Final Staff Assessment

STARWOOD POWER PLANT

AFC (06-AFC-10)
Fresno County

CALIFORNIA ENERGY COMMISSION

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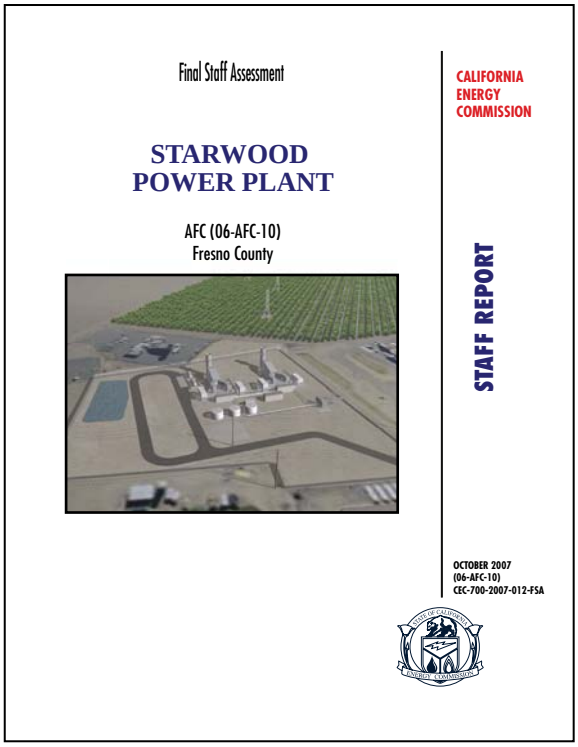

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STARWOOD POWER PLANT PROJECT
(06-AFC-10)
FINAL STAFF ASSESSMENT

EXECUTIVE SUMMARY

Testimony of Che McFarlin

INTRODUCTION

This Final Staff Assessment (FSA) contains the California Energy Commission staff's evaluation of Starwood Power-Midway, LLC, (the Applicant) Application for Certification (AFC) (06-AFC-10) for the Starwood Power Project (SPP). The proposed SPP electric generating plant and related facilities are under the Energy Commission's jurisdiction and cannot be constructed or operated without the Energy Commission's certification. This FSA examined engineering, environmental, public health and safety aspects of the SPP, based on the information provided by the applicant and other sources available at the time the FSA was prepared. The FSA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). When issuing a certificate, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR.

The Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and its potential effects on the environment, the public's health and safety, and whether the project conforms to all applicable laws, ordinances, regulations and standards (LORS). The staff also recommends measures to mitigate potential significant adverse environmental effects and conditions of certification for construction, operation and eventual closure of the project, if approved by the Energy Commission.

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

PROJECT DESCRIPTION

The proposed SPP site is located at 43627 West Panoche Road in an unincorporated area of western Fresno County, on a 5.6-acre parcel of land located within a 128-acre parcel (Assessors Parcel Number 027-060-78S). For reference, the proposed site is located approximately 12 miles southwest of the city of Mendota on West Panoche Road approximately 1 mile southwest of its intersection with South Fairfax Avenue, or alternately 2 miles northeast of the intersection of West Panoche Road and Interstate 5.

The proposed SPP site is leased by Starwood Power-Midway, LLC, and is adjacent to two existing peaking power plants and nearby to the existing Pacific Gas & Electric (PG&E) Panoche Substation. The two existing plants are commonly referred to as the

CalPeak Panoche peaking power plant and the Wellhead peaking power plant. Another power plant, commonly referred to as the Panoche Energy Center, is proposed for construction immediately southwest of the PG&E Panoche Substation and subject to a separate Energy Commission proceeding (06-AFC-5.) The land surrounding these existing and proposed electric facilities is agricultural (URS 2006a, p 3-2).

The proposed SPP would be a simple-cycle power plant with a nominal electrical output of 120 MW, consisting of two Pratt & Whitney FT8-3 SwiftPac natural gas-fired combustion turbine generators. Auxiliary equipment will include inlet air foggers with evaporative coolers, a step up transformer, compressed air system, control enclosures, aqueous ammonia storage tank, natural gas fuel system, water treatment system, water storage tanks, wastewater system, site stormwater drainage system, and a lined evaporation pond.

The applicant has proposed that the SPP be commercially operational by May of 2009. Facility construction is expected to take approximately 10 months. A more complete description of the project is contained in the **Project Description** section of this FSA.

PUBLIC AND AGENCY COORDINATION

The Energy Commission's SPP Committee conducted an Information Hearing and Site Visit on February 7, 2007. This hearing provided a forum for the public to learn about the project, the Energy Commission's licensing process, ask questions, and voice their opinions regarding the proposed power plant.

When the AFC was filed, staff mailed a notice to all property owners within 1,000 ft of the proposed project informing them of the proposal, and the Energy Commission's review process. Staff's notice also informed the property owners of how they can participate in the Energy Commission's review of the proposed SPP.

Staff conducted a workshop on April 13, 2007, to discuss the applicant's responses to staff's data requests and to work toward resolving issues. This workshop was open to all interested agencies and members of the public.

The Preliminary Staff Assessment (PSA) was published on July 25, 2007 and a publicly noticed PSA workshop was conducted on August 16, 2007. Information gathered during this workshop was used to prepare the FSA. Additionally, responses to comments on the PSA are included in the FSA.

Staff has also coordinated review of the SPP with the relevant local, state, federal agencies, such as Fresno County, San Joaquin Valley Air Pollution Control District, Central Valley Regional Water Quality Control Board, California Department of Fish and Game, U.S. Fish and Wildlife Service, and the U.S. Environmental Protection Agency. Staff has also worked with an independent transmission system planning and dispatch agency, the California Independent System Operator, regarding the project's addition of peaking capacity to the PG&E electricity grid. Comments provided by those agencies have been considered in staff's FSA.

ENVIRONMENTAL JUSTICE

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

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

California Statute, Section 65040.12 (c) of the Government Code, defines "environmental justice" to mean "fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." In light of the progress made by federal environmental agencies on environmental justice, the Energy Commission has examined federal guidelines pursuant to its desire to follow environmental justice principles for the environmental review of this project.

The steps recommended by these guidance documents to assure compliance with the Executive Order are: (1) outreach and involvement; (2) a screening-level analysis to determine the existence of a minority or low-income population; and (3) if warranted, a detailed examination of the distribution of impacts on segments of the population. Though the Federal Executive Order and guidance are not binding on the Energy Commission, staff finds these recommendations helpful for implementing this environmental justice analysis. Staff has followed each of the above steps for the following 11 sections in the FSA: Air Quality, Hazardous Materials, Land Use, Noise, Public Health, Socioeconomics, Soils and Water, Traffic and Transportation, Transmission Line Safety/Nuisance, Visual Resources, and Waste Management.

The purpose of the environmental justice screening analysis is to determine whether a low-income and/or minority population exists within the potentially affected area of the proposed site. Staff conducted the screening analysis in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis" (Guidance Document) dated April 1998. People of color populations, as defined by this Guidance Document, are identified where either:

- the minority population of the affected area is greater than fifty percent of the affected area's general population; or

- the minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Staff has concluded that the project does not result in any disproportionate significant unmitigated impacts to an environmental justice population.

OUTREACH

The Commission held an Informational Hearing and Site Visit for the SPP on February 7, 2007 in the nearby city of Mendota to facilitate public involvement. In preparation for that event, the Public Adviser's Office had notices placed in local newspapers, in English and Spanish, to notify the public of the upcoming hearing. Additionally, a publicly noticed workshop was conducted for this proposed project on April 13, 2007 to discuss data requests and data responses. A PSA workshop was held on August 16, 2007 in Mendota to discuss staff's PSA findings and receive comments from interested parties. The workshop was continued to, and concluded on August 24, 2007 at the Energy Commission.

STAFF'S ASSESSMENT

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

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

Staff has prepared its final analyses and has made recommendations for all technical areas. The details of each technical area are contained in the FSA and are summarized below.

Technical Discipline	Complies with LORS	Environmental Impacts Mitigated
Air Quality	Yes	No
Biological Resources	Yes	Yes
Cultural Resources	Yes	Yes
Power Plant Efficiency	N/A	N/A
Power Plant Reliability	Yes	Yes
Facility Design	Yes	Yes
Geology, Mineral Resources, and Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	Yes	Yes
Noise and Vibration	Yes	Yes
Public Health	Yes	Yes
Socioeconomics	Yes	Yes
Traffic and Transportation	Yes	Yes
Transmission Line Safety	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Soil and Water Resources	Yes	Yes
Worker Safety	Yes	Yes

CONCLUSIONS AND RECOMMENDATIONS

Air Quality

The applicant has yet to obtain 390 pounds of volatile organic compounds (VOC) emission reduction credits needed to complete the offset package. Staff expects that the applicant will provide these additional emission reduction credits prior to initiation of construction.

In summary this FSA finds:

- The project is in conformance with all Laws, Ordinances, Regulations and Standards (LORS).
- With the proposed conditions of certification included in the various technical areas, the project's construction and operation impacts can be mitigated to a level less than significant.

REFERENCES

URS 2006a - URS Corporation (tn 38405) Application for Certification for Starwood Power-Midway, LLC Peaking Project. Submitted on November 11, 2006.

INTRODUCTION

Testimony of Che McFarlin

PURPOSE OF THIS REPORT

The Final Staff Assessment (FSA) presents the California Energy Commission staff's independent analysis of the Starwood Power Project (SPP) Application for Certification (AFC). This FSA is a staff document. It is neither a Committee document, nor a draft decision. The FSA describes the following:

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

The analyses contained in this FSA are based upon information from: 1) the AFC; 2) subsequent submittals; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The verification is not part of the proposed condition, but is the Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted requirements.

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

ORGANIZATION OF THE STAFF ASSESSMENT

The FSA contains an Executive Summary, Introduction, Project Description, and Project Alternatives. The environmental, engineering, and public health and safety analyses of the proposed project are contained in a discussion of 19 technical areas. Each technical area is addressed in a separate chapter. They include the following: air quality, biological resources, cultural resources, hazardous material management, land use, noise, public health, socioeconomics, soil and water resources, traffic and transportation, transmission line safety, visual resources, waste management, worker safety and fire protection, facility design, geological and paleontological resources, power plant efficiency, power plant reliability, and transmission system engineering. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report.

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

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

ENERGY COMMISSION SITING PROCESS

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

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

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

laws, ordinances, regulations and standards are met (Cal. Code Regs., tit. 20, § 1744(b)).

Staff conducts its environmental analysis in accordance with the requirements of CEQA. No Environmental Impact Report is required because the Energy Commission's site certification program has been certified by the Resources Agency (Pub. Resources Code, §21080.5 and Cal. Code Regs., tit. 14, §15251 (k)). The Energy Commission is the CEQA lead agency and is subject to all other applicable portions of CEQA.

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

Staff uses the PSA to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the period between publishing the PSA and the FSA, staff will conduct one or more workshops to discuss their findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshops and written comments, staff will refine their analysis, make necessary changes, and finalize conditions of certification to reflect areas where staff has reached agreement with the parties. This refined analysis, along with responses to written comments on the PSA, will be published in the FSA. The FSA serves as staff's testimony for the evidentiary hearing.

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

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

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

Energy Commission. Staff's proposed description of the contents of the Compliance Monitoring Plan and proposed General Conditions are included in the **General Conditions** section of this PSA.

AGENCY COORDINATION

As noted above, the Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). However, the Commission typically seeks comments from and works closely with other regulatory agencies that administer LORS that may be applicable to proposed projects. For the SPP these agencies include; the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, the California Department of Conservation, the California Air Resources Board, the San Joaquin Valley Air Pollution Control District, and the Fresno County Department of Public Works and Planning .

PROJECT DESCRIPTION

Testimony of Che E. McFarlin

INTRODUCTION

On November 17, 2006, Starwood Power-Midway, LLC, submitted an application for certification (AFC) for the Starwood Power Project (SPP), seeking approval from the California Energy Commission to construct and operate a nominal 120-megawatt (MW) power plant consisting of two Pratt & Whitney FT8-3 SwiftPac Combustion Turbine Generators (CTGs) rated at 60 MW each. On December 26, 2007, Starwood Power-Midway filed a supplement to the AFC, and on January 3, 2007, the Energy Commission accepted the AFC (06-AFC-10) with supplemental information as complete. This determination initiated Energy Commission staff's independent analysis of the proposed project.

PURPOSE OF PROJECT

The SPP is designed as a peaking facility to meet electrical generation loads during periods of high demand, which generally occur during the daytime hours, and more frequently during the summer than other times of the year. The project is expected to have an annual capacity factor of no higher than 46%, depending on weather and customer demand, load growth, hydroelectric supplies, generation retirements and replacements, the level of generating-unit and transmission outages, and other factors.

The project objectives are based on the terms and conditions set forth in a power purchase agreement between the applicant and Pacific Gas and Electric Company (PG&E) (URS 2006a, p 2-2) These terms and conditions contain the elements listed below.

- The power supply contract term would be 15 years.
- The SPP would be constructed on a parcel of land adjacent to the existing PG&E Panoche Substation which is also adjacent to the existing 49 MW CalPeak Panoche Power plant on West Panoche Road, Fresno County, California.
- The SPP would have two (2) FT8-3 SwiftPac CTG units. The applicant has stated that the four turbines contained in the two units would be able to ramp from 0 to 100% load in a fairly short time and would provide an efficient heat rate for a peaking plant.
- Each of these combustion turbine units would provide approximately 54.9 MW of capacity in summer peak conditions with very low emission levels. This capacity and these emission levels could only be obtained with water injection and inlet cooling foggers.
- A turbine efficiency of 10,600 Btu/kWh would be produced at 100% rated capacity, summer peak conditions.
- PG&E would have the ability to dispatch each of the units as system conditions required.

- The entire SPP would be on line and available for PG&E to dispatch into the grid on or before May 1, 2009.
- The SPP would be available for up to 4,000 hours per year.

PROJECT LOCATION

The SPP plant site is located at 43627 West Panoche Road in an unincorporated area of western Fresno County, on a 5.6-acre parcel of land located within a 128-acre parcel (APN 027-060-78S). For reference, the site is located approximately 15 miles southwest of the city of Mendota on West Panoche Road approximately 1 mile southwest of its intersection with South Fairfax Avenue, or alternately 2 miles northeast of the intersection of West Panoche Road and Interstate 5.

The SPP site is leased by Starwood Power-Midway, LLC; adjacent to an existing five unit residence, two existing peaking power plants, and is near the PG&E Panoche Substation. The two existing plants are commonly referred to as the 49 MW CalPeak Panoche peaking power plant and the 49 MW Wellhead peaking power plant. Another power plant, commonly referred to as the 400MW Panoche Energy Center, is proposed for construction immediately southwest of the PG&E Panoche Substation. The proposed Panoche Energy Center is being considered under a separate Energy Commission licensing proceeding (06-AFC-5). The land surrounding these existing and proposed electric facilities is agricultural (URS 2006a, p 3-2).

Project Description Figure 1 shows the regional setting and **Project Description Figure 2** shows the local setting of the proposed project.

POWER PLANT EQUIPMENT AND LINEAR FACILITIES

The proposed SPP would be a simple-cycle power plant with a nominal electrical output of 120 MW, consisting of two Pratt & Whitney FT8-3 SwiftPac natural gas-fired combustion turbine generators. Auxiliary equipment would include inlet air foggers with evaporative coolers, a step-up transformer, a compressed-air system, control enclosures, an aqueous ammonia storage tank, a natural gas fuel system, a water treatment system, water storage tanks, a wastewater system, a site stormwater drainage system, and a lined evaporation pond.

Air emissions from the proposed SPP would be controlled using best available control technology. This technology consists of water injection to reduce production of nitrous oxides (NO_x), a selective catalytic reduction system with 19% aqueous ammonia to further reduce NOx emissions, and an oxidation catalyst to reduce the emission of carbon monoxide and volatile organic compounds (URS 2006a, pp 3-1 to 3-2, 3-4 to 3-5, 5.2-46)

While the SPP would be available for operation up to 4,000 hours per year as stated in it's PG&E contract, the applicant expects that it will operate approximately 400 hours per year. This expectation is based on the applicant's experience with its existing Calpeak Panoche plant (URS 2006a, P 3-44).

Project Description Figure 3 shows the general arrangement and layout of the proposed facility. **Project Description Figure 4** provides an architectural rendering of the proposed facility.

ELECTRIC TRANSMISSION

The SPP would connect to PG&E's electrical transmission system via the tie-line that connects the existing CalPeak Panoche plant to the adjacent PG&E Panoche Substation. A 300-foot, 115 kV generator tap line would originate from a new step-up transformer near the western perimeter of the SPP site, exit from the northwest edge of the site, and travel west into the existing CalPeak Panoche tie-line to the Panoche Substation. The tie-line connecting the existing CalPeak Panoche Plant to PG&E's system is already sized to carry the output of the proposed SPP.

Although the SPP would be interconnected to the CalPeak Panoche transmission system, each project would utilize independent breakers for isolation from the PG&E system. Neither the SPP or Calpeak Panoche plants would be dependent on the other for its transmission interconnection (URS 2006a, p 3-31). No new transmission facilities would be necessary beyond the switchyard.

NATURAL GAS SUPPLY

Natural gas would be delivered to the SPP from connection to the existing Calpeak Panoche plant's gas supply which is connected to the existing PG&E trunk line running along West Panoche Road north of the project site. PG&E would tap the 6-inch natural gas service line serving the existing CalPeak plant approximately 25 feet upstream of the existing meter set and connect it with approximately 200 feet of new 6-inch steel pipeline to a new turbine meter set adjacent to the existing meter set. Approximately 600 feet of new 6-inch steel natural gas pipeline would be constructed along the western perimeter of the SPP site to complete the connection from the meter set to the SPP (URS 2006a, pp 3-5 & 3-37; CEC 2007z1).

WATER SUPPLY

Peak water usage associated with the SPP would be 98 gallons per minute (gpm) (URS 2006a, p 5-5.9) of demineralized water for NOx control and 40 gpm for inlet fogging. On an annual basis, the proposed SPP is anticipated to consume approximately 14 acre-feet per year, presuming 400 hours of operation. Annual water consumption could be as high as 136 acre-feet per year if the SPP operated at the permitted maximum of 4,000 hours per year. Water would be delivered to the site from a connection to the adjacent and existing CalPeak plant's well (URS 2006a, pp 3-14 and 5.5-9).

The Calpeak plant's well draws groundwater from the upper semi-confined aquifer. The semi-confined aquifer water quality is considered "brackish" not "fresh inland water" within the meaning of State Water Resource Control Board's Resolution 75-58 because it is not a suitable source of domestic, municipal, or agricultural water supply due to the high TDS and salinity levels.

WASTEWATER DISCHARGE

The SPP facility is expected to generate process wastewater at an average rate of 25 gpm. Process and industrial wastewater discharge from the proposed SPP would

consist of nonhazardous reject water that would range from 3.4 acre-feet per year based on 400 hours of operation, to approximately 34 acre-feet per year based on 4,000 hours of operation. The wastewater discharge would be sent to an evaporation pond on the east side of the site via a 4-inch PVC gravity pipe. The evaporation pond would be a 25,000-square-foot surface impoundment with a polyethylene liner. Following drying in the evaporation pond, the solids would be removed to a landfill (URS 2006a, pp 5.5-12 to 5.5-14)

PROJECT CONSTRUCTION AND OPERATION

If approved by the Energy Commission, the applicant proposes to initiate construction of the SPP in the summer of 2008. The project is expected to take 10 months for construction and startup testing, and could begin commercial operation on or before May 2009. The construction workforce is projected to average 74 workers per month and would peak during the fourth through sixth months with up to 110 workers on site (URS 2006a, p 5.10-4). The plant would employ one full-time maintenance technician/operator for onsite operations (URS 2006a, pp. 5.10-4 to 5). The construction storage and laydown areas would be confined to the existing site. The residents of the adjacent five unit residence will be relocated prior to construction. The planned operational life of the facility would be 30 years, but the plant could remain operational for a longer period if it were still viable.

