewers in a major part of the SCIA viewshed are partially screened by the edge of the plateau above the Mojave River. A new 6.4 mile transmission line would be built for the project at the Adelanto site. The new line would parallel existing lines for almost all of its length, and would not be visible from any part of the viewshed with high visual quality. In contrast, the transmission line for the proposed project at the SCIA site would cause significant impacts on portions of the viewshed with high visual quality. Considering these factors, the Adelanto site would be better than the proposed site in regard to visual resource impacts.

Luz SEGS Unit 10 Alternative Site

ALTERNATIVES Table 1 shows the Luz SEGS Unit 10 alternative site to be better for visual resources impacts, when compared with the HDPP site. Visual quality is lower for the Luz SEGS 10 site than for some portions of the SCIA viewshed. The Luz SEGS Unit 10 site is adjacent to the existing Luz SEGS Unit 8 and Unit 9 projects, which are visible between the site and residences in the viewshed. In contrast, residences in some portions of the the SCIA viewshed do not have views of the existing development on the SCIA property. Both sites have rural residences in their viewsheds, at middleground distances, so viewer sensitivity is the same for both sites and viewer exposure is similar. Visibility is similar for both sites because at the Luz SEGS Unit 10 site the existing projects would partially screen the view of the project, while the viewers in a major part of the SCIA viewshed are partially screened by the edge of the plateau above the Mojave River. If a new transmission line from the Kramer Substation to the Victor Substation were needed, it would parallel the existing line. Although the new transmission lines would be substantially longer for the Luz SEGS 10 site, they would parallel existing lines. In contrast, the transmission line for the project at the SCIA site would not parallel an existing line for the first several miles, and it is expected to cause significant visual impacts. Considering these factors, the Luz SEGS 10 site would be better than the proposed site in regard to visual resource impacts.

Etiwanda Alternative Site

ALTERNATIVES Table 1 shows the Etiwanda Alternative site, located in the City of Rancho Cucamonga, to be better for visual resources impacts, when compared with the HDPP site. The site is located in a portion of the City designated for heavy industry. Visual quality is low for the Etiwanda alternative site, whereas visual quality is high for some portions of the SCIA viewshed. An existing power plant is visible adjacent to the alternative site. In contrast, residences in some portions of the the SCIA viewshed do not have views of the existing development on the SCIA property. The nearest residences to the Etiwanda site are approximately one mile away, similar to the SCIA site, so viewer sensitivity and viewer exposure is similar for the two sites. Visibility from residences is similar for both sites because both are partially screened: the Etiwanda site by existing power plants and the SCIA site by the edge of the plateau above the Mojave River. However, visibility for travelers is higher for the Etiwanda site because travelers on Interstate 15 have unimpeded views of the site. In contrast, views of the SCIA site for travelers on National Trails Highway are partially screened by the plateau edge. In addition, the transmission line for a power plant at the Etiwanda site would only be approximately 100 yards long, causing no significant visual impacts. In comparison, the project at the SCIA site would require a much longer transmission line that would cause significant impacts. Considering these factors, the Etiwanda site would be better than the proposed site in regard to visual resource impacts.

240 MW Combined Cycle At SCIA Alternative

ALTERNATIVES Table 1 shows the 240 MW project size alternative to be better for visual resources impacts, when compared with the HDPP project. The size of the power plant would be smaller, with only one stack at the same height as the proposed project stacks. The transmission line would be the same as for the proposed project. Therefore, visual impacts would be better.

832 MW Simple Cycle At SCIA Alternative

ALTERNATIVES Table 1 shows the 832 MW simple cycle alternative to be the same for visual resources impacts, when compared with the HDPP project. The size of the power plant and height of the stacks for the 832 MW option would be similar to that for the proposed project.

High Desert Power Project Without The Second Gas Pipeline

Alternatives Table 1 shows the HDPP without the second gas pipeline alternative to be the same as the proposed project from the visual resources perspective. The second gas pipeline does not make any difference since it will be buried, and therefore not a visual feature.

ALTERNATIVES Visual Resources Table 1
Comparison of Alternative Sites
and Alternative Size with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	better	better
Luz SEGS Unit 10 site	better	better
Etiwanda site	better	better
240 MW combined cycle at SCIA	better	better
832 MW simple cycle at SCIA	same	same
HDPP w/o 2nd gas pipeline	same	same

CONCLUSION

The three alternative sites would be better in terms of visual impacts than the proposed project. The 832 MW simple cycle, and HDPP without the second gas pipeline alternatives would be the same as the proposed project from the visual resources perspective. The 240 MW combined cycle project alternative size project would be better than the proposed project in regard to visual impacts.

PURPOSE OF THE ANALYSIS

The purpose of the cultural resources analysis is to compare the alternative sites, alternative project sizes, and the HDPP without the second gas pipeline to the HDPP as proposed. The proposed HDPP includes a power generation plant; a 7.2 mile electrical transmission line and associated access roads; a 2.75 mile natural gas pipeline; a new well field for pumping groundwater; a 2.5 mile and a 6.5 mile water supply pipeline; and a second, 32-mile gas pipeline with associated access roads.

APPLICABLE LORS

With respect to cultural resources, the same federal and state LORS apply to the three alternative sites, the alternative project sizes, and the HDPP without the second gas pipeline. However, each alternative site is located within the jurisdictional boundaries of a different local entity so different sets of local LORS would apply to project development at each alternative site.

Local

San Bernardino County

San Bernardino County has a well-developed set of policies, guidelines and requirements for the identification and protection of cultural resources. Project developers are informed of county requirements when they file for a permit for a new project. These LORS would apply to use of the LUZ SEGS Unit 10 site and portions of the linear routes for the SCIA and Adelanto alternative sites.

City of Rancho Cucamonga

Except for implementation of CEQA, the City of Rancho Cucamonga does not have any specific requirements for cultural resources. The city does keep a list and maps of known sensitive cultural resources locations that are important to the city. Plans for new projects are checked against these to ensure that the resources are protected. The city also has general plan goals and policies relative to maintain a rural atmosphere throughout the city. The city's goals and policies would apply to the use of the Etiwanda site, since the proposed site and associated linear facilities all assumed to lie within the city boundaries.

City of Adelanto

Staff has been unsuccessful in making contact with city planning staff to discuss possible city plans, goals, or policies relative the identification and protection of cultural resources. Under state law, the city must address CEQA requirements that do address cultural resources. Any plans, goals, or policies the city may have would apply to the use of the Adelanto alternative site and those portions of associated linear facilities that would be constructed within the city boundaries.

CULTURAL RESOURCES IMPACTS

The HDPP's potential cultural resources impacts for the SCIA site are discussed in the cultural resources section of this Preliminary Staff Assessment (PSA). The purpose of this discussion is to evaluate potential cultural resources impacts associated with the alternative sites, the alternative size projects, and the HDPP without the second gas pipeline.

To summarize: The San Bernardino Valley and major portions of the Mojave Desert, particularly areas near water, along the rivers and lakes, and along the margins between the High Desert and the mountains, were inhabited by Native American peoples long before contact and settlement by Euro-Americans. Prehistoric settlements tended to be located in protected areas near water sources and food supplies. Within these areas, there was a wide range of food and material resources used to sustain and maintain prehistoric cultures.

Incoming Euro-American explorers and settlers tended to choose places to live and to develop for resources using criteria similar to the native peoples. Thus some locations might have a prehistoric as well as an historic component. Cultural resources may be found on the surface or they may be present at varying depths below the surface. Often the potential for encountering cultural resources during project construction remains uncertain until excavation of sub-surface soils takes place. It is also often difficult to predict just where and what type of cultural resources may be discovered.