FACILITY CLOSURE

At the end of the SPP's operational lifespan, the project would cease operation and be shut down. At that time, it would be necessary to ensure that the closure occurred in such a way that public health and safety and the environment were protected from adverse impacts. Although the setting for this project does not appear to present any special or unusual closure problems, it is impossible to foresee what the situation would be in 30 years or more when the project has ceased operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting at the time of closure. Laws, ordinances, regulations, and standards (LORS) pertaining to facility closure are identified in the technical sections of this assessment. Facility closure would be consistent with LORS in effect at the time of closure.

Facility closure can be either temporary or permanent. Facility closure can result from two circumstances: 1) the facility is closed suddenly and/or unexpectedly due to unplanned circumstances, such as a natural disaster or other unexpected event (e.g., a temporary shortage of facility fuel); or 2) the facility is closed in a planned, orderly manner, such as at the end of its useful economic or mechanical life or due to gradual obsolescence. The two types of closure are discussed in the following sections.

TEMPORARY CLOSURE

Temporary or unplanned closure can result from a number of unforeseen circumstances, ranging from natural disaster to economic forces. For a short term unplanned closure, where there is no facility damage resulting in a hazardous substance release, the facility would be kept "as is," ready to resume operating when the unplanned closure event is rectified or ceases to restrict operations.

In the event that there is a possibility of a hazardous substances release, the project owner will notify the Energy Commission's compliance unit and follow emergency plans that are appropriate to the emergency Risk Management Plan (RMP). Depending upon the expected duration of the shutdown, chemicals may be drained from the storage tanks and other equipment. All waste (hazardous and non-hazardous) will be disposed of according to LORS in effect at the time of the closure. Facility security will be retained so that the facility is secure from trespassers.

PERMANENT CLOSURE

The anticipated life of the generation facility is 30 years. However, if the facility were economically viable at the end of the 30-year operating period, it could continue to operate for a much longer period of time. As power plant operators continuously upgrade their generation equipment, and maintain the equipment up to industry standards, there is every expectation that the generation facility will have value beyond its expected life.

CLOSURE MITIGATION

At the time of facility closure, decommissioning will be completed in a manner that: 1) protects the health and safety of the public; and, 2) is environmentally acceptable. One year prior to a planned closure, the project owner will submit to the Energy Commission a specific decommissioning plan that would include the following:

1. Identification, discussion, and scheduling of the proposed decommissioning activities to include the power plant, applicable transmission lines, and other pertinent facilities constructed as part of the project.
2. Description of the measures to be taken that will ensure the safe shutdown and decommissioning of all equipment, including the draining and cleaning of all tankage, and the removal of any hazardous waste.
3. Identification of all applicable LORS in effect at the time, and how the specific decommissioning will be accomplished in accordance with the LORS.
4. Notification of state and local agencies, including the Energy Commission.
5. Once land is used for industrial or commercial purposes, it rarely reverts back to its natural state. Reuse of the land will probably be encouraged in this case, as opposed to taking additional land for future industrial or commercial purposes. If the plant site is to return to its natural state, the specific decommissioning plan will include the removal of all aboveground and underground objects and material, and an erosion control plan that is consistent with sound land management practices.

In the event of an unplanned closure due to earthquake damage or other circumstances, the project owner will meet with the Energy Commission's Compliance Project Manager and local agencies and submit a detailed decommissioning closure plan in a timely manner.

No decommissioning plan will be submitted for a temporary shutdown.

REFERENCES

URS 2006a - URS Corporation (tn 38405) Application for Certification for Starwood Power-Midway, LLC Peaking Project. Submitted on November 11, 2006.

URS 2006k - URS Corporation (tn 38796) Data adequacy responses. Submitted on December 28, 2006.

URS 2006l - URS Corporation (tn 38845) Supplement data adequacy information. Submitted on December 29, 2006.

URS 2007b - URS Corporation (tn 39567) Responses to data requests (#1-67). Submitted on March 9, 2007.

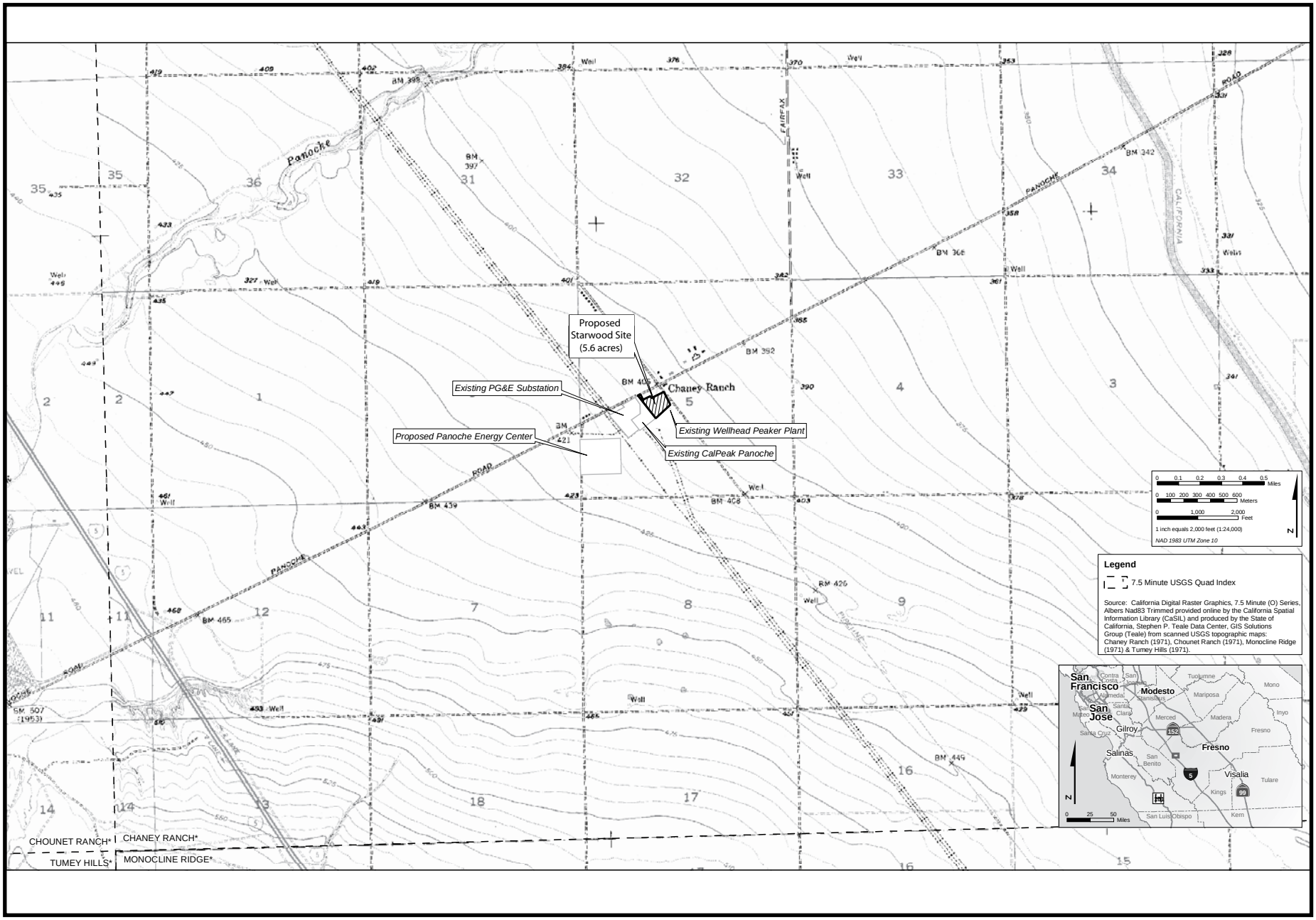
URS 2007d - URS Corporation (tn 39973) Additional project information for data requests (#1-67). Submitted on March 9, 2007.

URS 2007f - URS Corporation (tn 40016) Additional project description information. Submitted on April 20, 2007.

CEC 2007z1 - California Energy Commission (tn 40062) Correct length of natural gas line. Submitted on April 19, 2007.

PROJECT DESCRIPTION - FIGURE 1

Starwood Power Project - Regional Project Setting

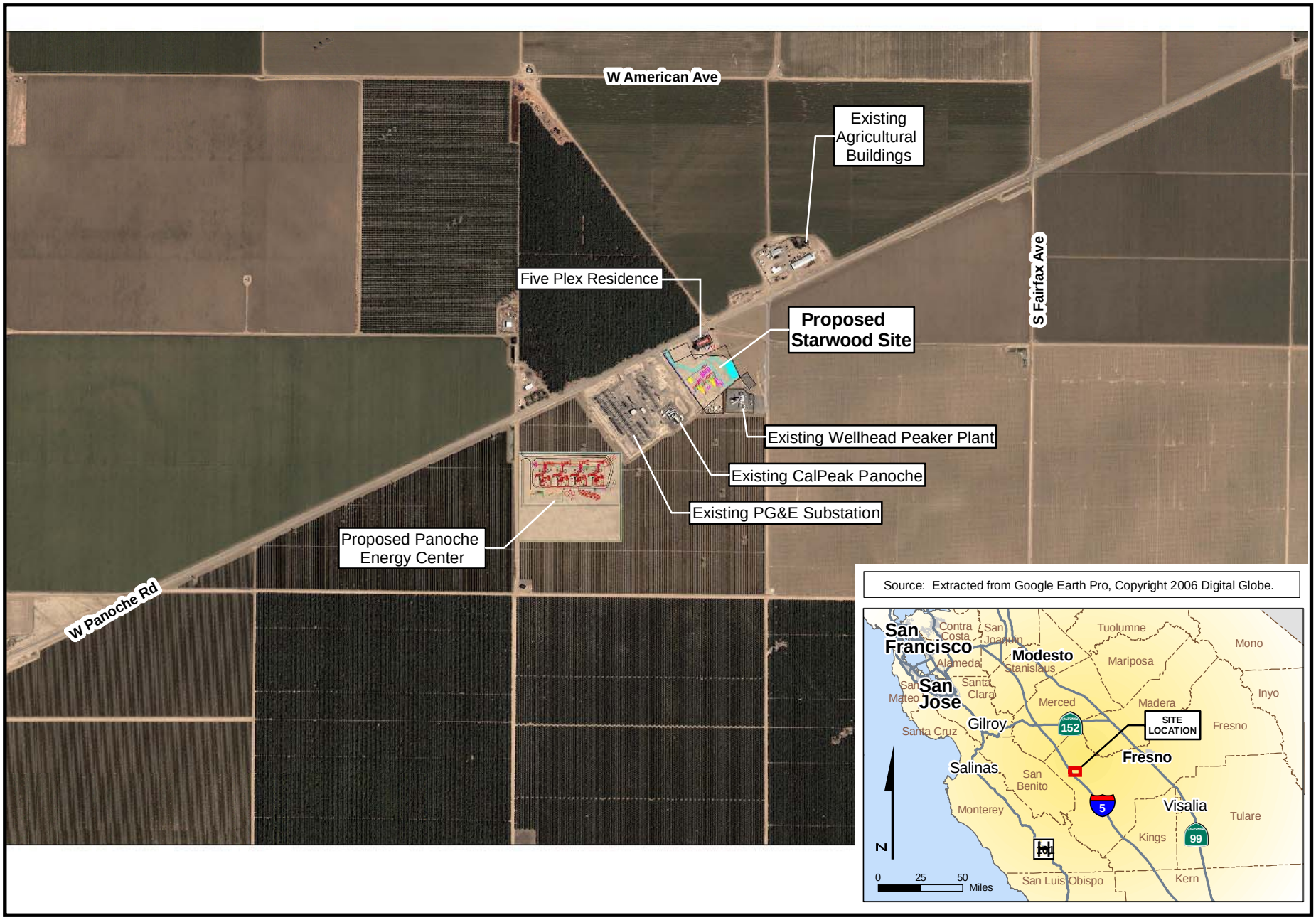


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 3.2-1

PROJECT DESCRIPTION - FIGURE 2

Starwood Power Project - Local Project Setting

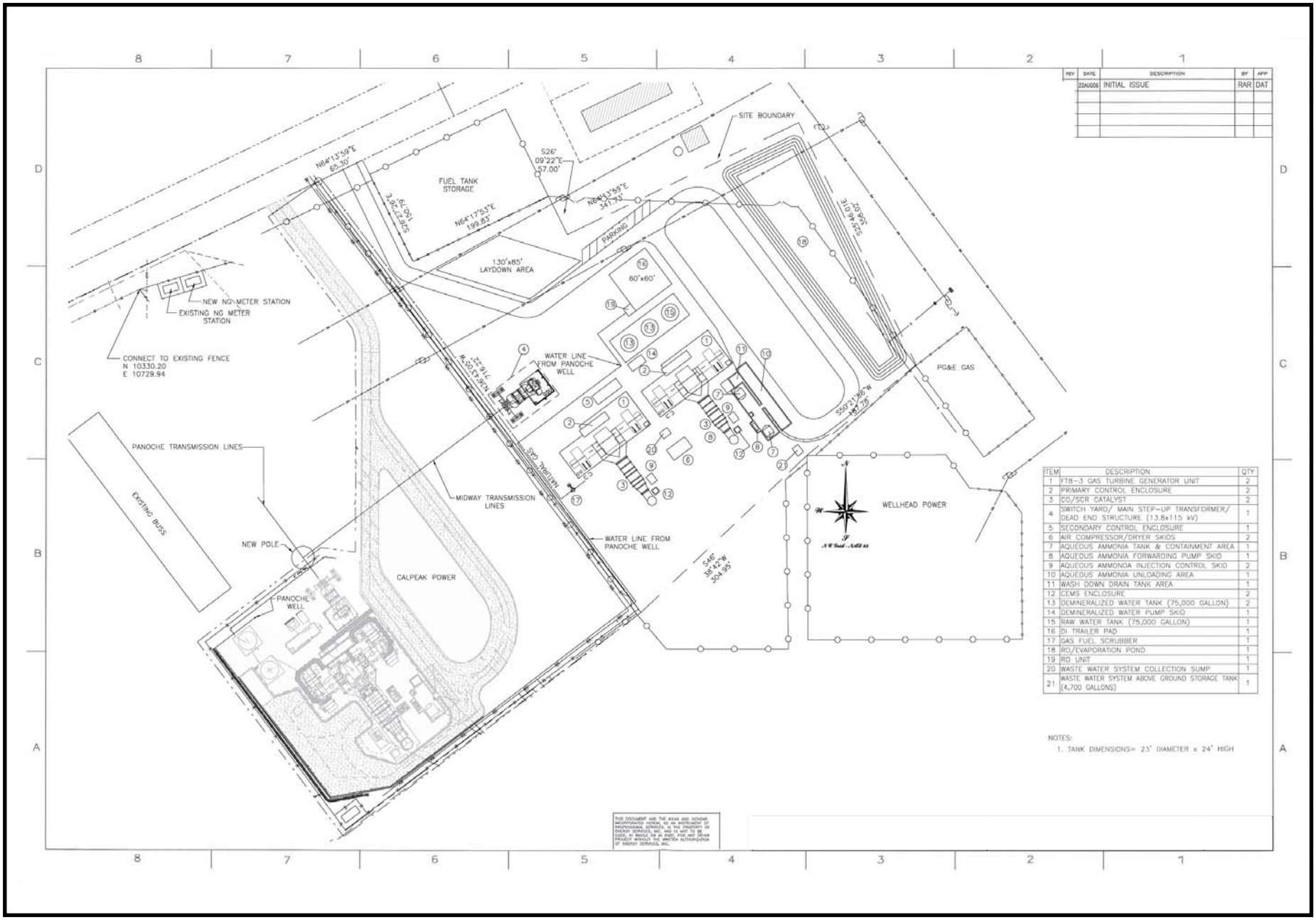


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 1.2-1

PROJECT DESCRIPTION - FIGURE 3

Starwood Power Project - Facility Layout



REV	DATE	DESCRIPTION	BY	APP
	22AUG06	INITIAL ISSUE	RAR	DAT

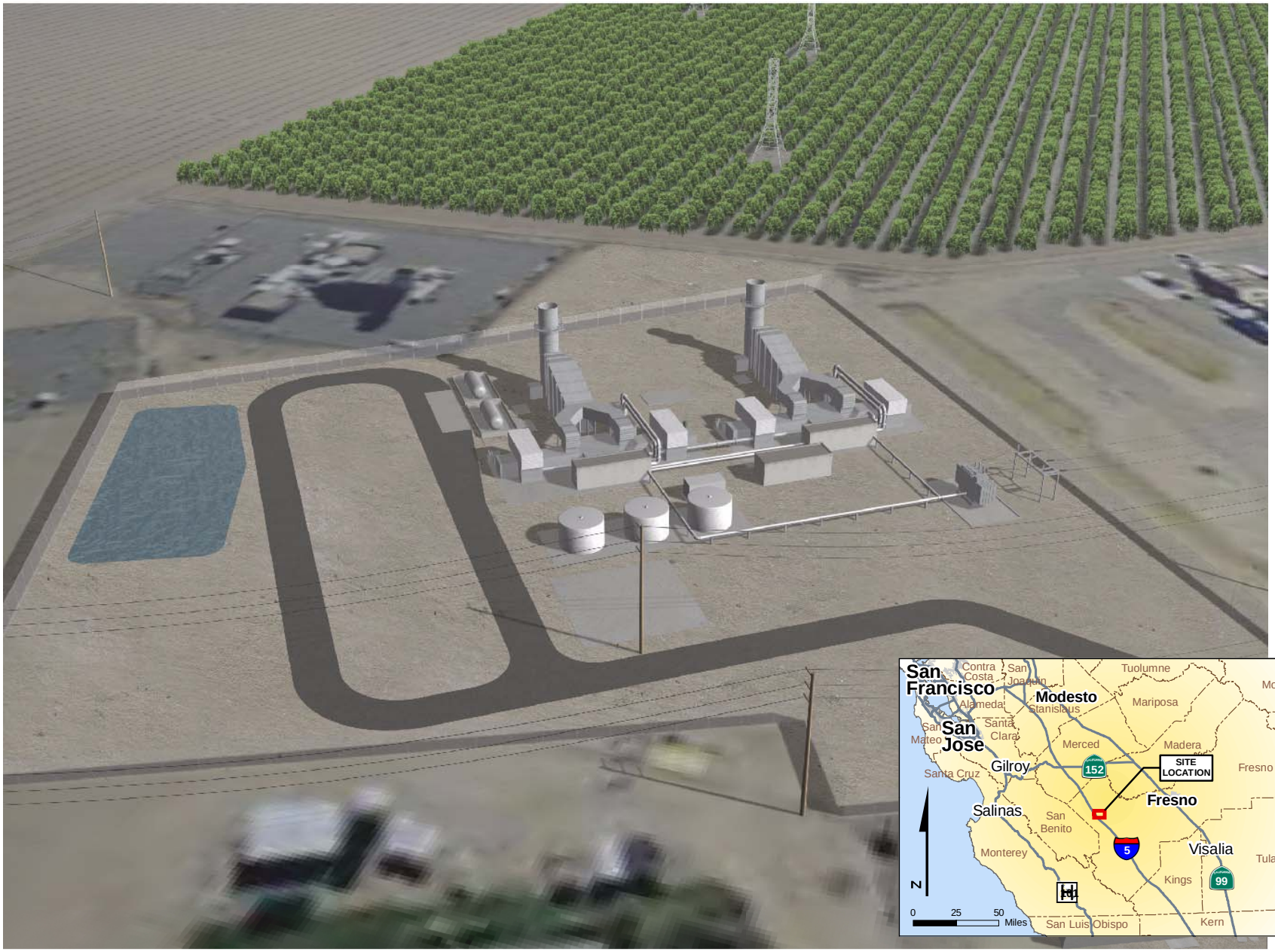
ITEM	DESCRIPTION	QTY
1	FT8-3 GAS TURBINE GENERATOR UNIT	2
2	PRIMARY CONTROL ENCLOSURE	2
3	CO/SCR CATALYST	2
4	SWITCH YARD/ MAIN STEP-UP TRANSFORMER/ DEAD END STRUCTURE (13.8x115 kV)	1
5	SECONDARY CONTROL ENCLOSURE	1
6	AIR COMPRESSOR/DRYER SKIDS	2
7	AQUEOUS AMMONIA TANK & CONTAINMENT AREA	1
8	AQUEOUS AMMONIA FORWARDING PUMP SKID	1
9	AQUEOUS AMMONOA INJECTION CONTROL SKID	2
10	AQUEOUS AMMONIA UNLOADING AREA	1
11	WASH DOWN DRAIN TANK AREA	1
12	CEMS ENCLOSURE	2
13	DEMINERALIZED WATER TANK (75,000 GALLON)	2
14	DEMINERALIZED WATER PUMP SKID	1
15	RAW WATER TANK (75,000 GALLON)	1
16	DI TRAILER PAD	1
17	GAS FUEL SCRUBBER	1
18	RO/EVAPORATION POND	1
19	RO UNIT	1
20	WASTE WATER SYSTEM COLLECTION SUMP	1
21	WASTE WATER SYSTEM ABOVE GROUND STORAGE TANK (4,700 GALLONS)	1

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 3.4-1

PROJECT DESCRIPTION - FIGURE 4

Starwood Power Project - Architectural Rendering



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 5.13-02

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of William Walters and Lisa Blewitt

SUMMARY OF CONCLUSIONS

The Starwood Power Plant (Starwood) Project should comply with all applicable Laws, Ordinances, Regulations, and Standards (LORS) and should not result in significant air quality impacts provided the recommended conditions of certification are adopted by the Commission and implemented by the project owner. The project has secured emission reduction credits (ERCs) in sufficient quantity to meet San Joaquin Valley Air Pollution Control District (SJVAPCD or District) requirements and to fully offset all nonattainment pollutants and their precursors at a minimum ratio of 1:1, with the exception of a small amount of VOC ERCs that are recommended in a Condition of Certification (**AQ-SC8**) to be obtained by the applicant prior to initiating construction.

Staff has assessed both the potential for localized impacts and regional impacts for the project's construction and operation, and as a product of this analysis staff has recommended mitigation and monitoring requirements that should provide adequate mitigation and monitoring sufficient to reduce the adverse construction and operating emission impacts to less than significant.

INTRODUCTION

This analysis evaluates the expected air quality impacts of the emissions of criteria air pollutants due to the construction and operation of the proposed Starwood Power Plant (Starwood) by Starwood Power-Midway, LLC (applicant). Starwood will be located adjacent to the Panoche Hills, east of the San Benito County line, in the unincorporated area of western Fresno County, approximately 45 miles west southwest of downtown Fresno and approximately two miles east of Interstate 5 just south of Panoche Road.

Criteria air pollutants are defined as those air contaminants for which the state and/or federal government has established an ambient air quality standard to protect public health. The criteria pollutants analyzed are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), CO, ozone (O_3), PM10, and PM2.5. In addition, VOC emissions are analyzed because they are precursors to both O_3 and particulate matter. Because NO_2 and SO_2 readily react in the atmosphere to form other oxides of nitrogen and sulfur respectively, the terms nitrogen oxides (NOx) and sulfur oxides (SOx) are also used when discussing these two pollutants.

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

- Whether Starwood is likely to conform with applicable Federal, State and San Joaquin Valley Air Pollution Control District (SJVAPCD or District) air quality laws, ordinances, regulations and standards (Title 20, California Code of Regulations, section 1744 (b));

- Whether Starwood is likely to cause significant air quality impacts, including new violations of ambient air quality standards or contributions to existing violations of those standards (Title 20, California Code of Regulations, section 1742 (b)); and
- Whether the mitigation proposed for Starwood is adequate to lessen the potential impacts to a level of insignificance (Title 20, California Code of Regulations, section 1742 (b)).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies pertain to the control of criteria pollutant emissions and mitigation of air quality impacts. Staff's analysis examines the project's compliance with these requirements.

AIR QUALITY Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
40 Code of Federal Regulations (CFR) 52	Nonattainment New Source Review (NSR) requires a permit and requires Best Available Control Technology (BACT) and Offsets. Permitting and enforcement delegated to SJVAPCD. Prevention of Significant Deterioration (PSD) requires major sources to obtain permits for attainment pollutants. A major source for a simple-cycle combustion turbine is defined as any one pollutant exceeding 250 tons per year. Since the emissions from Starwood are not expected to exceed 250 tons per year, PSD does not apply.
40 CFR 60 Subpart KKKK	New Source Performance Standard for gas turbines: 15 parts per million (ppm) NOx at 15%O_2 and fuel sulfur limit of 0.060 lb SOx per million Btu heat input. BACT will be more restrictive. Enforcement delegated to SJVAPCD.
40 CFR Part 70	Title V: Federal permit. Title V permit application is required within one year of start of operation. Permitting and enforcement delegated to SJVAPCD.
40 CFR Part 72	Acid Rain Program. Requires permit and obtaining sulfur oxides credits. Permitting and enforcement delegated to SJVAPCD.

State	
Health and Safety Code (HSC) Section 40910-40930	Permitting of source needs to be consistent with Air Resource Board (ARB) approved Clean Air Plans.
HSC Section 41700	Restricts emissions that would cause nuisance or injury.

Local – San Joaquin Valley Air Pollution Control District (SJVAPCD) Rules and Regulations	
Regulation I – General Provisions	This regulation sets forth requirements and standards for stack monitoring, source sampling, and breakdown events.

Local – San Joaquin Valley Air Pollution Control District (SJVAPCD) Rules and Regulations	
Regulation II – Permits	This regulation sets forth the regulatory framework of the application for and issuance of construction and operation permits for new, altered and existing equipment. Included in these requirements are the federally delegated requirements for New Source Review, Title V Permits, and the Acid Rain Program. Regulation II Rule 2201 establishes the pre-construction review requirements for new, modified or relocated facilities, in conformance with the federal New Source Review regulation to ensure that these facilities do not interfere with progress in attainment of the national ambient air quality standards and that future economic growth in the San Joaquin Valley is not unnecessarily restricted. This regulation establishes Best Available Control Technology (BACT) and emission offset requirements. Regulation II, Rule 2520 defines the permit application and issuance as well as compliance requirements associated with the Title V federal permit program. Any new source which qualifies as a Title V facility must obtain a Title V permit within twelve months of starting operation modification of that source. Regulation II, Rule 2540 incorporates the requirements for the Acid Rain Program, including the requirement for a subject facility to obtain emission allowances for SOx emissions as well as fuel sampling and/or continuous monitoring to determine SOx, NOx, and carbon dioxide (CO_2) emissions from the facility.
Regulation IV – Prohibitions	This regulation sets forth the restrictions for visible emissions, odor nuisance, various air emissions, and fuel contaminants. Regulation IV incorporates provisions of 40 CFR Part 60, Chapter I, and is applicable to all new, modified, or reconstructed sources of air pollution. Sections of this regulation apply to stationary gas turbines (40 CFR Part 60 Subpart KKKK). These subparts establish limits of NO_2 and SO_2 emissions from the facility as well as monitoring and test method requirements. This regulation also specifies additional performance standards for stationary gas turbines.
Regulation V – Procedures before the Hearing Board	Establishes the procedures for reporting emergencies and emergency variances.
Regulation VIII – Fugitive PM10 Prohibitions	This regulation sets forth the requirements and performance standards for the control of emissions from fugitive dust causing activities.

SETTING

METEOROLOGICAL CONDITIONS

The climate of the San Joaquin Valley is controlled by a semi-permanent subtropical high-pressure system that is located off the Pacific Ocean. In the summer, this strong high-pressure system results in clear skies, high temperatures, and low humidity. Very little precipitation occurs during the summer months because storms are blocked by the high-pressure system. Beginning in the fall and continuing through the winter, the high

pressure weakens and moves south, allowing storm systems to move through the area. Temperature, winds, and rainfall are more variable during these months, and stagnant conditions occur more frequently than during summer months. Weather patterns include periods of stormy weather with rain and gusty winds, clear weather that can occur after a storm, or persistent fog. The project site, as determined using nearby Mendota, receives an average of 12 inches of rain annually (WC 2007).

Temperature, wind speed, and wind direction data collected in Fresno at the Yosemite International Airport were provided for reference by the applicant (URS 2006a, Appendix I, Attachment A – Quarterly Wind Roses). The predominant annual wind direction from this monitoring site is from the northwest. The northwest wind direction is particularly predominating during the spring, summer, and autumn. The winds during the winter show two predominating directions, from the northwest and from the southeast (i.e. up and down valley directions). The wind speeds are generally higher during daylight hours, and higher during the spring and summer, and lower in fall and winter. Staff's review of monitoring data closer to the western side of the San Joaquin Valley, from the Lemoore Naval Air Station, indicates that the site area would generally have the same predominant wind directions.

Along with the wind flow, atmospheric stability and mixing heights are important factors in the determination of pollutant dispersion. Atmospheric stability reflects the amount of atmospheric turbulence and mixing. In general, the less stable an atmosphere, the greater the turbulence, which results in more mixing and better dispersion. The mixing height, measured from the ground upward, is the height of the atmospheric layer in which convection and mechanical turbulence promote mixing. Good ventilation results from a high mixing height and at least moderate wind speeds with the mixing layer. In general, mixing is more limited at night and in the winter in the San Joaquin Valley when there is a higher potential for lower level inversion layers being present along with low surface winds.

EXISTING AIR QUALITY

The project is located within the jurisdiction of the San Joaquin Valley Air Pollution Control District (District). The applicable federal and California ambient air quality standards (AAQS) are presented in **Air Quality Table 2**. As indicated in this table, the averaging times for the various air quality standards (the duration over which they are measured) range from one-hour to annual average. The standards are read as a mass fraction, in parts per million (ppm), or as a concentration, in milligrams or micrograms of pollutant per cubic meter of air (mg/m^3 or $\mu g/m^3$).

AIR QUALITY Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.08 ppm (157 µg/m^3)	0.070 ppm (137 µg/m^3)
	1 Hour	—	0.09 ppm (180 µg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053 ppm (100 µg/m^3)	— [a]
	1 Hour	—	0.25 ppm (470 µg/m^3) [a]
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	0.030 ppm (80 µg/m^3)	—
	24 Hour	0.14 ppm (365 µg/m^3)	0.04 ppm (105 µg/m^3)
	3 Hour	0.5 ppm (1300 µg/m^3)	—
	1 Hour	—	0.25 ppm (655 µg/m^3)
Respirable Particulate Matter (PM10)	Annual Arithmetic Mean	—	20 µg/m^3
	24 Hour	150 µg/m^3	50 µg/m^3
Fine Particulate Matter (PM2.5)	Annual Arithmetic Mean	15 µg/m^3	12 µg/m^3
	24 Hour	35 µg/m^3	—
Sulfates (SO_4)	24 Hour	—	25 µg/m^3
Lead	30 Day Average	—	1.5 µg/m^3
	Calendar Quarter	1.5 µg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 µg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 µg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.

Source: ARB 2007a.

[a] ARB has approved a revised 1-hour standard for NO_2 (0.18 ppm or 338 ug/m^3) and a new annual standard for NO_2 (0.030 ppm or 56 ug/m^3); however, these standards have not completed the state's official approval process at the time of the completion of the FSA.

The U.S. Environmental Protection Agency (U.S. EPA), California Air Resource Board (CARB), and the local air district classify an area as attainment, unclassified, or nonattainment, depending on whether or not the monitored ambient air quality data show compliance, insufficient data is available, or non-compliance with the ambient air quality standards, respectively. The Starwood project site is located within the San Joaquin Valley Air Basin (SJVAB) and, as stated above, is under the jurisdiction of the San Joaquin Valley Air Pollution Control District. This area is designated as nonattainment for both the federal and state ozone and PM10 standards. **Air Quality Table 3** summarizes federal and state attainment status of criteria pollutants for the SJVAB.

AIR QUALITY Table 3
Federal and State Attainment Status for the San Joaquin Valley Air Basin

Pollutant	Attainment Status	
	Federal	**State**
Ozone	Serious Nonattainment (8-hr)	Severe Nonattainment (1-hr)
CO	Unclassified/Attainment [a]	Attainment
NO_2	Unclassified/Attainment [a]	Attainment
SO_2	Attainment	Attainment
PM10	Serious Nonattainment	Nonattainment
PM2.5	Nonattainment	Nonattainment

Source: ARB 2007b, U.S. EPA 2007.
[a] Unclassified/Attainment – The attainment status for the subject pollutant is classified as either attainment or unclassified.

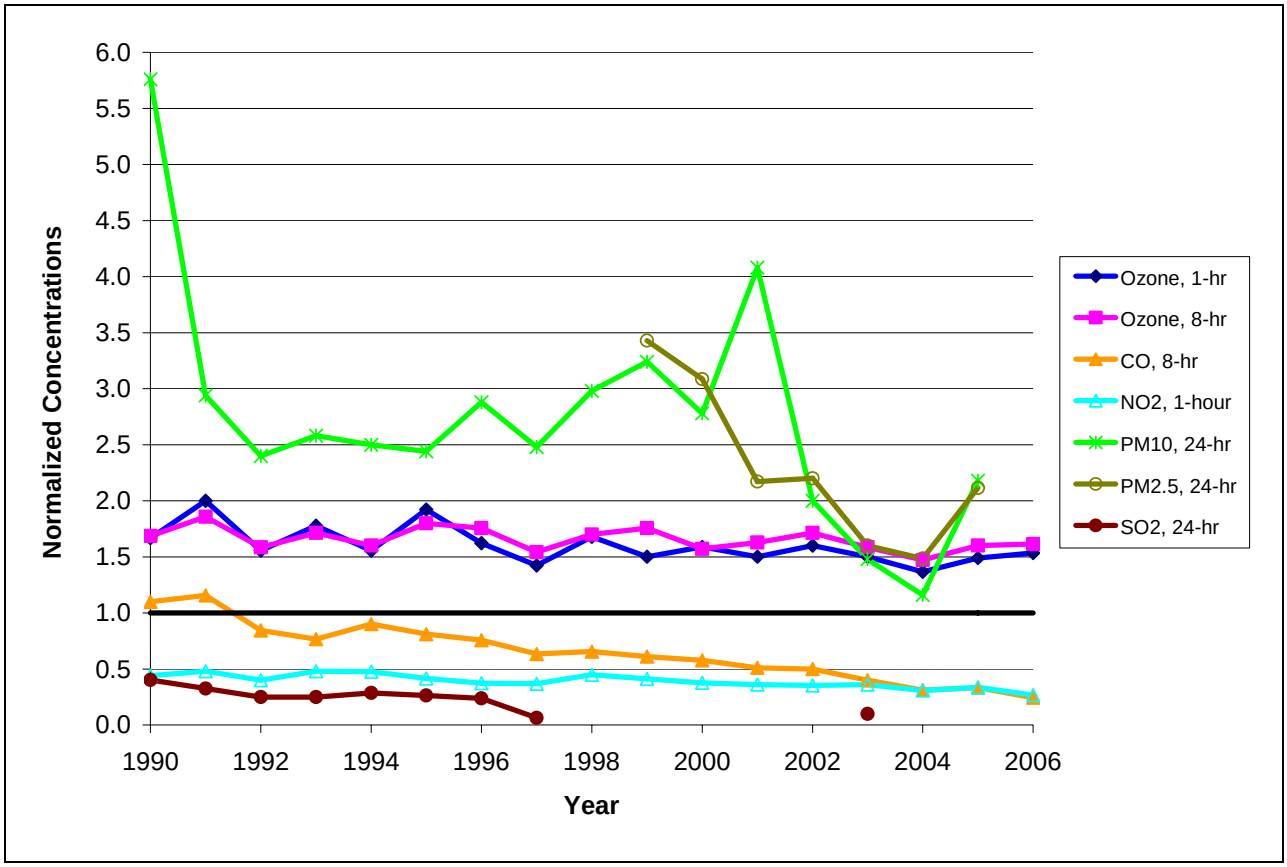
The project site is in Fresno County, about 45 miles (64 kilometers [km]) west southwest of downtown Fresno, 2.5 miles (4.0 km) east northeast of Interstate 5 (I-5) and approximately 2.5 miles (4.0 km) west southwest of the California Aqueduct. The project site is adjacent and east of the Calpeak Panoche peaking power plant, which abuts the existing Pacific Gas & Electric (PG&E) substation on the west.

The monitoring station closest to the proposed project site with a long-term record of all the criteria pollutants, except SO_2, is the Fresno First Street Station, located at 3425 North First Street, approximately 46 miles east northeast of the project site. This station monitors ambient concentrations of lead, ozone, NO_2, CO, PM10, and PM2.5. The Fresno Fremont School Station, approximately 43 miles east northeast of the project site, is the closest station that most recently monitored SO_2. To the extent that monitoring data from the Fresno stations have been used to characterize conditions at the project site, this practice would generally overestimate existing pollutant levels at the Starwood project site because of the much lower population and level of development of this area compared to the monitoring stations in the urban areas of Fresno.

AIR QUALITY Figure 1 summarizes the historical air quality data for the project location, recorded at Fresno First Street (1990-2006 for ozone, CO, NO_2, PM10, SO_2; 1999-2006 for PM2.5; 1990-1997 for SO_2), and Fresno Fremont School (2003 for SO_2) air monitoring stations. In **Air Quality Figure 1**, the short term normalized concentrations are provided from 1990 to 2006. Normalized concentrations represent the ratio of the highest measured concentrations in a given year to the most-stringent applicable national or state ambient air quality standard. Therefore, normalized

concentrations lower than one indicates that the measured concentrations were lower than the most-stringent ambient air quality standard.

AIR QUALITY Figure 1
Normalized Maximum Short-Term Historical Air Pollutant Concentrations
Fresno First Street (1990-2006), and Fresno Fremont School (2003 - SO_2 only)



Source: ARB 2006a, ARB 2007c.
A Normalized Concentration is the ratio of the highest measured concentration to the applicable most stringent air quality standard. For example, in 1999 the highest one-hour average ozone concentration measured at the Fresno First Street station was 0.135 ppm. Since the most stringent ambient air quality standard is the state standard of 0.09 ppm, the 1999 normalized concentration is 0.135/0.09 = 1.5.

Following is a more in-depth discussion of ambient air quality conditions in the project area.