The purpose of this discussion is to evaluate potential cultural resource impacts associated with use of the alternative sites for the HDPP power plant and its related facilities. Use of any one of the alternative sites would require construction of at least one project-related linear facility, i.e., a transmission line, natural gas supply line, water supply and/or water discharge routes. The alternative sites and their possible associated linear facilities are described in more detail in *[Section to be determined later]*. Note: the routings of the linear facilities for the alternatives are "best estimates" made by project management staff and may not be the actual routes that would used. In making a comparison of potential impacts associated with linear project facilities, staff has assumed that construction of an electric transmission line for a project has the potential to disturb a lesser amount of ground than an excavation of trenches for pipelines. However, for any of the alternatives discussed, the comparisons are very generalized since the records and maps of known archaeological resource sites have not been reviewed to determine their proximity to the alternative sites and facilities.

Adelanto Alternative Site

Alternatives Table 1, which compares the applicant's and staff's alternative sites, and staff's alternative sized project, to the applicant's proposed project, shows the Adelanto alternative site to be better for cultural resources impacts, when compared with the SCIA site. This preliminary conclusion is based on the assumption that a lesser amount of surface area would be disturbed for construction of linear facilities needed for the Adelanto alternative. The second gas pipeline proposed for the SCIA alternative would require thirty-two miles of disturbance and trenching through areas known to contain significant cultural resource sites. Even if the thirty-two mile, second gas pipeline were eliminated from the HDPP project, the Adelanto alternative would remain comparatively better than the proposed SCIA site because the initial gas pipeline route is nearly three miles long. The gas pipeline needed for the Adelanto site would be less than a mile long and would not affect any known cultural resource sites.

The length of the electric transmission line needed for the SCIA alternative is a little over seven miles in length while the length of the line needed for the Adelanto alternative is nearly six and a half miles long. Cultural resource sites are known to be present within or adjacent to both of these routes, so the potential for impacts is virtually the same. For comparative purposes, the slightly longer distance needed for the SCIA site would make it slightly worse than the Adelanto alternative.

Luz SEGS Unit 10 Alternative Site

Table 1 shows the Luz SEGS Unit 10 alternative site to be better for cultural resource impacts, when compared with the SCIA site. This preliminary conclusion is based on the assumption that a lesser amount of surface area would be disturbed for construction of linear facilities needed for the LUZ SEGS Unit 10 alternative. The second gas pipeline proposed for the SCIA alternative would require thirty-two miles of disturbance and trenching through areas known to contain significant cultural resource sites. The gas pipeline needed for the LUZ SEGS Unit 10 site would be less than a half mile long and would cross through an area that has been disturbed by previous roadway, gas pipeline, and power plant costruction.

Use of the LUZ SEGS Unit 10 alternative would require construction of over forty miles of electric transmission line and associated access roads, compared to the seven miles needed for the SCIA alternative. The ability for an electrical transmission line to span across a sensitive cultural resource site would off-set, to some degree, the comparative differences between the length of the these transmission facilities. If the thirty-two mile, second gas pipeline were eliminated from the HDPP project, then the LUZ SEGS Unit 10 alternative would become comparatively worse than the proposed SCIA site because of the longer transmission routes.

Etiwanda Power Plant Property

Table 1 shows the Etiwanda property to be potentially better, for cultural resource impacts, when compared with the SCIA site. This preliminary conclusion is based on the assumption that a lesser amount of surface area would be disturbed for construction of linear facilities needed for the Etiwanda alternative. Over seven miles of transmission line would be required to serve the SCIA alternative, while only a few hundred yards would be needed at the Etiwanda site. The second gas pipeline proposed for the SCIA alternative would require thirty-two miles of disturbance and trenching through areas known to contain significant cultural resource sites. Use of the Etiwanda alternative would require less than a mile of new gas pipeline, a relatively short water pipeline (within the site), and only a few hundred yards of new transmission lines.

240 MW Combined Cycle And 832 MW Simple Cycle

Table 1 also shows that the 240 MW combined cycle project and the 832 MW simple cycle alternatives, are better than the applicant's proposed project from the cultural resources perspective, because of the potential impacts associated with the second gas pipeline. From the cultural resources perspective, if the second gas pipeline were eliminated these alternatives would be considered the same as the proposed project.

High Desert Power Project Without The Second Gas Pipeline

Table 1 shows that this alternative would be better than the proposed project, because it would avoid the second gas pipeline's potential impacts on cultural resources.

Alternatives Cultural Resources Table 1
Comparison of Alternative Sites
and Alternative Size with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	better	better
Luz SEGS Unit 10 site	better	better
Etiwanda property site	better	better
240 MW combined cycle at SCIA	better	better
832 MW simple cycle at SCIA	better	better
HDPP w/o 2nd gas pipeline	better	better

CONCLUSION

The potential for project impacts to cultural resources is directly related to the amount of surface and sub-surface disturbance of the ground under the project site and the project-related facilities. The potential for project impacts to these resources is also directly related to the likelihood they are present in (or under) areas that would be affected by project construction and operation.

Power plant construction is usually confined to the project site and typically requires some degree of grading and excavation during construction. Construction and operation of electric transmission lines requires grading and excavation of soils for tower or pole footings. Construction of water, wastewater, and natural gas pipelines requires excavation and trenching to varying depths for placement of the pipe. Pipelines may also require horizontal drilling or boring to go under certain surface features. The greater the area of surface and sub-surface disturbance, the greater the potential for impacts to cultural resources.

With respect to potential impacts to cultural resources, the Adelanto, LUZ SEGS Unit 10, Etiwanda, and HDPP without the second gas pipeline alternatives are potentially better when compared to the SCIA alternative. The transmission line routes for the LUZ SEGS Unit 10 alternative are about forty-three miles longer than that proposed for the HDPP site and there would be some degree of disturbance associated with access roads needed for portions of the transmission line routes. But the proposed thirty-two mile gas pipeline route associated with any of the power plant configurations at the SCIA site has a much greater potential to impact significant cultural resources.

There are twenty-one known, recorded cultural resource sites along the thirty-two mile gas pipeline route. The largest and most diverse site has been determined to be eligible for listing on the National Register of Historic Places. At 1,387,880 square meters, this cultural resource site is so extensive that the pipeline route would have to be shifted to the other side of the road and over one-half mile beyond the existing highway rights-of-way to avoid disturbing the known limits of this site. Moving the pipeline route this distance would then place it in federally protected habitat and possibly outside the utility corridors identified in the BLM Desert Plan. Since pipeline construction requires excavation of trenches for the entire distance of the route, the potential for cultural resources to be encountered and disturbed is greatly increased, when compared to construction of electric transmission lines that can span across sensitive resource sites if necessary.

If the thirty-two mile gas pipeline were eliminated from the HDPP project, the LUZ SEGS Unit 10 alternative would become comparatively worse than the proposed SCIA site. The LUZ SEGS Unit 10 would require construction of thirty-seven plus thirteen miles of new transmission line and access roads, compared to the 7.2 miles needed for the SCIA alternative. The Etiwanda alternative would remain better than the SCIA alternative, even if the thirty-two mile gas pipeline were eliminated. And, if reclaimed water were piped to the Etiwanda site, this alternative would still be slightly better than the SCIA alternative without the thirty-two mile pipeline, since the water pipelines to the SCIA alternative site total nearly nine miles and they would be located in an area known to have a high sensitivity for cultural resources.

The urbanized location of the Etiwanda alternative could off-set the potential for the pipeline to affect cultural resources, making the Etiwanda alternative nearly the same as the HDPP site.

POWER PLANT RELIABILITY

PURPOSE OF THE ANALYSIS

The purpose of the Alternatives - Power Plant Reliability analysis is to compare the alternative sites , alternative size ,alternative configuration,and the HDPP without the second gas pipeline to the HDPP as proposed.

APPLICABLE LORS

No LORS apply to the subject of Power Plant Reliability.

RELIABILITY IMPACTS

The HDPP's power plant reliability for the SCIA site is discussed in the Power Plant Reliability section of this document. The purpose of this discussion is to evaluate potential effects on project reliability associated with the alternative sites, and with the alternative size and configuration, and HDPP without the second gas pipeline options.

All of the alternative sites lie within a span of 45 to 50 miles.

POTENTIAL IMPACTS ON POWER PLANT RELIABILITY

The power plant's reliability will not likely create any significant impacts upon the environment (see the Power Plant Reliability section of this document). The project's location, however, could impact power plant reliability in three ways:

- The reliability of the fuel supply could differ from one site to the next.
- The reliability of the water supply could differ from one site to the next.
- The project's exposure to natural hazards, such as earthquake and flood, could differ from one site to the next.