Ozone

In the presence of ultraviolet radiation, both nitrogen oxides (NOx) and volatile organic compounds (VOC) go through a number of complex chemical reactions to form ozone. **Air Quality Table 4** summarizes the best representative ambient ozone data collected from the Fresno First Street monitoring station. The table includes the maximum one-hour and eight-hour ozone levels and the number of days above the state or national standards. Ozone formation is higher in spring and summer and lower in the winter. The SJVAB was classified as an extreme nonattainment area for the previous federal 1-hour ozone standard (no longer applicable) and is classified as a serious nonattainment area for the federal 8-hour ozone standard. The SJVAB is also classified as a severe nonattainment area for the state 1-hour ozone standard.

AIR QUALITY Table 4
Ozone Air Quality Summary, 1996-2006 (ppm)

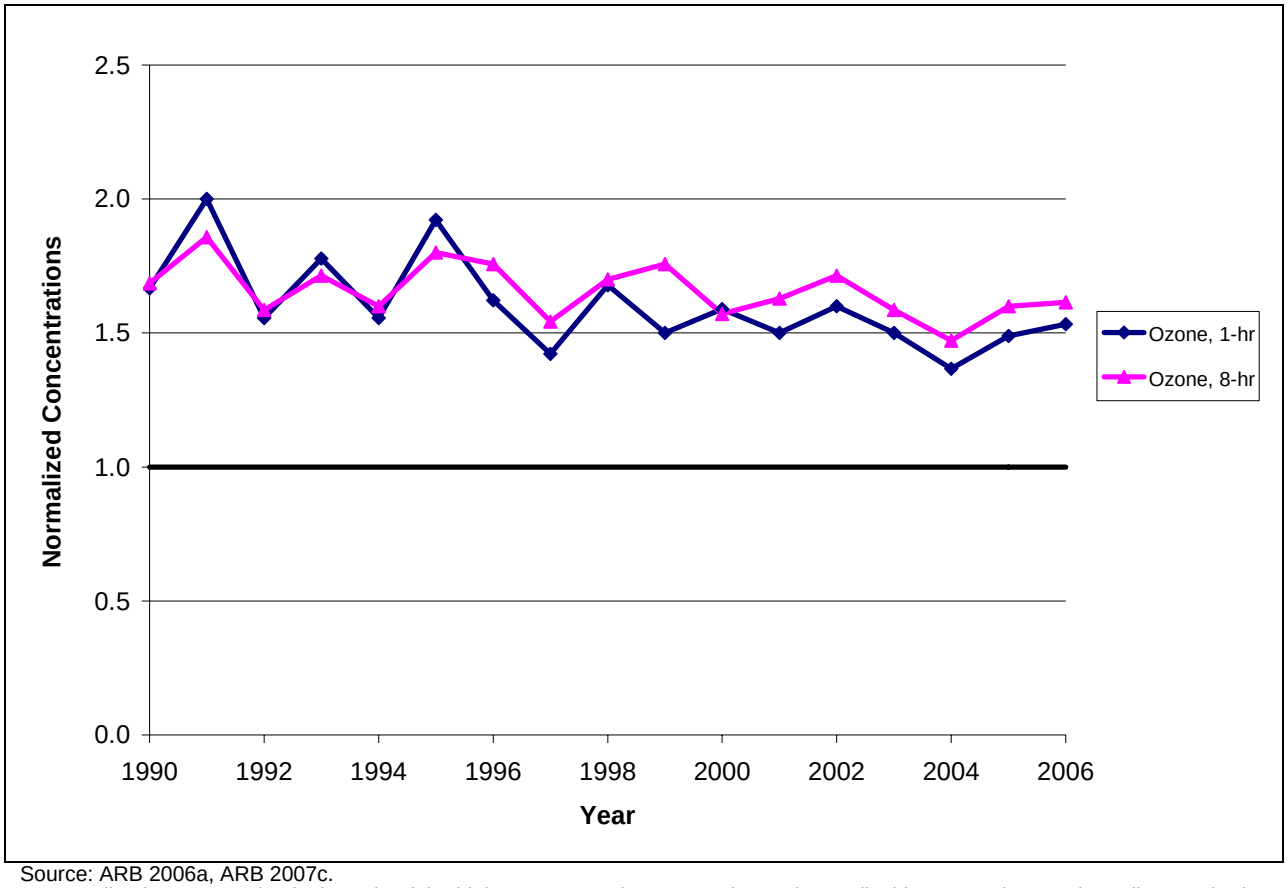
Year	Days Above CAAQS 1-Hr	Month of Max. 1-Hr Avg.	Max. 1-Hr Avg.	Days Above NAAQS 8-Hr	Month of Max. 8-Hr Avg.	Max. 8-Hr Avg.
	Fresno First Street					
1996	59	AUG	0.146	49	AUG	0.123
1997	30	AUG	0.128	23	AUG	0.107
1998	46	AUG	0.151	44	JUL	0.118
1999	53	JUL	0.135	45	JUL	0.123
2000	48	SEP	0.143	41	SEP	0.109
2001	51	AUG	0.135	40	AUG	0.113
2002	45	JUL	0.144	41	JUL	0.119
2003	56	SEP	0.135	47	SEP	0.111
2004	23	SEP	0.123	18	AUG	0.103
2005	31	JUL	0.134	27	JUL	0.111
2006	45	JUN	0.138	38	JUN	0.113
California Ambient Air Quality Standard (CAAQS): 1-Hr, 0.09 ppm, 8-Hr, 0.070 ppm National Ambient Air Quality Standard (NAAQS): 8-Hr, 0.08 ppm						

Source: ARB 2006a, ARB 2007c.

The yearly trends from 1990 to 2006 for the maximum one-hour and eight-hour ozone concentrations, referenced to the most stringent standard, and the number of days exceeding the California one-hour standard and the federal eight-hour standard for the Fresno First Street (1990-2006) monitoring station is shown in **Air Quality Figure 2** and **Figure 3**, respectively.

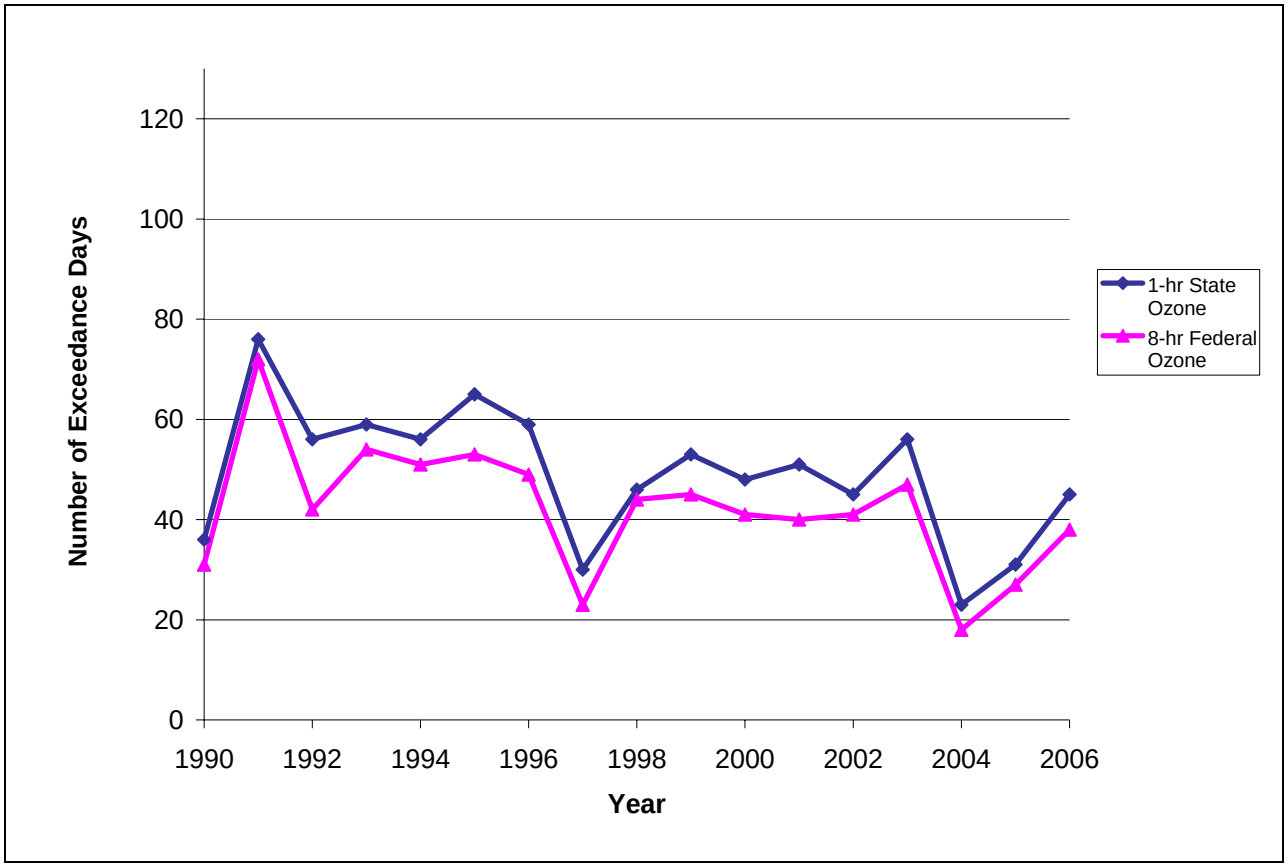
As these two figures show, the one-hour and eight-hour ozone concentrations were highest in 1991 and the number of exceedances were highest in 1991. However, there has been little or no improvement in the peak concentrations and number of exceedances since 1995.

AIR QUALITY Figure 2
Normalized Ozone Air Quality Maximum Concentrations
Fresno First Street (1990-2006)



Source: ARB 2006a, ARB 2007c.
A Normalized Concentration is the ratio of the highest measured concentration to the applicable most stringent air quality standard. The standard used for one-hour ozone is the state standard of 0.09 ppm, and for eight-hour ozone is the state standard of 0.070 ppm.

AIR QUALITY Figure 3
Ozone – Number of Days Exceeding the Air Quality Standards
Fresno First Street (1990-2006)



Source: ARB 2006a, ARB 2007c.

Respirable Particulate Matter (PM10)

As **Air Quality Table 5** indicates, the project area annually experiences a number of violations of the state and federal 24-hour PM10 standards. The SJVAB is classified as a serious nonattainment area for the federal PM10 standard and as a nonattainment area for the state PM10 standards.

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 turbines, and ammonia from NOx control equipment, given the right meteorological conditions, can form particulate matter in the form of nitrates (NO_3), sulfates (SO_4), and organic particles. These pollutants are known as secondary particulates, because they are not directly emitted, but are formed through complex chemical reactions in the atmosphere.

AIR QUALITY Table 5
PM10 Air Quality Summary, 1996-2006 ($\mu g/m^3$)

Year	Days * Above Daily CAAQS	Month of Max. Daily Avg.	Max. Daily Avg.	Annual Arithmetic Mean
	Fresno First Street			
1996	64	NOV	144	37.1
1997	71	DEC	124	42.6
1998	77	DEC	149	33.7
1999	110	DEC	162	44.6
2000	72	JAN	139	40.3
2001	98	JAN	204	42.6
2002	90	NOV	100	39.7
2003	80	OCT	74	**35.0**
2004	30	JAN	58	31.3
2005	58	NOV	**109**	32.9

California Ambient Air Quality Standard: 24-Hr, 50 $\mu g/m^3$; Annual Arithmetic, 20 $\mu g/m^3$
National Ambient Air Quality Standard: 24-Hr, 150 $\mu g/m^3$

* Days above the state standard (calculated): PM10 is monitored approximately once every six days. This value is a mathematical estimate of how many days the PM10 concentrations would have been greater than the level of the standard had each day been monitored.

Maximum average values corresponding to the most restrictive standard occurring during the most recent three years of available data are indicated in bold.

Source: ARB 2006a, ARB 2007c.

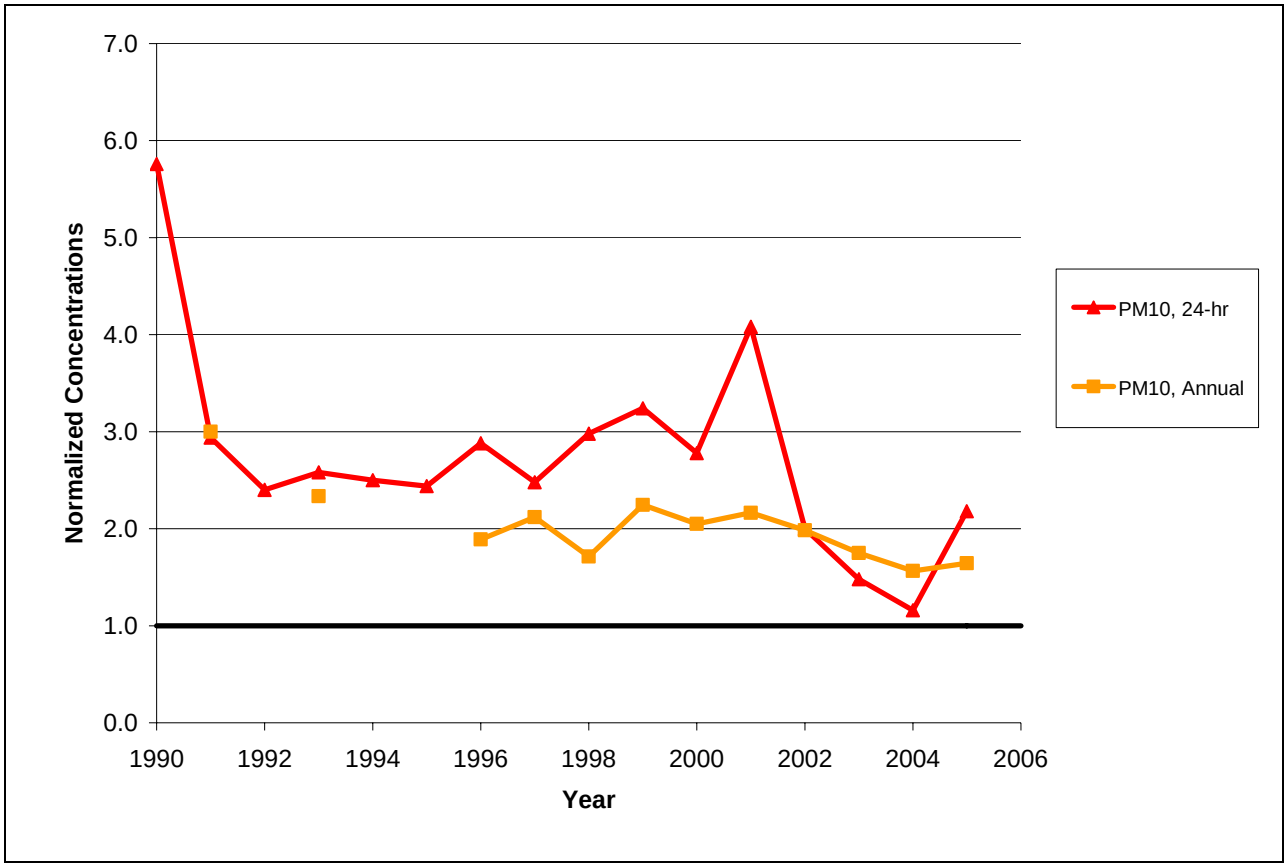
PM nitrate (mainly ammonium nitrate) is formed in the atmosphere from the reaction of nitric acid and ammonia. Nitric acid in turn originates from NOx emissions from combustion sources. The nitrate ion concentrations during the wintertime are a significant portion of the total PM10, and are likely even a higher contributor to particulate matter of less than 2.5 microns (PM2.5). The nitrate ion is only a portion of the PM nitrate, which can be in the form of ammonium nitrate (ammonium plus nitrate ions) and some as sodium nitrate. If the ammonium and the sodium ions associated with the nitrate ion are taken into consideration, PM nitrate contributions to the total PM are even more significant.

As shown in **Air Quality Table 5**, the highest PM10 concentrations are generally measured in the fall and winter when there are frequent low-level inversions. During the wintertime high PM10 episodes, the contribution of ground level releases to ambient PM10 concentrations is disproportionately high.

The 1990 to 2006 yearly trends for the maximum 24-hour PM10 and Annual Arithmetic Mean PM10, referenced to the most stringent standard, and the number of days exceeding the California 24-hour PM10 standard for the Fresno First Street (1990-2006) monitoring station is shown in **Air Quality Figure 4** and **Figure 5**, respectively.

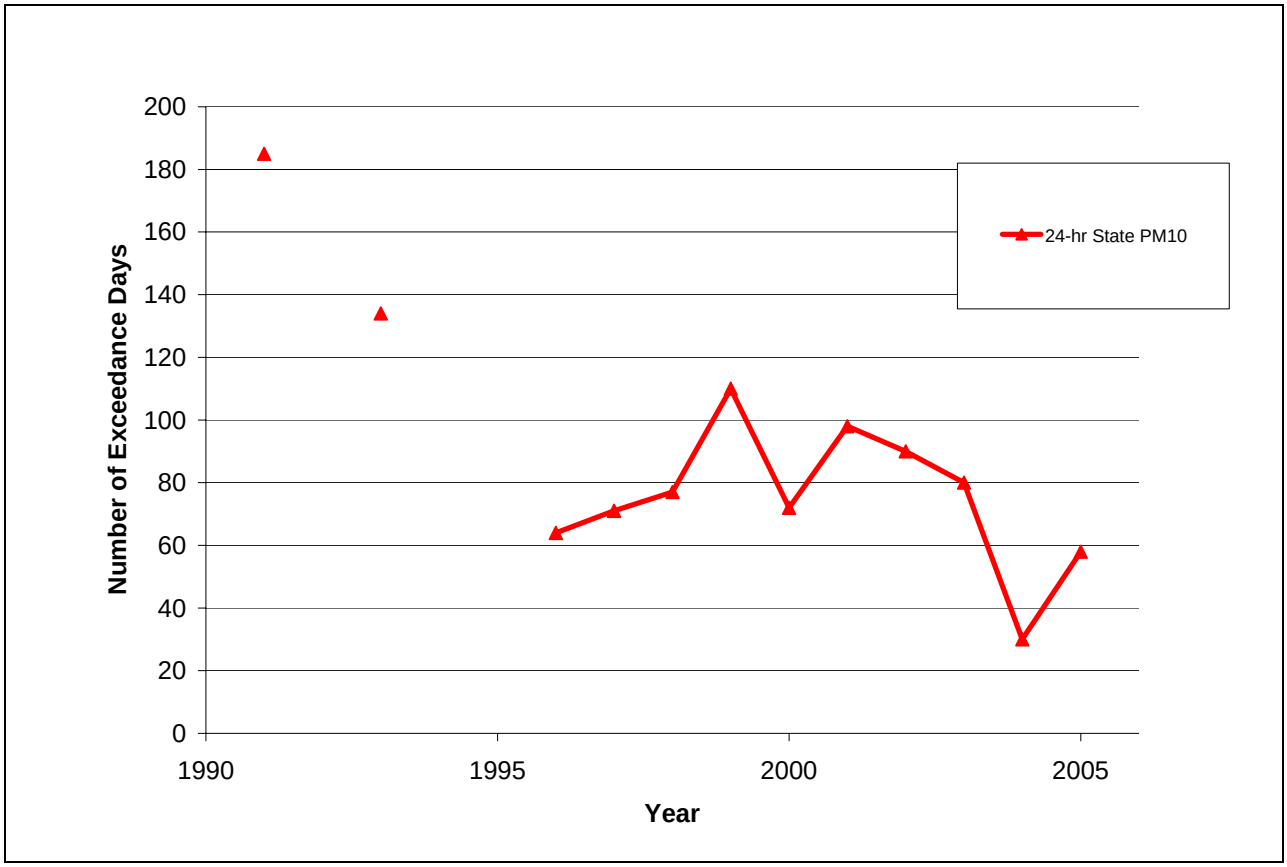
As the two figures show, there is an overall gradual downward trend for PM10 concentrations and number of violations of the California 24-hour standard since 1990; however, there has been little progress since 1995.

AIR QUALITY Figure 4
Normalized PM10 Air Quality Maximum Concentrations
Fresno First Street (1990-2005)



Source: ARB 2006a, ARB 2007c.
A Normalized Concentration is the ratio of the highest measured concentration to the applicable most stringent air quality standard. The standard used for 24-hour PM10 is the state standard of 50 $\mu g/m^3$, for the Annual Arithmetic Mean is the state standard of 20 $\mu g/m^3$, for 24-hour PM2.5 is the federal standard of 35 $\mu g/m^3$, and for the National Annual Arithmetic Mean PM2.5 is the is the federal standard of 15 $\mu g/m^3$.

AIR QUALITY Figure 5
PM10 24-Hour – Number of Days Exceeding the Air Quality Standard
Fresno First Street (1990-2006)



Source: ARB 2006a, ARB 2007c.

Fine Particulate Matter (PM2.5)

The SJVAB is classified as nonattainment for the state respirable particulate matter (PM2.5) standard. As shown in **Air Quality Table 6**, the highest PM2.5 concentrations are generally measured in the winter. The relative contribution of wood-smoke particles to the PM2.5 concentrations may be even higher than its relative contribution to PM10 concentrations, considering that most of the wood-smoke particles are smaller than 2.5 microns.

As **Air Quality Table 6** indicates, the 24-hour (3-year average 98th percentile) PM2.5 concentration levels have been declining from 1999-2005, but were still above the NAAQS of 35 $\mu g/m^3$ in 2003 at the Fresno First Street monitoring station. The annual arithmetic means also appear to have been declining from 1999-2005, but continue to be above the NAAQS of 15 $\mu g/m^3$ and the CAAQS of 12 $\mu g/m^3$.

AIR QUALITY Table 6
PM2.5 Air Quality Summary, 1999-2005 ($\mu g/m^3$)

Year	National Maximum Daily	98th Percentile Maximum Daily	3-Yr National 98th Percentile Maximum Average	State Annual Average	National Annual Average
	Fresno First Street				
1999	136	120	---	23.4	27.7
2000	160	108	---	---	---
2001	110	76	101	---	19.8
2002	99.7	77	86	---	21.6
2003	56	56	**69**	17.7	17.7
2004	52	52	61	16.8	16.4
2005	74	74	60	**19.7**	16.9

California Ambient Air Quality Standard: Annual Arithmetic Mean, 12 $\mu g/m^3$
National Ambient Air Quality Standard: 24-Hr Avg. Conc., 35 $\mu g/m^3$ (based on 98% of the daily concentrations, average over three years); Annual Arithmetic Mean, 15 $\mu g/m^3$

Maximum average values corresponding to the most restrictive standard occurring during the most recent three years of available data are indicated in bold.

Source: ARB 2006a, ARB 2007c.

The maximum daily PM2.5 concentrations shown in **Air Quality Table 6** all occurred in the late fall or winter (fourth and first quarters).

Carbon Monoxide (CO)

The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level in what is known as the stable boundary layer. These conditions occur frequently in the wintertime, late in the afternoon, persist during the night and may extend one or two hours after sunrise. Since mobile sources (motor vehicles) are the main cause of CO, ambient concentrations of CO are highly dependent on motor vehicle activity. In fact, the peak CO concentrations occur during the rush hour traffic in the mornings and afternoons. CO concentrations in Fresno County and the rest of the state have declined significantly due to two state-wide programs: 1) the 1992 wintertime oxygenated gasoline program, and 2) Phases I and II of the reformulated gasoline program. New vehicles with oxygen sensors and fuel injection systems have also contributed to the decline in CO levels in the state. Today, all the areas of California, with the sole exception of certain locations within Los Angeles County, are in attainment with the CO ambient air quality standards.

As **Air Quality Table 7** shows, the maximum one-hour and eight-hour CO concentrations in the project area are less than the California Ambient Air Quality Standards. CO is considered a local pollutant, as it is found in high concentrations only near the source of emission. Automobiles and other mobile sources are the principal sources of the CO emissions. High levels of CO emissions can also be generated from fireplaces and wood-burning stoves. According to the data recorded at the Fresno First Street air monitoring station, there have been no violations of the California Ambient Air Quality Standards since 1990 for the one-hour CO standard and 1992 for the eight-hour CO standard (see **Air Quality Figure 1 and Table 7**).

AIR QUALITY Table 7
CO Air Quality Summary, 1996-2006 (ppm)

Year	Month of Max. 8-Hr Average	Maximum 1-Hr Average	Maximum 8-Hr Average
	Fresno First Street		
1996	NOV	10.0	6.82
1997	OCT	8.7	5.69
1998	DEC	9.0	5.88
1999	DEC	8.7	5.53
2000	JAN	7.9	5.24
2001	JAN	6.7	4.64
2002	NOV	6.1	4.51
2003	NOV	4.9	3.56
2004	NOV	3.9	2.84
2005	NOV	**4.1**	**2.95**
2006	NOV	---	2.19

California Ambient Air Quality Standard: 1-Hr, 20 ppm; 8-Hr, 9.0 ppm
National Ambient Air Quality Standard: 1-Hr, 35 ppm; 8-Hr, 9 ppm

Maximum average values corresponding to the most restrictive standard occurring during the most recent three years of available data are indicated in bold.

Source: ARB 2006a, ARB 2007c.

Nitrogen Dioxide (NO_2)

As shown in **Air Quality Table 8,** the maximum one-hour and annual concentrations of NO_2 at the Fresno First Street monitoring station are lower than the California and National Ambient Air Quality Standards. Approximately 75 to 90% of the NOx emitted from combustion sources is NO, while the balance is NO_2. NO is oxidized in the atmosphere to NO_2, but some level of photochemical activity is needed for this conversion. This is why the highest concentrations of NO_2 generally occur during the fall and not in the winter, when atmospheric conditions favor the trapping of ground level releases, but lack significant photochemical activity (less sunlight). In the summer, the conversion rates of NO to NO_2 are high, but the relatively high temperatures and windy conditions (atmospheric unstable conditions) generally disperse pollutants, preventing the accumulation of NO_2 to levels approaching the California one-hour ambient air quality standard. The formation of NO_2 in the summer, in the presence of ozone, is according to the following reaction:

$$NO + O_3 \rightarrow NO_2 + O_2$$

In urban areas, ozone concentration levels are typically high. These levels drop substantially at night as the above reaction takes place between ozone and NO. This reaction explains why, in urban areas, ozone concentrations at ground level drop, while aloft and in downwind rural areas (without sources of fresh NOx emissions) ozone concentrations can remain relatively high.

AIR QUALITY Table 8
NO_2 Air Quality Summary, 1996-2006 (ppm)

Year	Month of Max. 1-Hr Average	Maximum 1-Hr Average	Maximum Annual Average
	Fresno First Street		
1996	AUG	0.093	0.021
1997	NOV	0.092	0.021
1998	SEP	0.112	0.020
1999	OCT	0.103	0.023
2000	SEP	0.094	0.021
2001	OCT	0.090	0.021
2002	OCT	0.088	0.020
2003	OCT	0.090	0.019
2004	OCT	0.077	0.017
2005	OCT	**0.084**	**0.017**
2006	OCT	0.067	0.016

California 1-Hr Ambient Air Quality Standard: 0.25 ppm
National Annual Arithmetic Mean Ambient Air Quality Standard: 0.053 ppm

Maximum average values corresponding to the most restrictive standard occurring during the most recent three years of available data are indicated in bold.

Source: ARB 2006a, ARB 2007c.

Sulfur Dioxide (SO_2)

Sulfur dioxide is typically emitted as a result of the combustion of a fuel containing sulfur. Fuels, such as natural gas, contain very little sulfur and consequently have very low SO_2 emissions when combusted. By contrast, fuels high in sulfur content, such as coal, emit very large amounts of SO_2 when combusted.

Sources of SO_2 emissions within the SJVAB come from every economic sector and include a wide variety of fuels: gaseous, liquid and solid. The SJVAB is designated attainment for all the SO_2 state and federal ambient air quality standards. **Air Quality Table 9** shows the historic one-hour, 24-hour and annual average SO_2 concentrations collected from the Fresno First Street monitoring station. No monitoring of SO_2 has occurred at this station since 1997 (data for 1997 was incomplete and therefore was not included). As **Air Quality Table 9** shows, concentrations of SO_2 are far below the state and federal SO_2 ambient air quality standards.

Visibility

Visibility in the region of the project site depends upon the area's natural relative humidity and the intensity of both particulate and gaseous pollution in the atmosphere. The most straightforward characterization of visibility is probably the visual range (the greatest distance that a large dark object can be seen). However, in order to characterize visibility over a range of distances, it is more common to analyze the changes in visibility in terms of the change in light-extinction that occurs over each additional kilometer of distance (1/km). In the case of a greater light-extinction, the visual range will decrease.

The SJVAB is currently designated as unclassified for visibility reducing particles.

AIR QUALITY Table 9
SO_2 Air Quality Summary, 1990-1996 (ppm)

Year	Maximum 1-Hr Avg.	Month of Max. 24-Hr Avg.	Maximum 24-Hr Avg.	Annual Average
	Fresno First Street			
1990	0.030	NOV	0.016	0.003
1991	0.030	FEB	0.013	0.004
1992	0.030	MAY	0.010	0.002
1993	0.010	JUN	0.010	0.002
1994	0.017	DEC	0.011	0.004
1995	0.014	JUL	0.010	0.004
1996	0.015	MAR	0.009	0.002
	Fresno Fremont School Station			
2003	**0.009**	JUL	**0.004**	**0.002**

California Ambient Air Quality Standard: 1-Hr, 0.25 ppm; 24-Hr, 0.04 ppm
National Ambient Air Quality Standard: 3-Hr, 0.5 ppm; 24-Hr, 0.14 ppm; Annual, 0.030 ppm

Maximum average values corresponding to the most restrictive standard occurring during the most recent available data are indicated in bold.

Source: ARB 2006a, ARB 2007c.

Summary

In summary, staff recommends the background ambient air concentrations in **Air Quality Table 10** for use in the modeling and impacts analysis. The maximum criteria pollutant concentrations from the past three years of available data collected at the monitoring stations within Fresno County are used to determine the recommended background values.

AIR QUALITY Table 10
Staff Recommended Background Concentrations ($\mu g/m^3$)

Pollutant	Averaging Time	Recommended Background	Limiting Standard	Percent of Standard
NO_2	1 hour	157.9	470	34%
	Annual	32.1	100	32%
PM10	24 hour	109	50	218%
	Annual	35	20	175%
PM2.5	24 hour	69	35	197%
	Annual	19.7	12	164%
CO	1 hour	4,715	23,000	21%
	8 hour	3,278	10,000	33%
SO_2	1 hour	23.6	655	4%
	3 hour [a]	21.2	1,300	2%
	24 hour	10.5	105	10%
	Annual	5.3	80	7%

Source: ARB 2006a, ARB 2007c & Energy Commission Staff Analysis
[a] The 3 hour background SO_2 concentration is assumed to be 90% of the 1 hour background.

Where possible, staff prefers that the recommended background concentrations come from nearby monitoring stations with similar characteristics; however no monitoring stations are located near the project site. Monitoring stations located within larger urban areas (Fresno) provide conservative estimates for background concentrations. For all pollutants, except for SO_2, the highest monitored values from the Fresno First Street monitoring station was used to determine the background concentrations. For SO_2, the 2003 monitored concentrations from the Fresno Fremont School monitoring station were used to determine the background concentrations.

The background concentrations for PM10 and PM2.5 are well above the most restrictive existing ambient air quality standards, while the background concentrations for the other pollutants are all well below the most restrictive existing ambient air quality standards.

The pollutant modeling analysis was limited to the pollutants listed above in **Air Quality Table 10**; therefore, recommended background concentrations were not determined for the other criteria pollutants (ozone, lead, visibility, etc.)

PROJECT DESCRIPTION AND EMISSIONS

Starwood Power-Midway, LLC, has proposed to develop the Starwood project on a 5.6 acre leased site within a 128-acre parcel. The project site is located east of the Panoche Hills, east of the San Benito County line, in the unincorporated area of western Fresno County, approximately 45 miles west southwest of downtown Fresno and approximately two and a half miles northeast of Interstate 5. The general area around the site is agricultural with little nearby population. The project site, currently used as a storage yard, is located within a leased section of a 128 acre parcel that includes the Calpeak Panoche power plant with the majority of the parcel currently planted with pomegranate trees. The PG&E Panoche substation is located one-tenth of a mile southwest of the project fence line across the existing Calpeak Panoche site.

This project has been defined by the San Joaquin Valley Air Pollution Control District (SJVAPCD) as a modification of the existing adjacent Calpeak Panoche peaking power plant owned by the applicant (SJVAPCD 2007d). This impact the New Source Review requirements for the project, particularly offsets as the existing facility is included in the offset emission trigger totals. For CEC purposes, with the exception of implementation of relevant SJVAPCD requirements, this project is not considered a modification to an existing source. The nearest current residence, a small five-unit apartment building, is located adjacent to the northern fence line of the project site.

Other project improvements include the construction of an 800 foot natural gas interconnection from a new gas metering station at the existing PG&E substation, a 300 foot 115 kV interconnection from the site to the PG&E Panoche substation, and a 1,200 foot water interconnection to the existing Calpeak Panoche plant well. Additionally, a paved access road and 20 foot by 1,400 foot long paved access road and 25,000 square foot R/O and oil water separator wastewater evaporation pond will be constructed.

CONSTRUCTION

Construction of the Starwood project would consist of the following: 1) clearing and grubbing, including removal of materials being stored at the site, and site grading (month 1); 2) water line excavation (month 2); and 3) building of facility structures (months 2 to 10). The construction is expected to take a total of 10 months, based on an 8-hour workday and a 5-day work week (URS 2006a, p. 5.2-11).

Fugitive dust emissions during the construction of the project would result from dust entrained during site preparation and grading/excavation activities, on-site and offsite travel on paved and unpaved surfaces, and aggregate and soil loading and unloading operations, as well as wind erosion of areas disturbed during construction activities. The largest fugitive dust emissions are often generated during site preparation activities, where work such as clearing, grading, excavation of footings and foundations, and backfilling operations occur. These types of activities require the use of large earth moving equipment, which generate combustion emissions, along with creating fugitive dust emissions. Fugitive dust emissions resulting from onsite soil disturbances, such as dozing and grading, and from onsite and offsite traffic were estimated. The site has very fine soils (URS 2006a, Appendix L) that will exacerbate fugitive dust formation potential during site grading activities. Additionally, the site grading and consequently the fugitive dust potential have also been increased from the original construction activity assumptions in order to raise the top of the foundations by three feet for floodplain impact mitigation (URS 2007f). A dust control efficiency of 85% assumed to be achieved for these activities based on frequent watering.

Combustion emissions during the construction of the project result from exhaust sources, including diesel construction equipment used for site preparation, water trucks used to control dust emissions, diesel-powered welding machines, electric generators, air compressors, water pumps, diesel trucks used for deliveries, and automobiles and trucks used by workers to commute to and from the construction site.

The applicant estimates for the highest daily emissions during construction, based on month 2 of construction where the building construction and water line excavation will overlap, are shown in **Air Quality Table 11**. Total on-site construction heavy equipment exhaust and fugitive dust emissions during the 10-month construction period are summarized in **Air Quality Table 12**.

AIR QUALITY Table 11
Maximum Mitigated Daily Emissions During Construction, lbs/day

Activity	NOx	CO	VOC	SOx	PM10	PM2.5
On-Site						
Building/Water Line Excavation						
Combustion Exhaust	128.4	46.2	15.6	0.1	6.1	5.6
Fugitive Dust	---	---	---	---	5.1	1.1
Off-site						
Onroad Vehicles (including fugitive dust)	20.1	88.6	10.1	0.1	48.1	5.5
Total Maximum Daily Emissions	148.5	134.8	25.7	0.2	59.3	12.1

Source: URS 2007d, DR 23 (additional response).

AIR QUALITY Table 12
Total Mitigated Emissions During Construction, tons

Activity	NOx	CO	VOC	SOx	PM10	PM2.5
Site Grading	0.63	0.20	0.07	0.00	0.10	0.04
Water Line Excavation	0.23	0.10	0.03	0.00	0.02	0.01
Building	10.66	3.66	1.34	0.01	0.95	0.55
Onroad Vehicles	1.90	9.65	1.08	0.01	4.68	0.82
Total Project Emissions	12.79	13.41	2.35	0.02	5.65	1.42

Source: URS 2007d, DR 23 (additional response).

INITIAL COMMISSIONING

The initial commissioning of a power plant refers to the time between the completion of construction and the reliable production of electricity for sale on the market. For most power plants, normal operating emission limits usually do not apply during the initial commissioning activities.

Commissioning activities for the Starwood CTGs are expected to last approximately 67 hours for each turbine. The range of commissioning tests for each CTG at Starwood includes the following (URS 2006a, p 5.2-20):

1. Power Turbine Break In (operate unit at synchronous idle and perform a system check);

2. Overspeed Test (operate unit at synchronous idle);

3. Brush Generator Test (operate unit at several points over entire load range for dynamic commissioning of the voltage regulator);

4. Water Injection Tuning (operate unit at several points over entire load range for commissioning of the NOx water injection system);

5. Fogger Commissioning (operate unit for commissioning of the fogging system);

6. Run Prior to Catalyst Loading (operate unit prior to catalyst loading);

7. SCR Commissioning (unit operation to adjust SCR control);

8. Performance Testing (operate the unit at full load for performance); and

9. Emission Compliance (operate the unit at full load for emission tests).

Air Quality Table 13 presents the applicant's estimated typical initial commissioning activity duration and emissions for each of the Starwood CTGs. The applicant has indicated that commissioning tests would not be conducted on more than one CTG at a time (URS 2007, DR 10).

AIR QUALITY Table 13
Starwood Initial Commissioning Emissions

Commissioning Activities Per CTG	Operation Duration (Hours)	Hourly Emissions, lb/event	
		NOx	CO
Power Turbine Break In	5	47.79	12.09
Overspeed Test	1	9.56	2.42
Brush Generator Test	17	322.91	142.08
Water Injection Tuning	12.5	374.08	209.53
Fogger Commissioning	4	166.61	52.91
Catalyst Loading	4	166.61	52.91
SCR Commissioning	4	88.94	31.61
Full Load Testing	7.75	19.68	22.54
Emissions Compliance	12	33.79	30.89
Startup/Shutdowns		44.37	31.16
Total (1 CTG)	67.25	1274.34	588.14

Source: (URS 2007b, DR 7 and 10).

The PM10, VOC and SO_2 emissions during initial commissioning are not estimated to be higher than during normal full load operations.

Air Quality Table 14 presents the applicant's worst-case short-term initial commissioning emissions.