Additionally, configuring the project as a single-train 240 MW combined cycle could affect its reliability compared to the proposed project due to its reduced level of equipment redundancy.

Reliability of Fuel Supply

All the alternative sites lie relatively near one another; the two farthest sites are no more than 50 miles apart. The fuel source for the project (AFC, э 3.7.5) will remain basically the same regardless which site is chosen. While the specific pipeline facilities conveying fuel to the project would differ in detail, they would all draw from the same ultimate energy source. Staff believes the reliability of fuel supply would be identical for all the alternatives.

Reliability of Water Supply

Groundwater wells and/or a pipeline from a large-volume supplier are potential sources of water for the proposed project and all six alternative options. No differences in reliability of water supply are likely.

Exposure to Natural Hazards

Flooding is not recognized as a likely hazard at the proposed site, nor at any of the alternative sites.

Earthquake hazard differs among the sites. All four sites lie within earthquake Zone 4, the highest level recognized by the Uniform Building Code (UBC). Two of the alternative sites, however, the Luz SEGS Unit 10 site and the Etiwanda Power Plant Property site, also lie within 10 kilometers of an “A” earthquake fault (see the Facility Design and Alternatives - Facility Design sections of this document). The potential of earthquake damage is thus greater at those two sites, requiring that substantially greater structural design margins be employed in the design and construction of the plant. For this reason, staff rates the Luz SEGS Unit 10 and the Etiwanda Power Plant Property sites as worse than the proposed site. The Adelanto site is, in effect, identical to the proposed site, and staff rates it the same (see Alternatives - Power Plant Reliability: Table 1 below).

Equipment Redundancy

Both configurations of the proposed project involve multiple, identical power trains of turbine generators. The 720 MW F-class combined cycle plant will consist of three identical power trains, each consisting of a gas turbine, a heat recovery steam generator (HRSG), and a steam turbine generator, all three trains capable of operating independently of one another. The 678 MW G-class combined cycle plant will consist of two identical power trains, each consisting of a gas turbine, a heat recovery steam generator (HRSG), and a steam turbine generator, both trains capable of operating independently of one another.

Staff’s smaller size alternative, a 240 MW project, would consist of a single combined cycle power train, identical to one of the F-class power trains of the proposed 720 MW configuration. The multiple trains of the proposed project offer a considerable level of redundancy of function; if one power train fails, the remaining trains can continue to operate, producing electrical output from 50 percent (G-class combined cycle) to 80 percent (simple cycle) of full capacity. This redundancy is not available from the smaller size alternative; failure of the single train would put the entire project out of service until repairs could be effected. Staff thus rates the smaller size alternative as worse than the proposed project.

The 832 MW peaking plant alternative would consist of five identical F-class gas turbine generators. This configuration would offer even more redundancy of function than the proposed project configurations; if one turbine generator fails, the remaining four could continue to operate, producing electrical output at 80 percent of full capacity. Staff thus rates the peaking power plant alternative as better than the proposed project.

The HDPP without the second gas pipeline alternative eliminates the second source of gas available. However, the second gas pipeline was proposed to enable the project operators to choose the least expensive gas supply option, rather than as a reliability factor. From the reliability perspective, the second gas pipeline makes an insignificant difference. Therefore this alternative is considered the same as the proposed project for reliability.

Alternatives - Power Plant Reliability: Table 1
Comparison of Alternative Sites,
Size, and Configuration Alternatives with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	same	same
Luz SEGS Unit 10 site	worse	worse
Etiwanda property site	worse	worse
240 MW combined cycle at SCIA	worse	worse
832 MW simple cycle at SCIA	same	same
HDPP w/o 2nd gas pipeline	same	same

CONCLUSION

The project's reliability will not cause environmental impacts. Rather, its location and configuration (the smaller size alternative) could influence the project's reliability. The Adelanto site, the 832 MW simple cycle, and the HDPP without the second gas pipeline options are effectively the same as the proposed site. Due to its close proximity, fuel and water supply and level of earthquake hazard are all identical to the proposed project.

The Luz SEGS Unit 10 site and the Etiwanda Property site both lie within 10 kilometers of an "A" earthquake fault, as defined by the UBC. This requires that the project be designed and built to a higher standard, rendering these sites worse than the proposed site.

The combined cycle smaller size alternative project would eliminate the equipment redundancy that contributes greatly to the reliability of both configurations of the proposed project, increasing the likelihood that the plant would be out of service when needed. This alternative is worse than the proposed project. (See Alternatives - Power Plant Reliability: Table 1 above.)

The five train simple cycle peaking plant configuration would increase the equipment redundancy that contributes to the reliability of the proposed project, decreasing the likelihood that the plant would be out of service when needed. From the reliability perspective this alternative is better than the proposed project.

POWER PLANT EFFICIENCY

PURPOSE OF THE ANALYSIS

The purpose of the Alternatives - Power Plant Efficiency analysis is to compare the alternative sites, combined cycle alternative, configuration alternative, and the HDPP without the second gas pipeline to the HDPP as proposed.

APPLICABLE LORS

With respect to Power Plant Efficiency, there are no federal or local LORS applicable to the proposed project, or to any of the alternatives. The same state LORS apply to the three alternative sites, the alternative project size, and the proposed project. There is thus no difference among the various alternatives due to LORS.

EFFICIENCY IMPACTS

The efficiency of the HDPP at the SCIA site is discussed in the Power Plant Efficiency section of this document. The purpose of this discussion is to evaluate potential impacts on power plant efficiency associated with the alternative sites and with the alternative size project.

Site Specific Impacts

The subject of Power Plant Efficiency is largely insensitive to site specific factors. Differing project sites, nevertheless, hold the potential to affect project efficiency in two ways:

- If the natural gas fuel were obtained from a source different from that delineated in the Application for Certification (AFC), the impacts on energy resources could be different.
- If climatic conditions at an alternative site were sufficiently different from the proposed site, project fuel efficiency could be affected, either positively or negatively.

Impacts on Energy Resources

All the sites lie within 45 or 50 miles of each other in southern California. A project at any one of these sites would obtain its natural gas fuel from the same ultimate source (AFC, э 3.7.5). While there would be minor differences in the specific pipeline facilities conducting the fuel to the project, none of the alternative sites would impose any differing impacts on the energy source.

Although the 240 MW alternative will burn less fuel than the three-train proposed project, the difference in fuel consumption is negligible in comparison to the capacity of the ultimate fuel source. The smaller size alternative thus effectively presents an identical impact upon energy resources. Likewise, although the simple cycle peaking plant would burn fuel less efficiently than any of the combined cycle configurations, its total energy output as a peaker, and thus its total fuel consumption, would be less, and negligible in comparison to the fuel source.

Climatic Conditions

The fuel efficiency of a gas turbine power plant, such as either of the proposed HDPP configurations, can be influenced by the climatic conditions under which it operates. Extremely high temperatures can reduce the efficiency of the gas turbine. Additionally, in the combined cycle configurations, this typically requires the burning of more fuel in the duct burner to supply the requisite steam to the steam turbine. Further, cooling of the steam turbine's condenser is less effective at high temperatures. All these factors serve to reduce project fuel efficiency.

The SCIA proposed site and the Adelanto alternative site lie in close proximity to each other, and thus enjoy identical climatic conditions. The Luz SEGS Unit 10 site is likewise located in the high desert region of southern California, and sees nearly identical temperatures. No difference in project fuel efficiency would likely exist among these three sites.

The Etiwanda Power Plant Property site is located in the Los Angeles basin. Annual temperatures there average approximately five degrees Fahrenheit warmer than the high desert temperatures, 65.2 °F as opposed to 60.5 °F.[44] Such a small difference will have only a minor affect on gas turbine power plant efficiency; fuel efficiency at the Etiwanda site could be expected to fall no more than one percent or so below that at the high desert sites. Staff regards this as a negligible difference, and thus rates the Etiwanda site effectively the same as the other sites.