AIR QUALITY Table 14
Starwood Worst-Case NOx and CO Short-Term Commissioning Emissions

Pollutant	Lbs/hr
NOx	41.65
CO	19.90

Source: (URS 2007b, DR 10).

The initial commissioning modeling analysis presented in the Impacts section uses these worst-case emission values.

OPERATIONAL PHASE

Equipment Description

The equipment for the proposed Starwood project would include the following major components (URS 2006a):

- Two Pratt & Whitney FT8-3 SwiftPac, which consisting of two natural gas-fired combustion turbine generators (CTGs) each, four CTGs total, operating in simple cycle mode producing approximately 60 MW of electricity from each SwiftPac, or 120 MW total;
- The CTGs would each be equipped with water injection to the combustors for reducing production of NOx, a selective catalytic reduction (SCR) system with 19.5% aqueous ammonia injection to further reduce NOx emissions, and an oxidation catalyst to reduce CO emissions;
- Inlet air filters and inlet air fogging;

- Two exhaust stacks that combine the exhausts from two CTGs (diameter of 15-feet and height of 50-feet);
- A continuous emission monitoring (CEM) system installed on each stack would record concentrations of NOx, CO, and oxygen in the flue gas;
- Raw water storage tank (75,000 gallons);
- Two demineralized water storage tanks (75,000 gallons each); and
- Two 12,000 gallon aqueous ammonia tanks.

Facility Operation

Each Starwood CTG would operate up to 4,000 hours per year, as required by PG&E, which equates to a maximum annual capacity factor of 46% (URS 2006a, p. 5.2-35, 36). The applicant's requested maximum quarterly operating capacity is as follows:

1st Quarter – 800 hours
2nd Quarter – 800 hours
3rd Quarter – 1,400 hours
4th Quarter – 1,000 hours

As a peaking facility the actual facility operation will be to provide maximum electrical output during summer periods when demand for electricity is highest, and based on staff's review of the Quarterly Fuel and Energy Report (QFER) data for simple cycle peaking plants, such as the Tracy, Hanford, Henrietta, Calpeak Panoche and Wellhead Power Panoche facilities will likely operate less than 5% of the time annually, or approximately 10% or less of the requested 4,000 hour per year maximum capacity.

Emission Controls

The exclusive use of pipeline-quality natural gas, a relatively clean-burning fuel, would limit the formation of VOC, PM10, and SO_2 emissions. Natural gas contains very little noncombustible gas or solid residues and a small amount of reduced sulfur compounds, including mercaptan. Water injection to the CTG combustors in conjunction with selective catalytic reduction (SCR) would be used to control NOx concentrations in the exhaust gas. Post-combustion NOx control would be provided using a selective catalytic reduction (SCR) system. The SCR system would use aqueous ammonia to further reduce NOx emissions to 2.5 parts per million by volume, dry (ppmvd) adjusted to 15% oxygen from the gas turbines/SCR systems. Ammonia slip would be limited to 10 ppmvd at 15% oxygen on a dry basis. An oxidizing catalytic converter would be used to reduce the CO concentration in the exhaust gas emitted to the atmosphere to 6 ppmvd adjusted to 15% oxygen from the CTGs. Particulate emissions would be controlled using natural gas as the sole fuel for the CTG and inlet air filtration (URS 2006a, p. 3-24).

Two 50-foot-tall, 15-foot diameter stacks would release the CTG exhaust gas into the atmosphere. A continuous emission monitoring (CEM) system would be installed on the CTG stack to monitor fuel gas flow rate, NOx and CO concentration levels, and percentage of oxygen in the flue gas to assure adherence with the proposed emission limits. The CEM system would generate reports of emissions data in accordance with

permit requirements and send alarm signals to the plant's control room when the level of emissions approaches or exceeds pre-selected limits.

Project Operating Emissions

Air emissions would be generated from operating the four CTGs. The District revised the emissions estimates for CO, VOC, SO_2 and NH_3 during the processing of the PDOC/FDOC. The normal operating emission rates (100% load) for the CTGs are provided in **Air Quality Table 15.**

AIR QUALITY Table 15
Maximum Normal Pollutant Emission Rates, lb/hr

Pollutant	ppmvd @ 15% O_2	Each CTG	Four CTGs
NOx	2.5	2.80	11.20
CO	6.0	4.19	16.76
VOC	2.0	0.82	3.28
PM10/PM2.5	---	1.85	7.40
SO_2 [a]	---	0.89	3.56
NH_3	10.0	4.24	16.96

From FDOC (SJVAPCD 2007d, p. 8).
[a] SO_2 emissions are based on natural gas sulfur content of 1.0 grains/100 dry standard cubic feet.

Expected event emission rates during startup and shutdown events are summarized in **Air Quality Table 16**.

AIR QUALITY Table 16
Starwood Criteria Pollutant Emission Rates
Maximum Short-Term Event Emissions, lbs/hr

Period	NOx	CO	VOC
Startup	4.17	12.5	0.83
Shutdown	1.50	21.33	0.83

Source: FDOC (SJVAPCD 2007d, p. 8)

Air Quality Table 17 summarizes the maximum (worst-case) estimated levels of the different criteria pollutants for each averaging time from the CTGs for Starwood. Maximum hourly operations are based on four turbines operating at the highest startup/shutdown rate, except for PM10, SO_2, and NH_3 which to determine worst-case emissions use the normal full-load operating load emission rate. Maximum daily operations are based on 1 startup and 1 shutdown for all four CTGs, with the remainder of the day in normal full-load operation. Maximum annual emissions for NOx, VOC and CO include 219 hours in startup/shutdown mode and 3,781 hours operating at full-load. The hypothetical operating scenario includes 43.8 hours split evenly in startup/shutdown mode in quarters one and two, 76.65 hours in startup/shutdown mode in quarter three, and 54.75 startup/shutdown hours in quarter four. Maximum annual emissions for PM10, SO_2, and NH_3 and are based on full-time, full-load operation for 4,000 hours. (SJVAPCD 2007d, p. 3).

AIR QUALITY Table 17
Starwood Worst-Case Hourly, Daily and Annual Emissions

	Pollutant					
Emission Period	**NOx**	**CO**	**VOC**	**SOx**	**PM10/2.5**	**NH_3**
Maximum Hourly Emissions, lb/hr	16.68	85.32	3.32	3.56	7.40	16.96
Maximum Daily Emissions, lb/day	269.2	504.0	78.8	85.6	177.6	407.2
Total Annual Emissions, tons/year	22.42	39.09	6.64	7.12 [a]	14.80	33.92

Source: FDOC (SJVAPCD 2007d)
[a] SO_2 annual emissions for the purposes of determining adequate CEQA mitigation are based on an annual average natural gas sulfur content of 0.32 grains/100 dry standard cubic feet, rather than the 1.0 grains/100 dry standard cubic feet basis shown above, or 2.28 tons/year.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses three kinds of impacts: construction, operation, and cumulative effects. As the name implies, construction impacts result from the emissions occurring during the construction of the project. The operation impacts result from the emissions of the proposed project during operation. Cumulative impacts analysis assesses the impacts that result from the proposed project's incremental effect viewed over time, together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355.) Additionally, cumulative impacts are assessed in terms of conformance with the District's attainment or maintenance plans.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff used two main significance criteria in evaluating this project. First, all project emissions of nonattainment criteria pollutants and their precursors (NOx, VOC, PM10 and SO_2) are considered significant and must be mitigated. Second, any AAQS violation or any contribution to any AAQS violation caused by any project emissions is considered to be significant and must be mitigated. For construction emissions, the mitigation that is considered is limited to controlling both construction equipment tailpipe emissions and fugitive dust emissions to the maximum extent feasible. For operating emissions, the mitigation includes both feasible emission controls (BACT) and the use of emission reduction credits to offset emissions of nonattainment criteria pollutants and their precursors.

The ambient air quality standards that staff uses as a basis for determining project significance are health-based standards established by the ARB and U.S. EPA. They are set at levels to adequately protect the health of all members of the public, including those most sensitive to adverse air quality impacts such as the aged, people with existing illnesses, children, and infants, including a margin of safety.

DIRECT/INDIRECT IMPACTS AND MITIGATION

While the emissions are the actual mass of pollutants emitted from the project, the impacts are the concentration of pollutants from the project that reach the ground level. When emissions are expelled at a high temperature and velocity through the relatively tall stack, the pollutants will be significantly diluted by the time they reach ground level.

The emissions from the proposed project are analyzed through the use of air dispersion models to determine the probable impacts at ground level.

Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions to provide theoretical maximum offsite pollutant concentrations short-term (1-hour, 3-hour, 8-hour, and 24-hour) and annual periods. The model results are generally described as maximum concentrations, often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

The applicant has used EPA-approved screening (SCREEN3) and refined (ISC-PRIME versions 04269 and 04272) models to estimate the direct impacts of the project's NOx, PM10, CO, and SOx emissions resulting from project construction and operation. The applicant submitted the AFC and the District air quality permit application just before the District started requiring the use of AERMOD, EPA's currently preferred model, in place of ISCST3 or ISC-PRIME. In general, ISC-PRIME will provide more conservative results (i.e. predict higher impacts) than AERMOD in elevated terrain, while ISC-PRIME and AERMOD provide very similar results for near-field impacts in flat terrain. In the near-field the site is surrounded by flat terrain with areas of elevated terrain located a few miles to the west. Therefore, the use of ISC-PRIME should provide a reasonably conservative prediction of worst-case near-field impacts and would likely overestimate the impacts in the elevated terrain to the west.

Staff added the applicant's modeled impacts to the available highest ambient background concentrations as shown in **Air Quality Table 10**. Staff then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or would contribute to an existing violation.

In general, the inputs for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions), specific turbine emission data and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For this project, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at Fresno, which is the closest complete meteorological data source to the project site, and is meteorological data approved for use by the SJVAPCD.

Construction Impacts and Mitigation

The following section discusses the project's short-term direct construction ambient air quality impacts, as estimated by the applicant, and provides a discussion of appropriate mitigation. Staff reviewed the construction emissions estimates and air dispersions modeling procedures and considers them to be adequate and generally conservative for this siting case.

Construction Impact Analysis

The applicant modeled the emissions of the Starwood on-site construction using the ISC-PRIME model (version 04272). The fugitive dust emissions were modeled as a

single area source that covered the total active area of the construction site and several smaller area sources for the water line excavation fugitive dust and exhaust emissions. The main building site exhaust emissions were modeled as a single volume source. The methodology used by the applicant is overly simplified and does not take advantage of less conservative models or less conservative input methods. Therefore, the modeling method used by the applicant should overestimate impacts based on the construction emission quantities modeled.

For the determination of one-hour average construction NOx concentrations the applicant used an Ozone Limiting Method Calculation that multiplied the maximum modeled NOx value by the assumed initial NO_2/NOx ratio of 0.1 for diesel equipment and added the conversion of NO to NO_2 based on the background ozone concentration that corresponded to the maximum NOx impact hour.

To determine the construction impacts on short-term ambient standards (i.e. 1-hour through 24 hours) the worst-case daily on-site construction emission levels shown in **Air Quality Table 11** were modeled. For pollutants with annual average ambient standards, the annual on-site emissions levels as shown in **Air Quality Table 12** were used. Modeling assumed that all of the equipment would operate from 7 am to 4 pm daily (URS 2007c, URS 2007e). **Air Quality Table 18** provides the results of this modeling analysis.

As can be seen from the modeling results provided in **Air Quality Table 18**, the construction impacts have the potential to worsen the existing violations of the PM10 and PM2.5 ambient air quality standards and are, therefore, potentially significant. The applicant's construction modeling analysis indicates that the maximum NOx, CO and SO_2 impacts will remain below the CAAQS and NAAQS.

Air Quality Table 18
Starwood Construction Impacts, (µg/m^3)

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [b]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2 [a]	1 hour	223.3	157.9	381	470	CAAQS	81
	annual [c]	5.25	32.1	37.4	100	NAAQS	37
PM10	24 hour	24.4	109.0	133.4	50	CAAQS	267
	annual [c]	3.13	32.9	36.0	20	CAAQS	180
PM2.5	24 hour	8.29	61	69.3	35	NAAQS	198
	annual [c]	0.67	19.7	20.4	12	CAAQS	170
CO	1 hour	830	4,715	5,545	23,000	CAAQS	24
	8 hour	226	3,278	3,504	10,000	CAAQS	35
SO_2	1 hour	2.00	23.6	25.6	655	CAAQS	4
	3 hour	0.90	15.6	16.5	1,300	NAAQS	1
	24 hour	0.12	10.5	10.6	105	CAAQS	10
	annual [c]	0.01	5.3	5.3	80	NAAQS	7

Source (URS 2007c, 2007e)
[a] One-hour NOx value was determined using Ozone Limiting Method calculation. Staff adjusted the annual value by multiplying by the Annual NOx Ratio Method (ARM) EPA default value of 0.75.
[b] Background values have been adjusted per staff recommended background concentrations shown in AIR QUALITY Table 10.
[c] The annual emissions modeled by the applicant were modeled by dividing the annual emissions by 8760 hours per year, but also were modeled for only 9 hours per day, resulting in the modeled emissions being 2.67 times (24/9) too low, so staff has adjusted the annual impact values provided by the applicant by multiplying by this correction factor value.

The maximum construction impacts generally occur at fence line. The maximum residential receptor[1] impacts, determined from the review of the applicants modeling files, are approximately 24 µg/m^3 for 24-hour PM10 and 6 µg/m^3 for 24-hour PM2.5 (URS 2007c). These impacts are based on the original construction assumptions and do not include the additional earthmoving requirements to move the project above the floodplain.

Construction Mitigation

As described in the "Laws, Ordinances, Regulations, and Standards" section, District Regulation VIII (i.e. Series 8000) limits fugitive dust during the construction phase of a project. Staff recommends that construction emission impacts be mitigated to the greatest feasible extent including all feasible measures from the LORS, as well as other measures considered necessary by staff to fully mitigate the construction emissions.

Applicant's Proposed Mitigation

Based on the assumptions provided with their emission calculations (URS 2007b, DR 23) the applicant proposes to control fugitive dust emissions by watering the site at least three times daily, maintaining vehicle speeds on unpaved areas to no more than 10 miles an hour, and using ultra-low sulfur diesel fuel. The fugitive dust control factor assumed by the applicant is 85%. The applicant's construction emissions estimates in

[1] The nearest potential receptors during construction would be the multi-unit apartment property located on property adjacent and north of the project site. The maximum impacts to the next closest residential receptors are approximately 4 µg/m^3 for 24-hour PM10 and 2 µg/m^3 for 24-hour PM2.5 (URS 2007c).

Air Quality Tables 11 to **12** and construction modeling results in **Air Quality Table 18** assume the use of these emission control measures.

Adequacy of Proposed Mitigation

The applicant's revised PM10 emission estimate assumes a very aggressive control efficiency factor for fugitive dust (85%) from unpaved roads, which staff believes to be potentially overly optimistic. However, even if the emission and modeling analyses performed by the applicant were assumed to be reasonably accurate, the modeling analysis shows that the mitigated construction PM10 impacts are predicted to be potentially significant beyond the project fence line. Therefore, staff believes that all reasonable feasible construction emission mitigation measures are needed to mitigate the potentially significant construction PM10 impacts. Additionally, staff believes the unmitigated fugitive dust impacts (PM10 and PM2.5) to residents of the multi-unit apartment property located on property adjacent and north of the project site to be significant; therefore, staff recommends additional mitigation to minimize the fugitive dust exposure to these residents.

Staff Proposed Mitigation

Staff recommends construction PM10 and NOx emission mitigation measures that include the three mitigation measures proposed by the applicant, and several additional construction PM10 emission mitigation measures and construction equipment mitigation measures to assure maximum feasible fugitive dust control performance and construction equipment exhaust emissions control, as well as, compliance assurance measures in Conditions of Certification **AQ-SC1** through **AQ-SC5**.

Staff recommends **AQ-SC1** to require the applicant to have an on-site construction mitigation manager who will be responsible for the implementation and compliance of the construction mitigation program. The documentation of the ongoing implementation and compliance with the construction mitigation program would be provided in the monthly construction compliance report that is required in staff's recommended Condition of Certification **AQ-SC2**.

Staff incorporated and augmented the applicant's proposed fugitive dust mitigation and recommends that the fugitive dust mitigation measures be formalized in Condition of Certification **AQ-SC3**. **AQ-SC3** includes the following fugitive dust control measures:

- All unpaved roads and disturbed areas in the project and linear construction sites shall be watered as frequently as necessary to comply with the dust mitigation objectives of AQ-SC4. The frequency of watering may be reduced or eliminated during periods of precipitation.
- No vehicle shall exceed 10 miles per hour within the construction site.
- The construction site entrances shall be posted with visible speed limit signs.
- All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.
- Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

- All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.
- All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM.
- Construction areas adjacent to any paved roadway shall be provided with sandbags or other measures as specified in the Storm Water Pollution Prevention Plan (SWPPP) to prevent run-off to roadways.
- All paved roads within the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.
- At least the first 500 feet of any public roadway exiting from the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff from the construction site is visible on the public roadways.
- All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.
- All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least two feet of freeboard.
- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.
- The main access route(s) through the site will be graveled and/or paved prior to the completion of the initial grading/site preparation phase of construction if residents will be re-occupying the multi-unit apartment property as allowed under Condition of Certification **AQ-SC6**.

Staff recommends Condition of Certification **AQ-SC4** to limit the potential offsite impacts from visible dust emissions from the construction activities.

The project's construction NOx emissions have been estimated to exceed the SJVAPCD CEQA significance threshold of 10 tons per year (SJVAPCD 2007a). Staff recommends Condition of Certification **AQ-SC5** to mitigate the NOx and PM emissions from the large diesel-fueled construction equipment. Implementation of this mitigation measure will meet the general intent of the engine NOx emission reduction measure recommendations in the SJVAPCD CEQA guideline document (SJVAPCD 2002), as well as providing additional PM mitigation to supplement the recommended fugitive dust mitigation measures. This condition requires the use of EPA/CARB Tier 2 engine compliant equipment for equipment over 100 horsepower where available and includes equipment idle time restrictions. The Tier 2 standards include engine emission standards for NOx plus non-methane hydrocarbons, CO, and PM emissions. The Tier 2

standards became effective for engine/equipment model years 2001 to 2003 for engines between 100 and 750 horsepower.

Staff recommends Condition of Certification **AQ-SC6** to relocate the residents that are located adjacent to the site along Panoche Road from the site area during the initial grading/site preparation construction phase to mitigate potentially significant fugitive dust PM10 and PM2.5 impacts to those residents. Additionally, this mitigation measure requires the applicant to relocate residents, at the resident's request, during the rest of the construction period. The residents will be relocated after the main construction activities and prior to operation as necessary to comply with other Conditions of Certification.

Due to the worst-case PM10 impacts identified for project construction, the very fine soils (URS 2006a, Appendix L) at the site that will exacerbate dust formation, and the existing serious PM10 nonattainment status in the project site area, staff has recommended requiring all feasible construction emission mitigation measures. Based on the relatively short-term nature of the worst-case construction impacts, and staff's recommendation of requiring all feasible construction emission mitigation measures, staff believes that the construction air quality impacts will be less than significant with the implementation of the mitigation measures contained in the recommended Conditions of Certification.

Operation Impacts and Mitigation

The following section discusses the project's direct ambient air quality impacts, as estimated by the applicant, and evaluated by staff. Additionally, this section discusses the recommended mitigation measures.

The applicant performed direct impact modeling analyses, including operations, fumigation, and initial commissioning impact modeling.

Operational Modeling Analysis

A refined modeling analysis was performed to identify off-site criteria pollutant impacts from operational emissions of the proposed project. Turbine emission rates were first calculated from equipment vendor estimates for six operating conditions:

- One load case, 100% load for both CTGs in each Swiftpac generating unit.
- Three different ambient conditions, winter minimum, yearly average, and summer maximum.
- Two different catalyst operating scenarios, high and low catalyst temperature.

These conditions were then modeled to determine the worst case short term conditions and the assumptions to be used for the stack parameters to be used in the modeling analysis.

The ISC-PRIME model (Versions 04269 and 04272) was used for the modeling analysis. The applicant's predicted maximum concentrations of the non-reactive pollutants for the Starwood project are summarized in **Air Quality Table 19.**

Air Quality Table 19
Starwood Operating Impacts, (µg/m^3)

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [a]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2	1 hour	7.83	157.9	165.7	470	CAAQS	35
	annual	0.03	32.1	32.1	100	NAAQS	32
PM10	24 hour	0.68	109	109.7	50	CAAQS	219
	annual	0.02	35	35.0	20	CAAQS	175
PM2.5	24 hour	0.68	69	69.7	35	NAAQS	199
	annual	0.02	19.7	19.7	12	CAAQS	164
CO	1 hour	171.6 [b]	4,715	4,887	23,000	CAAQS	21
	8 hour	47.4 [b]	3,278	3,325	10,000	CAAQS	33
SO_2 [c]	1 hour	2.42	23.6	26.0	655	CAAQS	4
	3 hour	1.18	21.2	22.4	1,300	NAAQS	2
	24 hour	0.32	10.5	10.8	105	CAAQS	10
	annual	0.003	5.3	5.3	80	NAAQS	7

Source: (URS 2006a, URS 2007c).
[a] Background values have been adjusted per staff recommended background concentrations shown in **Air Quality Table 10**.
[b] The applicant did not model normal short-term operating emissions for CO, these results are the worst-case initial commissioning results.
[c] The SO_2 short-term (1, 3, 24 hour) modeling results provided by the applicant were based on the gas turbine fuel having a natural gas fuel sulfur content of 0.5 grains per 100 SCF, which is lower than the value of 1.0 grains per 100 SCF used by SJVAPCD in the FDOC, so they were adjusted by multiplying by a factor of 2; while the annual results are based on an average fuel sulfur content of 0.32 grains per 100 SCF.

The modeling analysis provided by the applicant for CO impacts was limited to modeling the maximum emissions from commissioning activities. Therefore the modeled concentrations only represent the absolute worst-case during initial commissioning activities and the normal operating impacts, including during startup/shutdown, for these two pollutants will be significantly lower that shown in **Air Quality Table 19.**

The applicant's modeling results indicate that the project's normal operational impacts would not create violations of NO_2, SO_2 or CO standards, but could further exacerbate violations of the PM10 and PM2.5 standards. In light of the existing PM10 and PM2.5 non-attainment status for the project site area, staff considers the modeled impacts to be significant and, therefore, require mitigation.

Fumigation Modeling Impact Analysis

There is the potential that higher short-term concentrations may occur during fumigation conditions. During the early morning hours before sunrise, the air is usually very stable. During such stable meteorological conditions, emissions from elevated stacks rise through this stable layer and are dispersed. When the sun first rises, the air at ground level is heated, resulting in a vertical (both rising and sinking air) mixing of air for a few hundred feet or so. Emissions from a stack that enter this vertically mixed layer of air will also be vertically mixed, bringing some of those emissions down to the ground level. Later in the day, as the sun continues to heat the ground, this vertical mixing layer becomes higher and higher, and the emissions plume becomes better dispersed. The early morning pollution event, called fumigation, usually lasts approximately 30 to 90 minutes.

Fumigation conditions are generally only compared to one-hour standards. The applicant analyzed the maximum one-hour and three-hour air quality impacts under fumigation conditions from the CTGs using the SCREEN3 model (URS 2006a, p. 5.2-33). The results of the analysis, as shown in **Air Quality Table 20**, indicate that the maximum one-hour fumigation impacts would be lower than the maximum operating emission impacts.

Air Quality Table 20
Maximum Starwood Fumigation Impacts, (µg/m^3)

Pollutant	Averaging Period	Project Impact (µg/m^3)	Background (µg/m^3) [a]	Total Impact (µg/m^3)	Limiting Standard (µg/m^3)	Type of Standard	Percent of Standard
NO_2	1 hour	7.78	157.9	165.7	470	CAAQS	35
CO	1 hour	3.72	4,715	4,719	23,000	CAAQS	21
SO_2	1 hour	0.08	23.6	23.7	655	CAAQS	4

Source: (URS 2006a, Table 5.2-19).
[a] Background values have been adjusted per staff recommended background concentrations shown in **Air Quality Table 10**.

Maximum fumigation impacts for the turbines, modeled with maximum initial commissioning emissions, were predicted to occur about 14.3 kilometers from the facility (URS 2006a, Table 5.2-19, p. 5.2-33). The impacts under fumigation conditions were found to be below the maximum concentrations calculated by ISC-PRIME for normal operations and maximum initial commissioning operations (see **Air Quality Tables 19 and 21**). This is due to the very high stack temperatures which reduce the potential for fumigation.

Startup/Commissioning Short-Term Modeling Impact Analysis

The applicant did not model the worst-case startup NOx and CO emissions, rather the applicant modeled the commissioning emissions, which are higher than the startup emissions to determine worst-case short-term operating impacts for the project. The SO_2 and PM10 emissions and ambient air quality impacts are not forecast to be higher during initial commissioning or startup/shutdown events than they are under normal operation.

The applicant presented several initial commissioning activities that would occur prior to meeting normal emission limits. The worst case conditions for the short-term NOx and CO impacts, as provided in the discussion prior to **Air Quality Tables 13 and 14**, were determined and modeled (URS 2007b, DR 10). The initial commissioning activities are limited to one Swiftpac, or two CTGs, at a time.

The ISC-PRIME model (version 04272) was used for the applicant's modeling analysis. The results of the commissioning emissions modeling analysis are shown in **Air Quality Table 21.** As shown in the table below the, the worst-case emissions would not cause an exceedance of the one-hour NO_2 standard or the one-hour and eight-hour CO standards. Therefore, the modeling results indicate that the commissioning emissions, and by comparison the startup emission impacts, do not have the potential to cause significant short-term ambient air quality impacts.

Air Quality Table 21
Maximum Starwood Initial Commissioning Impacts

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$) [a]	Total Impact ($\mu g/m^3$)	Limiting Standard ($\mu g/m^3$)	Type of Standard	Percent of Standard
NO_2	1 hour	155.0	157.9	312.9	470	CAAQS	67
CO	1 hour	171.6	4,715	4,887	23,000	CAAQS	21
CO	8 hour	47.4	3,278	3,325	10,000	CAAQS	33

Source: (URS 2007b, DR10).
[a] Background values have been adjusted per staff recommended background concentrations shown in **Air Quality Table 10**.

Operations Mitigation

Applicant's Proposed Mitigation

Emission Controls

As discussed in the project description section, the applicant proposes to employ water injection, SCR with ammonia injection, CO catalyst, and operate exclusively on pipeline quality natural gas to limit turbine emission levels (URS 2006a, p. 3-24). The AFC (URS 2006a, Table 5.2-25, p. 5.2-46) and FDOC (SJVAPCD 2007d) provide the following BACT emission limits, each for the four CTGs:

- NOx: 2.5 ppmvd at 15% O_2 (one-hour average, excluding startup/shutdown) and 2.8 lb/hr
- CO: 6.0 ppmvd at 15% O_2 (three-hour rolling average, excluding startup/shutdown) and 4.19 lb/hr
- VOC: 2.0 ppmvd at 15% O_2 (three-hour rolling average, excluding startup/shutdown) and 0.82 lb/hr
- PM10: 1.85 lb/hr (three-hour rolling average)
- SO_2: 0.89 lb/hr with fuel sulfur content of 1.0 grains/100 scf (three-hour rolling average)
- NH_3: 10 ppmvd at 15% O_2 (24-hour rolling average) and 4.24 lb/hr

Emission Offsets

District Rule 2201 requires that the applicant provide emission offsets, in the form of banked ERCs, for the project's emissions exceeding the SJVAPCD offset thresholds. Starwood would require offsets for NOx and PM10 based on District Rule 2201. **Air Quality Table 22** shows the District's summary of the emission liabilities that need to be offset under Rule 2201 requirements.

AIR QUALITY Table 22
Starwood District Offset Calculations (lb/year)

Offset Need Determination	NOx	VOC	PM10	SO_2	CO
Starwood Emissions	44,836	13,280	29,600	14,240	78,184
Calpeak Panoche Emissions	20,000	3,995	10,112	4,432	33,555
Total Emissions [a]	64,836	17,725	39,712	18,672	111,739
Offset Threshold	20,000	20,000	29,200	54,750	200,000
Emissions Above Threshold	44,836	---	10,512	---	---
Offsets Triggered?	**Yes**	**No**	**Yes**	**No**	**No**
Offset Amount Calculations					
Required Offset Ratio [b]	1.5	---	1.5 [c]	---	---
Starwood Offsets Required [d]	67,254	---	15,768	---	---

Source: FDOC (SJVAPCD 2007d).
[a] Total emissions are the sum of the Starwood and Calpeak Panoche facilities. The Starwood facility is considered a modification of the Calpeak Panoche facility as both are owned by the applicant and located on contiguous properties (SJVAPCD 2006).
[b] Based on assumption that all ERCs are obtained from sources more than 15 miles away.
[c] Distance based offset ratio only. Interpollutant offset ratio for PM10 is discussed separately below.
[d] Calculated as 1.5 times the Starwood emissions above the offset threshold, where triggered.

All air pollutant offsets provided for the project, by District rule, are estimated on a quarterly basis. The applicant is proposing several sources of offsets to mitigate the project's potential emissions. Calculations of the required ERCs are based on the distance of the project from different sources of offsets. The District requires a 1.2:1 (1.3:1 for major sources) offsetting ratio for off-site ERCs within 15 miles. For areas outside of the 15 miles, ERCs must be provided at a ratio of 1.5:1. The applicant's ERCs are obtained from sources more than 15 miles away; therefore, a distance ratio of 1.5:1 is used for District offset purposes (SJVAPCD 2007d). The District determines appropriate interpollutant offset ratios on a case-by-case basis.

Energy Commission staff have long held that emission reductions need to be provided for all nonattainment pollutants and their precursors at a minimum 1:1 ratio of annual operating emissions. For this project the District's offset requirements would meet or exceed that minimum offsetting goal for NOx, but would not meet that goal for PM10 due to the offset threshold, nor for VOC and SO_2, where no offsets are required under District rules. The applicant has proposed to provide PM10, VOC, and SO_2 emission reduction credits to offset the permitted annual emissions for each at a 1:1 ratio.

As shown in **Air Quality Table 23** through **Air Quality Table 26**, the applicant has demonstrated, per District requirements and Energy Commission policy, that it owns ERCs in quantities sufficient to offset the project's NOx, PM10, and SO_2 emissions. PM2.5 emissions are not currently offset separately from PM10 emissions, a discussion of the offset mitigation in terms of PM2.5 mitigation is discussed separately in the Chemically Reactive Pollutants Impact section. The applicant will need to secure a small amount of VOC emission offsets to fully mitigate the project as discussed below.

NOx Emission Offsets

Air Quality Table 23 provides a summary of the total project NOx emissions and identifies the project offset sources. ERC S-2382-2 is from an emission reduction source that was generated from the retrofit of stationary reciprocating engines with pre-combustion chambers.

AIR QUALITY Table 23
NOx Offsets Available for Starwood

Offset Source Location	Credit Number	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
Elk Hills ERC	S-2382-2	13,676	18,234	18,234	18,234
Total Starwood Offsets required @ 1.5:1	---	13,452	13,452	23,538	16,812
Surplus/Deficit	---	224	4,782	-5,304	1,422
Quarterly Transfer from Q2 and Q4 to Q3		0	-4,782	5,304	-522
Final Surplus		224	0	0	900

Sources: FDOC (SJVAPCD 2007d) and staff interpretation.

The applicant appears to be in compliance with the District's NOx offset requirements and is providing ERCs at a total offset ratio of greater than 1:1 for the Starwood project. Staff has determined that this offset proposal satisfies CEQA mitigation requirements.

VOC Emission Offsets

Air Quality Table 24 provides a summary of the total project VOC emissions and identifies the project offset sources. ERCs S-2422-1 and S-2493-1 were generated from the modification of a coker to incinerate its exhaust in a CO boiler.

AIR QUALITY Table 24
VOC Offsets Available for Starwood

Offset Source Location	Credit Number	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
Rosedale Highway; STR 28/29S/27E	S-2422-1	2,263	3,046	3,046	3,045
Rosedale Highway; STR 28/29S/27E	S-2493-1	0	500	500	500
Total ERC Holdings	---	2,263	3,546	3,546	3,545
Total Starwood Mitigation required @ 1:1	---	2,656	2,656	4,648	3,320
Surplus/Deficit	---	-393	890	-1,102	225
Quarterly Transfer from Q2 and Q4 to Q3 and Q4 to Q1 [a]		75	-890	1,040	-225
Final Deficit		-318	0	-72	0

Sources: (URS 2007g), (SJVAPCD 2007c), and staff interpretation.

The applicant is not required to provide offsets under the District's rules and regulations, but has committed to providing ERCs at an offset ratio of 1:1 for the Starwood project. Currently, due to an increase in the emission estimate by SJVAPCD, to change the BACT emission level basis from 1.7 to 2.0 ppm the applicant's offset proposal is 390 pounds short. The applicant has agreed to obtain the additional 390 pounds of VOC ERCs prior to initiating project construction, and during the PSA workshop stated that they are willing to accept that requirement in a Condition of Certification.

PM10 Emission Offsets

The applicant has proposed the use of SOx for PM10 interpollutant offsets to complete the PM10 offset package. **Air Quality Table 25** provides a summary of the total project PM10 emissions and identifies the project offset sources.

AIR QUALITY Table 25
PM10 Offsets Available for Starwood

Offset Source Location	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
DISTRICT REQUIREMENTS				
Total Surplus SOx ERC Holdings [a]	20,589	17,389	25,505	20,361
District Total Starwood ERCs required @ 2.8:1 [b]	5,886	5,888	10,301	7,359
Surplus/Deficit based on District Requirements	14,703	11,501	15,204	13,002
CEQA FULLY OFFSET REQUIREMENTS				
Total Surplus SOx ERC Holdings [a]	20,589	17,389	25,505	20,361
Fully Mitigated @ 1.867:1 [c]	11,053	11,053	19,342	13,816
Surplus [d]	9,536	6,336	6,163	6,545

Source: FDOC (SJVAPCD 2007d) and staff interpretation.
[a] Surplus SOx ERC certificates from **Air Quality Table 26**.
[b] The District approved SOx: PM10 ratio for Starwood of 2.8:1, which includes the interpollutant ratio of 1.867:1 and the distance ratio of 1.5:1. This also includes the use of the District offset threshold of 29,200 lbs/year.
[c] The CEQA based requirement to be fully offset does not include the District offset threshold of 29,200 lbs/year and also does not include the District's offset distance ratio.
[d] The applicant has committed to provide SOx ERCs as recommended by Staff for CEQA mitigation to fully offset the project, which unlike District requirements does not include a distance ratio. The applicant's calculations (URS 2007g) inadvertently kept the distance ratio which causes the significant ERC surplus shown in this table.

The applicant has proposed the use of SOx for PM10 interpollutant offsets. SOx is accepted as one of the major precursors of PM10 and PM2.5 through reaction with ammonia to form ammonium sulfates. Reductions in SO_2, particularly in areas that are ammonia rich such as the SJVAB, will reduce secondary particulate formation. Therefore, interpollutant offsets of SOx for PM10 can be used to reach the goal of mitigating a project's impacts to regional ambient particulate concentrations. The key issue is the determination of an appropriate interpollutant offset ratio, which depends on the existing levels of PM precursors and the general air chemistry of the area in question. The 1.8:1 SOx for PM10 interpollutant ratio originally proposed by the applicant (URS 2007b, DR 15) was reviewed and revised by the District to 1.867:1 (SJVAPCD 2007d). The District approves interpollutant offsets on a case by case basis and has provided their analysis of the approved SOx for PM10 offset ratio in Attachment H of the FDOC (SJVAPCD 2007d). The use of SOx for PM10 interpollutant offsets is allowed by District Rule 2201 Section 4.13.3 and SOx for PM10 interpollutant offsets has been used on other projects, including power plant projects in the past.

The Applicant appears to be in compliance with the District's PM10 offset requirements and is providing PM10 precursor ERCs at a total offset ratio of greater than 1:1 as PM10 for the Starwood project. Staff has determined that this offset proposal satisfies CEQA mitigation requirements.

SO_2 Emission Offsets

Air Quality Table 26 provides a summary of the total project SO_2 emissions and identifies the project offset sources. ERC S-2492-5 was generated by discontinuing residual fuel (high sulfur oil) use in a process heater. ERC N-623-5 was generated through a boiler fuel limitation.

AIR QUALITY Table 26
SO_2 Offsets Available for Starwood

Offset Source Location	Credit Number	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
7714 Panama Lane, Bakersfield	S-2492-5	21,500	18,300	25,500	21,500
1785 N. Ashby Road, Merced	N-623-5 [b]	0	0	1,600	0
Total ERC Holdings	---	21,500	18,300	27,100	21,500
Total Starwood Mitigation required [a] @ 1:1	---	911	911	1,595	1,139
Surplus	---	20,589	17,389	25,505	20,361

Sources: (URS 2007g), (SJVAPCD 2007c).
[a] The quarterly amounts are based on an average fuel sulfur content of 0.32 grains/100 scf of natural gas.
[b] It is staff understanding that 3,200 lbs from the second quarter of the former certificate number S-2403-5 were trading to obtain the 1,600 lbs in the third quarter from former certificate number N-598-5.

The applicant is not required by the District to provide SO_2 offsets, but is proposing to offset annual SO_2 emissions at a total offset ratio of 1:1 for the Starwood project in order to meet CEC staff recommended mitigation measures. The applicant has adjusted the emission estimate of SO_2 for this purpose, per staff's suggestion, to reflect the long-term average fuel sulfur content rather than using the worst-case short-term maximum fuel sulfur content. Staff's evaluation of long term natural gas sulfur content data from PG&E, given the project location and likely sources of natural gas, suggests that the applicant's use of 0.32 grains per 100 scf is reasonably conservative for the purposes of determining annual emissions. Additionally, there is an additional real-world safety margin in the emission estimate as it is unlikely that this peaking power plant will operate near its permitted maximum fuel throughput. Therefore, staff has determined that this offset proposal satisfies CEQA mitigation requirements.

Adequacy of Proposed Mitigation

Staff concurs with the District's determination that the project's proposed emission controls/emission levels for criteria pollutants meets BACT requirements and that the proposed emission levels are reduced to the lowest technically feasible levels. Staff has determined that the proposed emission controls and emission levels, along with the proposed emission offset package, mitigate all project air quality impacts to less than significant.

Staff has made a determination that the applicant's offset proposal meets both District requirements and CEQA mitigation requirements. However, the applicant's VOC ERCs are slightly short of that required to meet their proposal due to an increase in the VOC emission estimate. The applicant will need to obtain the small amount of additional VOC ERCs required to fully offset the project's VOC emissions.