Note that while increasing altitude will reduce the maximum power that a gas turbine generator can produce, it has a negligible affect on fuel efficiency. Staff thus does not consider altitude a factor in comparing the alternative sites.

240 MW Combined Cycle At SCIA

As discussed in the Power Plant Efficiency section of this document, one of the alternative configurations of the proposed project consists of three 240 MW power trains, each comprised of an F-class gas turbine generator with heat recovery steam generator (HRSG) and a steam turbine generator. Since each of the three trains operates essentially independent of the others, building just one train instead of three (the staff smaller size alternative) will have no impact on project fuel efficiency.

As further discussed in the Power Plant Efficiency section of this document, another of the proposed alternative configurations of the proposed project consists of two 339 MW power trains, each comprised of a G-class gas turbine generator with HRSG and a steam turbine generator. This configuration would exhibit fuel efficiency only insignificantly higher than the 240 MW F-class alternative. No real difference exists between these two alternatives.

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44 Source: National Climatic Data Center, National Oceanic & Atmospheric Administration. *Chronological Data, Annual Summary, California, 1996.* Volume 100, Number 13, ISSN 0145-0069.

832 MW Simple Cycle At SCIA

Staff's peaking plant alternative configuration, comprised of five 166 MW gas turbines operating in simple cycle, is intended to operate in peaking mode only, as opposed to the baseload dispatch that is the objective of the combined cycle configurations of the proposed project. While a simple cycle plant can be used in baseload duty, it does so with significantly lower efficiency. Where the proposed combined cycle configurations can be expected to consume fuel at efficiency levels around 54 to 55 percent (see that portion of the document entitled Power Plant Efficiency), the simple cycle configuration would burn fuel at an efficiency level around 36 percent.45 This is significantly worse than the proposed project configurations. Staff thus deems the peaking plant alternative to be worse than either proposed configuration from the standpoint of efficiency.

High Desert Power Project Without The Second Gas Pipeline

From the efficiency perspective, the second gas pipeline would not make any difference. Therefore, the HDPP without the second gas pipeline alternative would be the same as the proposed project.

Alternatives - Power Plant Efficiency: Table 1
Comparison of Alternative Sites, Size, and Configuration with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	same	same
Luz SEGS Unit 10 site	same	same
Etiwanda property site	same	same
240 MW combined cycle at SCIA	same	same
832 MW simple cycle at SCIA	worse	worse
HDPP w/o 2nd gas pipeline	same	Same

CONCLUSION

If any of the alternative sites were sufficiently distant from the proposed site, fuel might be obtained from a different source, potentially altering the impact on energy resources. Further, if any of the alternative sites were exposed to a climate sufficiently different from the proposed site, project fuel efficiency could be altered. Since all the alternative sites lie near one another, and are exposed to very similar climatic conditions, no impacts on energy resources or fuel efficiency are likely.

If the smaller size alternative were comprised of different generating technology from the proposed project, efficiency might differ. Since the alternative consists of identical technology, no difference in efficiency will occur. The fuel efficiency of the

45 Source: Gas Turbine World Performance Specs 1997-1998, Volume 17, December 1997

simple cycle peaking plant would be significantly lower than that of any of the other configurations studies. Therefore, staff considers it worse than the proposed project and the alternatives.

PURPOSE OF THE ANALYSIS

The purpose of the transmission system engineering analysis is to compare alternative sites,alternative project sizes, and the HDPP without the second gas pipeline to the HDPP as proposed.

APPLICABLE LORS

With respect to transmission system engineering discipline the same state LORS apply to the three alternative sites, the alternative project sizes, and the HDPP without the second gas pipeline.

Local

None

State

California Public Utilities Commission General Order-95

TRANSMISSION SYSTEM ENGINEERING IMPACTS

The HDPP's potential transmission system engineering impacts for the SCIA site are discussed in the transmission system engineering section of this document. The purpose of this discussion is to evaluate potential impacts and benefits associated with the alternative sites, the alternative size projects, and the HDPP without the second gas pipeline. Because a power flow analysis is not available for the alternative sites, complete system reliability implications cannot be determined.

Adelanto Alternative Site

Alternatives Table 1, which compares the applicant's and staff's alternative sites, and staff's alternative size, to the applicant's proposed project, shows the Adelanto alternative site to be better when compared with the SCIA site because of a shorter outlet line.

Luz SEGS Unit 10 Alternative Site

Table 1 shows the Luz SEGS Unit 10 alternative site to be worse for transmission system engineering impacts, when compared with the SCIA site because a 38 mile 230 kilovolt transmission line may have to be built. This site however, would not require an outlet line as the existing Segs 8 and Segs 9 outlet line is sufficient to handle the SCIA output.

Etiwanda Power Plant Property

Table 1 shows the Etiwanda property to be better when compared with the SCIA site because it does not require an outlet line and is located closer to the load thus likely reducing transmission losses. It also would likely provide more reactive power to the system because it is located closer to the load.

240 MW Combined Cycle At SCIA Alternative

Table 1 shows that the alternative size 240 MW combined cycle project is better when compared with the applicant's proposed project size options because it would reduce congestion on transmission circuits, reduce or eliminate the use of special control procedures, and reduce losses.

832 MW Project Simple Cycle At SCIA Alternative

Table 1 also shows that the 832 MW simple cycle alternative is the same as the 720 MW and 678 MW because the system can reliably accommodate all three sizes adequately.

High Desert Power Project Without The Second Gas Pipeline

Table 1 also shows that the HDPP project without the second gas pipeline alternative is the same as the proposed project, because the pipeline does not affect transmission system engineering.

Alternatives-Transmission System Engineering Table 1
Comparison of Alternative Sites
and Alternative Size with the SCIA Site

ALTERNATIVE SITE/SIZE	COMPARISON TO THE PROPOSED PROJECT AT SCIA SITE	
	720 MW combined cycle	678 MW combined cycle
Adelanto site	better	better
Luz SEGS Unit 10 site	worse	worse
Etiwanda property site	better	better
240 MW combined cycle project	better	better
832 MW simple cycle	same	same
HDPP w/o 2nd gas pipeline	same	same

CONCLUSION

The Adelanto, Etiwanda, and 240 MW alternatives are ranked better at this level of analysis. The 832 MW size and the HDPP without the second gas pipeline alternatives are ranked the same and the Luz SEGS Unit 10 alternative site is ranked worse.

ATTACHMENT B - DESCRIPTION OF ALTERNATIVE SITES, SIZE, AND CONFIGURATION OPTIONS

INTRODUCTION

The purpose of this discussion is to describe the project, including linear facilities, if it were to be located at one of the alternative sites; and to describe the features of an smaller project alternative and an alternative project configuration.

ADELANTO SITE ALTERNATIVE

The applicant's Adelanto alternative site was originally considered in 1994, and was the proposed site at that time. The Adelanto site is within the Adelanto city limits. It consists of approximately 26 acres located within the 42 acre Adelanto Industrial Park No.4 (see Figure). The site is adjacent to an existing warehouse/shop operation, with several industrial operations and office buildings nearby. It currently has disturbed vegetation. The assessor's parcel number for the site is 3129-251-14. The site is zoned Manufacturing/ Industrial(M/I). The project at the Adelanto alternative site would consist of the same two configuration options being considered for the SCIA site.

WATER SUPPLY

Potable water will be provided by the City of Adelanto via an existing line on Holly Road. The water connection will enter at the southeast corner of the site.Non-potable water will be supplied from one of the following sources:

- Groundwater using the same wells as proposed for the SCIA site.
- State Water Project (SWP) water via the Mojave River Pipeline Project

WATER PIPELINE

The well locations have not been established for the groundwater option. Therefore the connecting pipeline routes are unknown at this time.

For the SWP option, the site will be connected with the Mojave River Pipeline via a new connector pipeline running west along Holly Road approximately .5 mile to Richardson Road (note that further south, Richardson Road is called White Road when it reaches Palmdale Road/Route 18).

WASTE WATER TREATMENT

The project's industrial waste water will be handled the same way as at the SCIA site, with concentrated brine being sent to a crystallizer. Sewer services for sanitary wastes will be provided by the city of Adelanto via an existing line on Holly Road. The sewer connection will enter at the southeast corner of the site.

TRANSMISSION LINE

A new 6.4 mile 230 kV overhead, single circuit electric transmission line will be built to connect the project to the Southern California Edison Company's electrical transmission system at the existing Victor Substation. A new 230 kV switchyard would be built at the southern end of the project site.

The new line would exit the switchyard and run approximately 3.6 miles east along Holly Road to Highway 395, at which point it runs approximately 2.8 miles in a southeasterly direction to the Victor Substation. The line will parallel: 1) LADWP's Victorville-Rinaldi 500 kV line for approximately 45 percent of the distance along Holly Road till Highway 395; 2) SCE's Kramer-Victor 115 kV line for the first 1.7 miles after turning southeasterly at Highway 395; 3) SCE's Kramer-Lugo 230 kV line and the Kramer-Victor 115 kV line for the final 1.1 miles to the Victor Substation.

NATURAL GAS PIPELINE

A new 12-inch line approximately 3,280 feet long would be built by Southern California Gas Company to connect the project to its existing distribution line on Koala Road approximately 1/2 mile east of the alternative site. The new line would enter at the southeast corner of the site at Holly Road (see Figure). This alternative does not include the 32 mile long second gas pipeline associated with the proposed project.

LUZ SOLAR ELECTRIC GENERATING STATION UNIT 10

The Luz SEGS Unit 10 alternative site was certified by the Commission in 1990 in the Luz SEGS Units 9 and 10 proceeding. While Unit 9 was built and is operating, Unit 10 was not built. The alternative site consists of approximately 26 acres within the approximately 400 acre Luz SEGS Unit 10 site (see Figure) in the Harper Lake region of San Bernardino County. The site is adjacent to the existing Units 8 and 9, with primarily disturbed vegetation, and some native vegetation. For analysis purposes, Gary Walker and Eileen Allen have assumed that the 26 acre site would be in the southeast corner of the original Unit 10 site. The project at the Luz SEGS Unit 10 site would consist of the same three design configurations options being considered for the SCIA site.

The site is classified Rural Conservation (RC) and Rural Living (RL) in the San Bernardino County General Plan, which permits generation facilities in all designations and Official Land Use Districts, with site approval. The Luz SEGS Unit 9 and 10 plants were found to be consistent with the County's General Plan, which encourages development of renewable energy resources. The proposed project does not involve renewables. As of April 3, 1998 the County staff could not give a firm answer that a natural gas fired project would be consistent with General Plan policies for that area, but they offered no objections either.

WATER SUPPLY

Water will be supplied by groundwater via wells at the Unit 10 site. The location of the wells is unknown but we can assume that they would be within the boundary of the Unit 10 site.

WATER PIPELINE

Since the exact well locations are unknown, the locations of the connecting pipelines are unknown.

WASTE WATER TREATMENT

The project's industrial waste water will be handled the same way as at the SCIA site, with concentrated brine being sent to a crystallizer. HDPP would install a septic system and leach field for handling sanitary wastes, which we can assume would be contained within the 26 acre alternative site.

TRANSMISSION LINE

A project at this site would need an approximately .5-mile outlet line to connect with the existing Luz SEGS Unit 8 230 kV line. Building a 650-750 MW project at this alternative site could necessitate building a new single circuit 37 mile long 230 kV line from the Kramer substation to the Victor substation, which would parallel an existing line.

NATURAL GAS PIPELINE

A new natural gas pipeline approximately .5 mile long would be built from the project site south to the existing underground line which runs along Hoffman Road. This alternative does not include the 32 mile long second gas pipeline associated with the proposed project.

ETIWANDA PROPERTY SITE ALTERNATIVE

The Etiwanda property site consists of approximately 25 acres within the City of Rancho Cucamonga. (see Figure). The site is located on a portion of a vacant land area, which is west of the intersection of 6th St. and Etiwanda Avenue.

The vacant land was part of a 209 acre fenced parcel owned by Southern California Edison (SCE) called the Etiwanda Generating Station, which is located north of the intersection of Etiwanda Avenue and 6th St. In the Fall of 1997 SCE sold 76 acres of the 209 acres, including the 1030 MW gas fired Etiwanda power plant, to Houston Industries. Houston Industries has indicated that they plan to run the existing power plant after the current ownership transition period has ended, which will likely be sometime in 1999.

SCE has retained 133 acres of the Etiwanda property and the following assets: a fuel-oil storage and transportation system; a switchyard comprised of a 220 kV switchyard, a 66 kV switchyard, circuit breakers, towers, lines, structures and buildings and electrical protection; SCENet communication equipment; and other assets unrelated to power generation, including vacant land. The alternative site would be located within the vacant land area. We have assumed that it would be located at the southwest corner of the property since that area appears to have few structures. The project at the Etiwanda property site would consist of the same two configurations options being considered for the SCIA site.

The assessor's parcel number for the site is unknown. The site is within Sub-Area 15 of Rancho Cucamonga's "Industrial Area". It is zoned Heavy Industrial, which permits uses such as power plants.

In addition to SCE's remaining uses on the property, the site is west of the former Kaiser Steel plant and related facilities which are located on the east side of Etiwanda Avenue. The Kaiser property manager, Kaiser Ventures, has developed the California Speedway on Foothill Boulevard approximately .75 mile northeast of the site. Kaiser Ventures is planning to develop a 1300 vehicle truck stop which would be located on the southeast corner of the intersection of Etiwanda Avenue and San Bernardino Avenue. Uses in the area immediately south of the Etiwanda property include San Bernardino County's West Valley Detention Center, a juvenile hall facility, and some warehouse operations. The site currently has disturbed vegetation [check this on 4/30].

WATER SUPPLY

Water would be supplied by groundwater via two existing wells or new wells that would be drilled at the site. The location of any new wells is unknown but we can assume that they would be within the boundary of the site. Reclaimed waste water is conceivably another option because sufficient quantities are available from municipal treatment plants in the area. The nearest treatment plant with sufficient volume is approximately 8 miles east of the site.

Potable water would be supplied by the City through the same lines that supply the existing Etiwanda power plant.

WATER PIPELINES

The location of the pipelines connecting the wells to the power plant is unknown.

WASTE WATER TREATMENT

The project's industrial waste water will be handled the same way as at the SCIA site, with concentrated brine being sent to a crystallizer. Sewer services for sanitary wastes will be provided by the City of Rancho Cucamonga via an existing line Etiwanda Avenue. The sewer connection will enter at the southeast corner of the site.

TRANSMISSION LINE

A power plant at the Etiwanda property alternative site would connect with the existing Etiwanda switchyard through a short outlet line that would be approximately 100 yards long.

NATURAL GAS PIPELINE

A power plant at the Etiwanda property alternative site would connect to an existing gas line running along Etiwanda Avenue, with the line entering at the southeast corner of the site. This alternative does not include the 32 mile long second natural gas pipeline associated with the proposed project.

240 MW COMBINED CYCLE AT SCIA SITE

We have assumed that the smaller size project alternative would have project design features that would cut the 720 MW design down to one 240 MW unit, with one stack at the same height. With the exception of the 32-mile second gas pipeline, the linear facilities would be the same as those for the proposed project at the SCIA site. We can assume that fewer wells would be needed, with the location of any of the wells and related water pipelines still unknown.

832 MW SIMPLE CYCLE AT SCIA SITE

We have assumed that an 832 MW simple cycle project alternative would have design and plot plan features that are basically similar to the proposed project. With the exception of the 32-mile second gas pipeline, the linear facilities would be the same as that for the proposed project.

HIGH DESERT POWER PROJECT AT SCIA SITE WITHOUT THE SECOND GAS PIPELINE

We have assumed that this alternative would be identical to the proposed project, with the exception that it would not have the second gas pipeline.

ATTACHMENT C - INFEASIBLE ALTERNATIVES

INDUSTRIAL CITIES

Our initial approach was to consider the possibility of sites in the industrially oriented communities of Irwindale, Industry, and Vernon. The Irwindale Planning staff told us that Irwindale has an open ended moratorium on industrial development. The other two cities never responded to staff phone messages. The industrial community option was eliminated at this point.

FORMER MILITARY BASES

Staff talked with Ben Williams of the Governor's Office of Planning and Research about the feasibility of using any former militiary facilities for power plants, such as Norton Air Force Base in San Bernardino. He was very unfavorable to the Norton concept, noting that Norton is smaller than George Air Force Base and in a much more congested urban area with many residences nearby. He said that March Air Force Base in Riverside County might be better (Williams 1998, pers. comm.). After several calls to the March facility, and to Riverside County were not returned, the military base option was eliminated.

PARCELS ZONED FOR HEAVY INDUSTRY

After talking with several commercial/industrial real estate brokers, the staff alternatives team looked at the availability of land within a 400 acre parcel on the site of the now closed Kaiser Steel plant in San Bernardino County, and a 25 acre parcel in north San Bernardino.

KAISER STEEL SITE

Although the Kaiser Steel site was zoned IR (i.e., Industrial Regional, which includes heavy industrial uses) it was eliminated during preliminary screening because San Bernardino County, and the landowner, Kaiser Ventures, were not favorable towards a power plant in that location. A power plant at this location would not be prohibited by the County's General Plan and related codes. However, San Bernardino County's Planning staff stated that an electric power plant with stacks approximately 175 feet tall, would not be visually compatible with the type of industrial development the County envisioned for that area (Coleman 1998, pers. comm.). Kaiser Ventures concurred with the County's position (Redman 1998, pers. comm.). The County staff noted that they are currently processing a specific plan proposal for that area, and a power plant would not be consistent with the plan.

NORTH SAN BERNARDINO SITE

Although the staff alternatives team found the 25 acre north San Bernardino site, at 5175 North Industrial Parkway initially acceptable, it was eliminated during preliminary screening. The site is zoned for heavy industry and it appeared to be feasible for a number of technical areas. However, it was eliminated because it is located within a mile of two active earthquake faults, the San Andreas to the east, and the San Jacinto to the west.

LAND ADJACENT TO EXISTING SAN BERNARDINO POWER PLANT

The staff alternatives team looked at the land immediately south and east of the existing San Bernardino power plant. The plant itself is in an unincorporated area of San Bernardino County, whereas the adjacent land is on the western edge of the city of Redlands. This area was eliminated because the land was a productive, irrigated agricultural area, there were a number of residences within 1/4 mile, and it was not consistent with the Redlands General Plan.

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Robert Brand

INTRODUCTION

The project General Conditions Including Compliance Monitoring and Closure Plan (Compliance Plan) has been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in conjunction with air and water quality, public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission (Energy Commission) and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of the following elements:

19. General conditions that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;

- set forth the requirements for handling confidential records and maintaining the compliance record;

- state procedures for settling disputes and making post-certification changes; and

- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions; and

- establish requirements for facility closure plans.

20. <u>Specific conditions of certification</u> which are found following each technical area that contain the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure to an insignificant level. Each specific condition of certification also includes a verification provision that describes the method of verifying that the condition has been satisfied.

COMPLIANCE PROJECT MANAGER (CPM) RESPONSIBILITIES

A CPM will oversee the compliance monitoring and shall be responsible for:

21. ensuring that the design, construction, operation, and closure of the project facilities is in compliance with the terms and conditions of the Commission Decision;

22. resolving complaints;

23. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;

24. documenting and tracking compliance filings; and,

25. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, it should be understood that the approval would involve all appropriate staff and management.

Pre-Construction and Pre-Operation Compliance Meeting

The CPM may schedule pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings will be to assemble both the Energy Commission's and the project owner's technical staff to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification to confirm that they have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings shall ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight or inadvertence and to preclude any last minute, unforeseen issues from arising.

Energy Commission Record

The Energy Commission shall maintain as a public record in either the Compliance file or Docket file for the life of the project (or other period as required):

1) all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;

2) all monthly and annual compliance reports filed by the project owner;

3) all complaints of noncompliance filed with the Energy Commission; and,

4) all petitions for project or condition changes and the resulting staff or Energy Commission action taken.

PROJECT OWNER RESPONSIBILITIES

It is the responsibility of the project owner to ensure that the general compliance conditions and the conditions of certification are satisfied. The general compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, compliance conditions, or ownership. Failure to comply with any of the conditions of certification or the general compliance conditions may result in reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate.

Access

The CPM, designated staff, and delegated agencies or consultants, shall be guaranteed and granted access to the power plant site, related facilities, project-related staff, and the records maintained on site, for the purpose of conducting audits, surveys, inspections, or general site visits.

Compliance Record

The project owner shall maintain project files on-site or at an alternative site approved by the CPM, for the life of the project. The files shall contain copies of all "as-built" drawings, all documents submitted as verification for conditions, and all other project-related documents for the life of the project, unless a lesser period is specified by the conditions of certification.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given access to the files.

Compliance Verifications

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the involved condition(s) of certification by condition number and include a brief description of the subject of the submittal**. The project owner shall also identify those submittals **not** required by a condition of certification with a statement such as: "This submittal is for information only and is not required by a specific condition of certification." When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All submittals shall be addressed as follows:

Compliance Project Manager
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

If the project owner desires Energy Commission staff action by a specific date, they shall so state in their submittal and include a detailed explanation of the effects on the project if this date is not met.

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified, as necessary, by the CPM, in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

1) reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;

2) appropriate letters from delegate agencies verifying compliance;

3) Energy Commission staff audit of project records; and/or

4) Energy Commission staff inspection of mitigation and/or other evidence of mitigation.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

Compliance Matrix

A compliance matrix is to be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of compliance conditions in a spreadsheet format. The compliance matrix must identify:

1) the technical area,

2) the condition number,

3) a brief description of the verification action or submittal required by the condition,

4) the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.),

5) the expected or actual submittal date,

6) the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable, and

7) an indication of the compliance status for each condition (e.g., “not started”, “in progress” or “completed date”).

Completed or satisfied conditions do not need to be included in the compliance matrix after they have been identified as completed/satisfied in at least one monthly or annual compliance report.

Monthly Compliance Report

During construction of the project, the project owner or authorized agent shall submit Monthly Compliance Reports within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain at a minimum:

1) a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2) documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Monthly Compliance Report;

3) an initial, and thereafter updated compliance matrix which shows the status of all conditions of certification (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);

4) a list of conditions which have been satisfied during the reporting period, and a description or reference to the actions which satisfied the condition;

5) a list of any submittal deadlines that were missed accompanied by an explanation and an estimate of when the information will be provided;

6) a cumulative listing of any approved changes to conditions of certification;

7) a listing of any filings with, or permits issued by, other governmental agencies during the month;

8) a projection of project compliance activities scheduled during the next two months;

9) a listing of the month's additions to the on-site compliance file; and

10) any requests to dispose of items that are required to be maintained in the project owner's compliance file.

The first Monthly Compliance Report is due the month following the Energy Commission business meeting date that the project was approved, unless the project owner notifies the CPM in writing that a delay is warranted. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the Key Events List. The Key Events List is found at the end of this section.

Annual Compliance Report

After the air district has issued a Permit to Operate, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The 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, and

9) an evaluation of the on-site contingency plan for unexpected facility closure, including any suggestions necessary for bringing the plan up to date [see General Conditions for Facility Closure addressed later in this section].

Confidential Information

Any information, which the project owner deems confidential shall be submitted to the Energy Commission's Docket with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information, which is determined to be confidential, shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

Department of Fish and Game Filing Fee

Pursuant to the provisions of Fish and Game Code section 711.4, the project owner must remit to the California Department of Fish and Game (CDFG) a filing fee in the amount of eight hundred and fifty dollars ($850). The fee must be paid on or before the tenth day following the Energy Commission Business Meeting at which the project was approved. No construction may commence until the fees have been paid in full, and proof of payment is submitted to the CPM.

The project owner shall submit a copy of the CDFG receipt to the CPM within 30 days of the Energy Commission Business Meeting in which the project was approved. The receipt shall identify the project, indicate the date paid and specify the amount paid.

FACILITY CLOSURE

Introduction

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made which provide the flexibility to deal with the specific situation and project setting which will exist at the time of closure. LORS pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

There are at least three circumstances in which a facility closure can take place, planned closure, unexpected temporary closure and unexpected permanent closure.

Planned Closure

This planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unexpected Temporary Closure

This unplanned closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster, or an emergency.

Unexpected Permanent Closure

This unplanned closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

General Conditions for Facility Closure

Planned Closure

In order that a planned facility closure does not create adverse impacts, a closure process, that will provide for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least twelve months prior to commencement of closure activities (or other period of time agreed to by the CPM). The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall a) identify and discuss impacts associated with the proposed facility closure activities and 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, b) identify any facilities or equipment intended to remain on site after closure and the reason, and any future use, and c) 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.

The project owner shall not commence facility closure activities, with the exception of measures to eliminate any immediate threats to health and safety or the environment, until Commission approval of the facility closure plan is obtained.

Unexpected Temporary Closure

In order to ensure that public health and safety and the environment are protected in the event of an unexpected temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety, and environmental impacts, are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less that 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facilities and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may recommend revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for temporary closures of more than 90 days (unless other arrangements are agreed to by the CPM), the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment (also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management).

In the event of an unexpected temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, e-mail, etc., within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of circumstances and expected duration of the closure.

If the CPM determines that a temporary closure is likely to be permanent or for a duration of more than twelve months, a closure plan consistent with that for a planned closure shall be submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

Unexpected Permanent Closure

In order to ensure that public health and safety and the environment are protected in the event of an unexpected permanent facility closure, it is essential to have an <u>on-site contingency plan</u> in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety, and environmental impacts, are taken in a timely manner (even in an unlikely abandonment scenario).

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less that 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facilities and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may recommend revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management). Furthermore, the plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the unlikely event of abandonment.

In the event of an unexpected permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, e-mail, etc., within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

DELEGATE AGENCIES

To the extent permitted by law, the Energy Commission may delegate authority for compliance verification and enforcement to various state and local agencies that have expertise in subject areas where specific requirements have been established as a condition of certification. If a delegate agency does not participate in this program, the Energy Commission staff will establish an alternative method of verification and enforcement. Energy Commission staff reserves the right to independently verify compliance.

In performing construction and operation monitoring of the project, the Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). The Commission staff retains this authority when delegating to a local CBO. Delegation of authority for compliance verification includes the authority for enforcing codes, the responsibility for code interpretation where required, and the authority to use discretion as necessary, in implementing the various codes and standards.

Whenever an agency's responsibility for a particular area is transferred by law to another entity, all references to the original agency shall be interpreted to apply to the successor entity.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Commission Decision.

Moreover, to ensure compliance with the terms and conditions of certification and applicable laws, ordinances, regulations, and standards, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint 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 are described below:

Informal Dispute Resolution Procedure

The following procedure is designed to informally resolve disputes concerning interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents.

This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1230 et. seq., but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy

Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The procedure encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be referred to the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter and within seven (7) working days of the CPM's request, provide a written report of the results of the investigation, including corrective measures proposed or undertaken, to the CPM. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to provide an initial report, within forty-eight (48) hours, followed by a written report filed within seven (7) days.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within fourteen (14) days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1) immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

2) secure the attendance of appropriate Energy Commission staff and staff of any other agency with expertise in the subject area of concern as necessary;

3) conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and,

4) after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum which fairly and accurately identifies the positions of all parties and any conclusions reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et. seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

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 Commission shall have the authority to consider all relevant facts involved and make any appropriate orders consistent with its jurisdiction (Title 20, California Code of Regulations, sections 1232 - 1236).

POST CERTIFICATION CHANGES TO THE COMMISSION DECISION: AMENDMENTS, STAFF CHANGES AND VERIFICATION CHANGES

The project owner must petition the Energy Commission, pursuant to Title 20, California Code of Regulations, section 1769, to 1) delete or change a condition of certification; 2) modify the project design or operational requirements; 3) transfer ownership or operational control of the facility; or 4) change a condition verification requirement.

A petition is required for **amendments** and for **insignificant (staff) changes**. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the Commission's Docket in accordance with Title 20, California Code of Regulations, section 1209. The criteria that determine which type of change process applies are explained below.

Amendment

A proposed change will be processed as an amendment if it involves a change to the requirement or protocol (and in some cases the verification) portion of a condition of certification, an ownership or operator change, or a potential significant environmental impact.

Insignificant Staff Change

The proposed change will be processed as an insignificant staff change if it does not require changing the language in a condition of certification, does not have a potential significant environmental impact, and will not cause the project to violate laws, ordinances, regulations or standards.

Verification Change

The proposed change will be processed as a verification change if it involves only the language in the verification portion of the condition of certification. This procedure can only be used to change verification requirements that are of an administrative nature, usually the timing of a required action. In the unlikely event that verification language contains technical requirements, the proposed change must be processed as an amendment.

KEY EVENT LIST

PROJECT _______________ DATE ENTERED

DOCKET # _______________ PROJECT MANAGER

EVENT DESCRIPTION	***DATE ASSIGNED***
Date of Certification	
Start of Construction	
Completion of Construction	
Start of Operation (1st Turbine Roll)	
Start of Rainy Season	
End of Rainy Season	
Start T/L Construction	
Complete T/L Construction	
Start Fuel Supply Line Construction	
Complete Fuel Supply Line Construction	
Start Rough Grading	
Complete Rough Grading	
Start of Water Supply Line Construction	
Complete Water Supply Line Construction	
Start Implementing Erosion Control Measures	
Complete Implementing Erosion Control Measures	

GLOSSARY OF TERMS AND ACRONYMS

	A
A	Ampere
AAL	all aluminum (electricity conductor)
AAQS	Ambient Air Quality Standards
ABAG	Association of Bay Area Governments
AC	alternating current
ACE	Argus Cogeneration Expansion Project Army Corps of Engineers
ACSR	aluminum covered steel reinforced (electricity conductor)
AFC	Application for Certification
AFY	acre-feet per year
AHM	Acutely Hazardous Materials
ANSI	American National Standards Institute
APCD	Air Pollution Control District
APCO	Air Pollution Control Officer
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ARB	Air Resources Board
ARCO	Atlantic Richfield Company
ASAE	American Society of Architectural Engineers
ASHRAE	American Society of Heating Refrigeration & Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ATC	Authority to Construct
	B
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BAF	Basic American Foods
BARCT	Best Available Retrofit Control Technology
bbl	barrel
BCDC	Bay Conservation and Development Commission
BCF	billion cubic feet
Bcfd	billion cubic feet per day
b/d	barrels per day
BLM	Bureau of Land Management
BPA	U.S. Bonneville Power Administration
BR	Biennial Report
Btu	British thermal unit
	C
CAA	U.S. Clean Air Act
CAAQS	California Ambient Air Quality Standards
CALEPA	California Environmental Protection Agency
CALTRANS	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CBC	California Building Code
CCAA	California Clean Air Act
CDF	California Department of Forestry
CDFG	California Department of Fish and Game
CEERT	Coalition for Energy Efficiency and Renewable Technologies
CEM	continuous emissions monitoring
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFB	circulating fluidized bed

CFCs	chloro-fluorocarbons
cfm	cubic feet per minute
CFR	Code of Federal Regulations
cfs	cubic feet per second
CLUP	Comprehensive Land Use Plan
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
COI	California Oregon Intertie
CPCN	Certificate of Public Convenience & Necessity
CPM	Compliance Project Manager
CPUC	California Public Utilities Commission
CT	combustion turbine current transformer
CTG	combustion turbine generator
CURE	California Unions for Reliable Energy
	D
dB	decibel
dB(A)	decibel on the A scale
DC	direct current
DCTL	Double Circuit Transmission Line
DEIR	Draft Environmental Impact Report
DEIS	Draft Environmental Impact Statement
DFG	California Department of Fish and Game
DHS	California Department of Health Services
DISCO	Distribution Company
DOC	Determination of Compliance
DOE	U.S. Department of Energy
DSM	demand side management
DTC	Desert Tortoise Council
DWR	California Department of Water Resources
	E
EDF	Environmental Defense Fund
Edison	Southern California Edison Company
EDR	Energy Development Report
EFS&EPD	Energy Facilities Siting and Environmental Protection Division
EIA	U.S. Energy Information Agency
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ELFIN	Electric Utility Financial and Production Simulation Model
EMF	electric and magnetic fields
EOR	East of River (Colorado River)
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
ER	Electricity Report
ERC	emission reduction credit {offset}
ESA	Endangered Species Act (Federal) Environmental Site Assessment
ETSR	Energy Technologies Status Report
	F
FAA	Federal Aviation Administration
FBE	Functional Basis Earthquake
FCAA	Federal Clean Air Act
FCC	Federal Communications Commission
FEIR	Final Environmental Impact Report
FIP	Federal Implementation Plan
FONSI	Finding of No-Significant Impact
FERC	Federal Energy Regulatory Commission

FSA Final Staff Assessment

G

GEP good engineering practice

GIS gas insulated switchgear
geographic information system

gpd gallons per day

gpm gallons per minute

GW gigawatt

GWh gigawatt hour

H

H_2S hydrogen sulfide

HCP habitat conservation plan

HHV higher heating value

HRA Health Risk Assessment

HRSG heat recovery steam generator

HV high voltage

HVAC heating, ventilating and air conditioning

I

IAR Issues and Alternatives Report

IEA International Energy Agency

IEEE Institute of Electrical & Electronics Engineers

IID Imperial Irrigation District

IIR Issues Identification Report

IOU Investor-Owned Utility

IS Initial Study

ISO Independent System Operator

J

JES Joint Environmental Statement

K

KCAPCD Kern County Air Pollution Control District

KCM thousand circular mils (also KCmil) (electricity conductor)

KGRA known geothermal resource area

km kilometer

KOP key observation point

KRCC Kern River Cogeneration Company

kV kilovolt

KVAR kilovolt-ampere reactive

kW kilowatt

kWe kilowatt, electric

kWh kilowatt hour

kWp peak kilowatt

L

LADWP Los Angeles Department of Water and Power

LAER Lowest Achievable Emission Rate

lbs pounds

lbs/hr pounds per hour

lbs/MMBtu pounds per million British thermal units

LCAQMD Lake County Air Quality Management District

LMUD Lassen Municipal Utility District

LORS laws, ordinances, regulations and standards

M

m (M) meter, million, mega, milli or thousand

MBUAPCD Monterey Bay Unified Air Pollution Control District

MCE maximum credible earthquake

MCF thousand cubic feet

MCL Maximum Containment Level

MCM	thousand circular mil (electricity conductor)
$\mu g/m^3$	micro grams (10^{-6} grams) per cubic meter
MEID	Merced Irrigation District
MG	milli gauss
mgd	million gallons per day
MID	Modesto Irrigation District
MOU	Memorandum of Understanding
MPE	maximum probable earthquake
m/s	meters per second
MS	Mail Station
MVAR	megavolt-ampere reactive
MW	megawatt (million watts)
MWA	Mojave Water Agency
MWD	Metropolitan Water District
MWh	megawatt hour
MWp	peak megawatt
	N
N-1	one transmission circuit out
N-2	two transmission circuits out
NAAQS	National Ambient Air Quality Standards
NCPA	Northern California Power Agency
NEPA	National Energy Policy Act National Environmental Policy Act
NERC	National Electric Reliability Council
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NMHC	nonmethane hydrocarbons
NO	nitrogen oxide
NOI	Notice of Intention
NOL	North of Lugo
NO_x	nitrogen oxides
NO_2	nitrogen dioxide
NOP	Notice of Preparation (of EIR)
NOV	Notice of Violation
NRDC	Natural Resources Defense Council
NSCAPCD	Northern Sonoma County Air Pollution Control District
NSPS	New Source Performance Standards
NSR	New Source Review
	O
O_3	Ozone
OASIS	Open Access Same-Time Information System
OCB	oil circuit breaker
OCSG	Operating Capability Study Group
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration (or Act)
	P
PG&E	Pacific Gas & Electric Company
PDCI	Pacific DC Intertie
PHC(S)	Prehearing Conference (Statement)
PIFUA	Federal Powerplant & Industrial Fuel Use Act of 1978
PM	Project Manager particulate matter
PM_{10}	particulate matter 10 microns and smaller in diameter
$PM_{2.5}$	particulate matter 2.5 microns and smaller in diameter
ppb	parts per billion
ppm	parts per million
ppmvd	parts per million by volume, dry

ppt	parts per thousand
PRC	California Public Resources Code
PSD	Prevention of Significant Deterioration
PSRC	Plumas Sierra Rural Electric Cooperative
PT	potential transformer
PTO	Permit to Operate
PU	per unit
PURPA	Federal Public Utilities Regulatory Policy Act of 1978
PV	Palo Verde photovoltaic
PX	Power Exchange
	Q
QA/QC	Quality Assurance/Quality Control
QF	Qualifying Facility
	R
RACT	Reasonably Available Control Technology
RDF	refuse derived fuel
ROC	Report of Conversation reactive organic compounds
ROG	reactive organic gas
ROW	right of way
RWQCB	Regional Water Quality Control Board
	S
SACOG	Sacramento Area Council of Governments
SANBAG	San Bernardino Association of Governments
SANDAG	San Diego Association of Governments
SANDER	San Diego Energy Recovery Project
SB	Senate Bill
SCAB	South Coast Air Basin
SEGS	Solar Electric Generating Station
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison Company
SCFM	standard cubic feet per minute
SCH	State Clearing House
SCIT	Southern California Import Transmission
SCR	Selective Catalytic Reduction
SCTL	single circuit transmission line
SDCAPCD	San Diego County Air Pollution Control District
SDG&E	San Diego Gas & Electric Company
SEPCO	Sacramento Ethanol and Power Cogeneration Project
SIC	Standard industrial classification
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAQMD	San Joaquin Valley Air Quality Management District
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMUD	Sacramento Municipal Utility District
SMUDGEO	SMUD Geothermal
SNCR	Selective Noncatalytic Reduction
SNG	Synthetic Natural Gas
SO_2	sulfur dioxide
SO_x	sulfur oxides
SO_4	sulfates
SoCAL	Southern California Gas Company
SONGS	San Onofre Nuclear Generating Station

SPP	Sierra Pacific Power
STIG	steam injected gas turbine
SWP	State Water Project
SWRCB	State Water Resources Control Board
	T
TAC	Toxic Air Contaminant
TBtu	trillion Btu
TCF	trillion cubic feet
TCM	transportation control measure
TDS	total dissolved solids
TE	transmission engineering
TEOR	Thermally Enhanced Oil Recovery
TID	Turlock Irrigation District
TL	transmission line or lines
T-Line	transmission line
TOG	total organic gases
TPD	tons per day
TPY	tons per year
TS&N	Transmission Safety and Nuisance
TSE	Transmission System Engineering
TSIN	Transmission Services Information Network
TSP	total suspended particulate matter
	U
UBC	Uniform Building Code
UDC	Utility Displacement Credits
UDF	Utility Displacement Factor
UEG	Utility Electric Generator
USC(A)	United States Code (Annotated)
USCOE	U.S. Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
	V
VCAPCD	Ventura County Air Pollution Control District
VOC	volatile organic compounds
	W
W	Watt
WAA	Warren-Alquist Act
WEPEX	Western Energy Power Exchange
WICF	Western Interconnection Forum
WIEB	Western Interstate Energy Board
WOR	West of River (Colorado River)
WRTA	Western Region Transmission Association
WSCC	Western System Coordination Council
WSPP	Western System Power Pool

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WITNESS QUALIFICATIONS AND DECLARATIONS