Staff's acceptance of this offset package was determined solely based on the merits of this case, including the District offset requirements, the project's emission limits, the

specific ERCs proposed, and ambient air quality considerations of the region, and does not in any way provide a precedence or obligation for the acceptance of offset proposals for any other current or future licensing cases.

For combined-cycle projects, staff believes an ammonia slip level of 5 ppm should be required. However, for simple cycle projects, such as Starwood, staff agrees that a 10 ppm ammonia slip level is adequate. Thus, staff agrees with the San Joaquin Valley Air Pollution Control District's FDOC permitted ammonia slip level of 10 ppm.

Staff has considered the minority population surrounding the site (see Socioeconomics Figure 1). Since the project's direct air quality impacts have been reduced to less than significant, there is no environmental justice issue for air quality.

Staff Proposed Mitigation

Staff is proposing conditions of certification (**AQ-SC7** and **AQ-SC10**) that would ensure ongoing compliance through the requirement of quarterly reports and ensure that the license is amended as necessary to incorporate changes to the air quality permits. Staff is proposing condition of certification **AQ-SC8** to formalize the applicant's PM10, VOC and SOx offset proposal, including requiring the applicant to obtain an additional 390 pounds of VOC ERCs prior to initiated construction.

CUMULATIVE IMPACTS

"Cumulative impacts" are defined as "two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts." (CEQA Guidelines, § 15355.) A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts." (CEQA Guidelines, § 15130(a)(1).) Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

This analysis is primarily concerned with "criteria" air pollutants. Such pollutants have impacts that are usually (though not always) cumulative by nature. Rarely will a project cause a violation of a federal or state criteria pollutant standard. However, a new source of pollution may contribute to violations of criteria pollutant standards because of the existing background sources or foreseeable future projects. Air districts attempt to attain the criteria pollutant standards by adopting attainment plans, which comprise a multi-faceted programmatic approach to such attainment. Depending on the air district, these plans typically include requirements for air offsets and the use of Best Available Control Technology for new sources of emissions, and restrictions of emissions from existing sources of air pollution.

Much of the preceding discussion is concerned with cumulative impacts. The "Existing Ambient Air Quality" section describes the air quality background in the San Joaquin Valley Air Basin, including a discussion of historic ambient levels for each of the significant criteria pollutants. The "Construction Impacts and Mitigation" section discusses the project's contribution to the local existing background caused by project construction. The "Operation Impacts and Mitigation" section discusses the project's

contribution to the local existing background caused by project operation. The following section includes four additional analyses:

- a summary of projections for criteria pollutants by the air district and the air district's programmatic efforts to abate such pollution;
- an analysis of the project's "localized cumulative impacts", the project's direct operating emissions combined with other local major emission sources;
- a discussion of chemically reactive pollution impacts, ozone and PM2.5; and
- a discussion of greenhouse gas reporting.

Summary of Projections

The SJVAPCD is the lead agency for managing air quality and coordinating planning efforts for the portion of Fresno County within the SJVAB, so that the ozone and PM10 standards are attained in a timely fashion and attainment with CO standards are maintained. The District is responsible for developing those portions of the State Implementation Plan (SIP) and the Air Quality Management Plan (AQMP), that deal with certain stationary and area source controls and, in cooperation with the transportation planning agencies (TPAs), the development of transportation control measures (TCMs). In this role the SJVAPCD is the agency with principal responsibility for analyzing and addressing cumulative air quality impacts, including the impacts of ambient ozone, particulate matter, and CO. The District has summarized the cumulative impacts of ozone, particulate matter, and CO on the air basin from the broad variety of its sources. Analyses of these cumulative impacts, as well as the measures the District proposes to reduce impacts to air quality and public health, are summarized in four publicly available documents that the District has adopted or will soon adopt. These adopted air quality plans are summarized below.

- **Draft 2007 Ozone Plan** (8-hour ozone plan)
  Link: http://www.valleyair.org/Air_Quality_Plans/AQ_Final_Draft_Ozone2007.htm
- **Extreme Ozone Attainment Demonstration Plan** (revision adopted 10/20/05)
  Link: http://www.valleyair.org/Air_Quality_Plans/AQ_plans_Ozone_Final.htm
- **2003 PM10 Plan and 2006 PM10 Plan** (adopted 2/16/06)
  Link: http://www.valleyair.org/Air_Quality_Plans/AQ_plans_PM_2003PlanTOC.htm
  Link: http://www.valleyair.org/Air_Quality_Plans/06PM10.htm
- **2004 Revisions to the Carbon Monoxide Maintenance Plan** (adopted 7/22/2004)
  Link: http://www.arb.ca.gov/planning/sip/co/co.htm

The District has not yet completed a draft of the PM2.5 attainment plan that is required to be submitted to the U.S. EPA by April 2008. The Extreme Ozone Attainment Demonstration Plan has not and will not be approved by U.S. EPA, as it is based on the federal 1-hour ozone standard that was revoked in 2005. The Draft 2007 Ozone Plan, when finalized, will become the ozone attainment plan for the District. The last federally approved ozone plan for this District is no longer valid, as its timeline has expired, so staff is only summarizing the current draft plans. The 2006 PM10 Plan is currently awaiting approval at ARB for forwarding to the U.S. EPA for their approval. The 2003

PM10 plan was approved by U.S. EPA in 2004, then that plan was amended in 2005, prior to completion of the 2006 PM10 Plan.

Extreme Ozone Attainment Demonstration Plan and Draft 2007 Ozone Plan

The 2007 Ozone Plan, like the 1-hour Extreme Ozone Plan is requesting that the SJVAB be reclassified as an extreme nonattainment area. This is being requested as the District believes it needs more time to meet the 8-hour standard, time that is allowed for areas designated as extreme, and that no other measures would allow them to meet an earlier attainment date. The extreme designation will change permitting requirements and definitions, including lowering the threshold for a major source and increasing the minimum offset ratio to 1.5 to 1 assuming that the District cannot prove all major sources have implemented BACT. Other requirements include the expeditious implementation of Reasonably Available Control Technology (RACT). The plan includes a number of control measures to implement the reductions needed for attainment, that include stationary source control measures, as well as incentive measures, innovative measures, and the implementation of other transportation and engine standard measures from the State and Federal governments. This plan targets NOx and VOC emission reductions from a multitude of stationary source types, such as wineries, feedlots, small combustion sources, gas turbines, IC engines, and various solvent/coating sources. However, the plan would not impact the Starwood gas turbines that already need to meet BACT.

While there is no U.S. EPA approved ozone attainment plan for the project to conflict or comply with, the project will be required to comply with all District rules and regulations. The SJVAPCD rules and regulations specify the emissions control and offset requirements for new sources such as Starwood. Starwood will use BACT to control the project's emissions. In addition, the operational emissions of NOx and VOC are proposed by the applicant to be mitigated by the use of emissions offset credits (ERCs) obtained by the applicant. Since the project will comply with all existing emission control regulations and will fully offset all nonattainment pollutant and precursor emissions, staff believes that the project will not conflict with the District's 2007 Ozone Plan once approved.

2003 PM10 Plan and 2006 PM10 Plan

The District prepared a PM10 Attainment Plan in 2003 which provided for attainment of the PM10 standards by 2010. This plan was approved by the U.S. EPA in 2004. Measures outlined in the proposed 2003 PM10 Plan to reduce emissions during construction include amendments to Regulation VIII that have been implemented. No other specific measures contained in the plan would appear applicable to the project emission sources. The applicant would be expected to comply with any additional applicable revisions to the Regulation VIII rules that would be implemented prior to the end of the project construction. SJVAPCD rules and regulations specify the emissions control and offset requirements for new sources, such as Starwood. BACT will be implemented, and ERCs to offset PM10 emissions, which would be obtained by the applicant and approved and certified by the SJVAPCD, comply with District rules, so that the project would be consistent with the strategies and future emissions anticipated under the 2003 PM10 Plan.

The District prepared another PM10 plan in 2006. This plan updates the modeling methods and projections used in the 2003 PM10 Plan. The 2006 PM10 Plan was designed to meet all of the following requirements for areas classified as serious nonattainment under the CAA:

- Demonstrate attainment at the earliest practicable date,
- Implement Best Available Control Measures/Technology (BACM/BACT) for all significant sources of PM10 or PM10 precursors,
- Provide annual reductions of at least 5% of PM10 or PM10 precursor emissions based on the most recent inventory until attainment (applies only to areas designated "serious" that have failed to achieve attainment by CAA deadlines),
- Provide quantitative milestones for reasonable further progress,
- Evaluate whether most recent milestone was met, and
- Adopt contingency measures to assure that emission reductions are in place that can be implemented if a milestone is not achieved on schedule.

The 2006 plan relies on a number of federal, state and local (District) control measures to reduce the emission of PM10 and NOx, which has been identified as the most significant PM10 precursor in the SJVAB. Similar to the 2003 Plan the mitigation measures outlined in the 2006 plan do not appear to directly impact the project. Most of the mitigation measures involve mobile source emission reductions and continued implementation of existing rules and regulations. The project will comply with these plans by meeting its permit requirements and following appropriate existing rules and regulations.

Carbon Monoxide Maintenance Plan

The Carbon Monoxide Maintenance Plan applies to ten separate urbanized areas including the Fresno urbanized area. The project site itself is approximately 40 miles west of the Fresno urbanized area; therefore, the plan does not strictly apply to the project area. The project's construction and operation were not found to cause any new exceedances of the CO AAQS. The project's generated traffic would be insignificant in comparison with the existing Fresno county traffic and the project's primary emission sources normally emit CO concentrations out of the stack that are below the ambient air quality standards. Therefore, the project would not impact the Carbon Monoxide Maintenance Plan.

Localized Cumulative Impacts

Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling (see Operational Modeling Analysis section) the project contributions to localized cumulative impacts can be estimated. To represent "past" and, to an extent, "present projects" that contribute to ambient air quality conditions, the Commission staff recommends the use of ambient air quality monitoring data (see Environmental Setting section), referred to as the "background". The staff undertakes the following steps to estimate what are additional appropriate "present projects" that are not represented in the background and "reasonably foreseeable projects":

- First, the Commission staff (or the applicant) works with the air district to identify all projects that have submitted, within the last year of monitoring data, new applications for an authority to construct (ATC) or permit to operate (PTO) and applications to modify an existing PTO within six miles of the project site. Based on staff's modeling experience, beyond six miles there is no statistically significant concentration overlap for non-reactive pollutant concentrations between two stationary emission sources.
- Second, the Commission staff (or the applicant) works with the air district and local counties to identify any new area sources within six miles of the project site. As opposed to point sources, area sources include sources like agricultural fields, residential developments or other such sources that do not have a distinct point of emission. New area sources are typically identified through draft or final Environmental Impact Reports (EIR) that are prepared for those sources. The initiation of the EIR process is a reasonable basis on which to determine what is "reasonably foreseeable" for new area sources.
- The data submitted, or generated from the applications with the air district for point sources or initiating the EIR process for area sources provides enough information to include these new emission sources in air dispersion modeling. Thus, the next step is to review the available EIR(s) and permit application(s), determine what sources must be modeled and how they must be modeled.
- Sources that are not new, but may not be represented in ambient air quality monitoring are also identified and included in the analysis. These sources include existing sources that are co-located with or adjacent to the proposed source (such as an existing power plant). In most cases, the ambient air quality measurements are not recorded close to the proposed project, thus a local major source might not be well represented by the background air monitoring. When these sources are included, it is typically a result of there being an existing source on the project site and the ambient air quality monitoring station being more than 2 miles away.
- The modeling results must be carefully interpreted so that they are not skewed towards a single source, in high impact areas near that source's fence line. It is not truly a cumulative impact of the Starwood project if the high impact area is the result of high fence line concentrations from another stationary source and Starwood is not providing a substantial contribution to the determined high impact area.

Once the modeling results are interpreted, they are added to the background ambient air quality monitoring data and thus the modeling portion of the cumulative assessment is complete. Due to the use of air dispersion modeling programs in staff's cumulative impacts analysis, the applicant must submit a modeling protocol, based on information requirements for an application, prior to beginning the investigation of the sources to be modeled in the cumulative analysis. The modeling protocol is typically reviewed, commented on, and eventually approved in the Data Adequacy phase of the licensing procedure. Staff typically assists the applicant in finding sources (as described above), characterizing those sources and interpreting the results of the modeling. However, the actual modeling runs are usually left to the applicant to complete. There are several reasons for this; modeling analyses take time to perform and require significant expertise, the applicant has already performed a modeling analysis of the project alone (see Operational Modeling Analysis section), and the applicant can act on its own to

modify the project as the results warrant. Once the cumulative project emission impacts are determined, the necessity to mitigate the project emissions can be evaluated, and the mitigation itself can be proposed by staff and//or applicant (see Mitigation section).

The cumulative assessment for Starwood includes the three other sources shown in **Air Quality Table 27**. The original list of possible new sources from the SJVAPCD included 12 sources (URS 2007b, DR 26). No significant area sources were identified within six miles of the project site. Of the 12 stationary sources identified by SJVAPCD:

- 2 are included in the cumulative modeling analysis (Cal Peak Power Panoche and Wellhead Power Panoche),
- 4 were VOC sources (i.e. gasoline stations) and are not appropriate for modeling,
- 6 were for modifications to existing sources that resulted in either emission reductions, or insignificant increases in criteria pollutants,

The Panoche Energy Center (PEC) project that is being licensed concurrent with the Starwood project was not included in the SJVAPCD list but was included in the applicant's cumulative modeling analysis.

The applicant obtained stack parameters and emission data from the SJVAPCD and followed the same modeling procedures used for the Starwood operating emissions modeling analysis, using the more recent version ISC-PRIME (Version 04272).

AIR QUALITY Table 27
Facilities Included in the Cumulative Modeling Analysis

Facility	Source Type
Cal Peak Power Panoche	Gas Turbine Peaking Power Plant
Wellhead Power Panoche	Gas Turbine Peaking Power Plant
Panoche Energy Center	Gas Turbine Peaking Power Plant

The results of this modeling effort, **Air Quality Table 28**, show that Starwood, along with the other three peaking plants, will contribute to existing violations of the PM10 and PM2.5 ambient air quality standards. The results also show that Starwood, along with the other three peaking power plants, will not contribute to new AAQS violations for any of the other pollutants modeled.

AIR QUALITY Table 28
Cumulative Impacts Modeling Results (ug/m^3)

Pollutant	Averaging Time	Maximum Modeled Concentration (ug/m^3)	Background[a] (ug/m^3)	Total Impact (ug/m^3)	Limiting AAQS (ug/m^3)	Percent of Limiting Standard
NO_2	1 hour	91.70	157.9	250	470	53%
	annual	0.13	32.1	32.2	100	32%
CO	24 hour	173.81	4,715	4,889	23,000	21%
	annual	81.47	3,278	3,359	10,000	34%
PM10	24 hour	3.30	109	112.3	50	225%
	annual	0.14	35	35.1	20	176%
PM2.5	1 hour	3.30	69	72.3	35	207%
	8 hour	0.14	19.7	19.8	12	165%
SO_2	1 hour	4.22	23.6	27.8	655	4%
	3 hour	3.07	21.2	24.3	1300	2%
	24 hour	1.04	10.5	11.5	105	11%
	annual	0.023	5.3	5.3	80	7%

Source: Starwood/PEC Revised Cumulative Assessment (URS 2007g).
[a] Background concentrations used by staff use more current ambient monitoring data and are therefore in some cases different than those used by the applicant.

The Starwood and Panoche project will provide emission reduction credits for PM10 and particulate precursor pollutants (NOx, SOx and VOC), these offsets will be in amounts much greater than the expected operation of these peaking power plants. Therefore, the particulate matter (PM10 and PM2.5) operating impacts after mitigation are considered to be less than significant.

In addition to the potential for operating cumulative impacts, as discussed above, there is the potential for cumulative construction impacts due to the fact that the construction of this project and the Panoche project may overlap. The cumulative impacts of these two construction activities will somewhat increase downwind pollutant concentration when winds cross from one site to the other. However, the maximum concentrations for both sites occur at the fence line and drop rapidly with distance from the fence line. Since both of these projects are both recommended through staff conditions to have maximum feasible emission controls they conform to staff's significance criteria for construction emissions and are considered to have cumulative construction air quality impacts that are less than significant.

Staff has considered the minority population surrounding the site (see Socioeconomics Figure 1). Since the project's cumulative air quality impacts have been mitigated to less than significant, there is no environmental justice issue for air quality.

Chemically Reactive Pollutant Impacts

Ozone Impacts

The project's gaseous emissions of NOx, SO_2, VOC and ammonia can contribute to the formation of secondary pollutants: ozone and PM10/PM2.5.

There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are

input into the modeling to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, it can be said that the emissions of NOx and VOC from the Starwood project do have the potential (if left unmitigated) to contribute to higher ozone levels in the region. These impacts would be cumulatively significant because they would contribute to ongoing violations of the state and federal ozone ambient air quality standards.

PM2.5 Impacts

Secondary PM10 formation, which is assumed to be 100% PM2.5, is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion, which occurs downwind from the point of emission, is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SOx and NOx emissions are converted into sulfuric acid and nitric acid first, and then react with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid and converts completely and irreversibly to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase will tend to fall out, however the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air. There are two conditions that are of interest, described as “ammonia rich” and “ammonia poor.” The term “ammonia rich” indicates that there is more than enough ammonia to react with all the sulfuric acid and to establish a balance of nitric acid-ammonium nitrate. Further ammonia emissions in this case will not necessarily lead to increases in ambient PM2.5 concentrations. In the case of an “ammonia poor” environment, there is insufficient ammonia to establish a balance and thus additional ammonia will tend to increase PM2.5 concentrations.

The San Joaquin Valley has been the subject of an extensive secondary particulate formation study, the California Regional Particulate Air Quality Study, which has determined that the San Joaquin Valley is ammonia rich. Therefore, the ammonia emissions from the Starwood project are not expected to lead to substantial further formation of ammonium nitrate or sulfate. While there will certainly be some conversion from the ammonia emitted from the Starwood project, there is currently no regulatory model that can predict the conversion rate. However, because of the known relationship of NOx and SOx emissions to PM2.5 formation, it can be said that the emissions of NOx and SOx from the Starwood project do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region.

The applicant is proposing to mitigate the project’s NOx, VOC, SO_2, and PM10 emissions through the use of emission offsets and limit the ammonia slip emissions to 10 ppm. The NOx, VOC, SO_2, and PM10 offsets are proposed by the applicant to be provided at a minimum 1:1 ratio, and will be higher than 1:1 for NOx as required by District rules. With the proposed emission offsets, it is staff’s belief that the project will not cause significant secondary pollutant impacts.

Greenhouse Gas Reporting

The generation of electricity can produce air emissions known as greenhouse gases in addition to the criteria air pollutants. Greenhouse gases are known to contribute to the warming of the earth's atmosphere. These include primarily carbon dioxide, nitrous oxide (N_20, not NO or NO_2, which are commonly know as NOx or oxides of nitrogen), and methane (unburned natural gas). Also included are sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs) from transformers and chillers.

Climate change from rising temperatures represents a risk to California's economy, public health, and environment (CEC, 2003). In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC, 1998, p.5). In 2003, the Energy Commission recommended that the state should require reporting of greenhouse gas emissions as a condition of state licensing of new electric generating facilities (CEC, 2003, p. 42). Such reporting would be done in accordance with reporting protocols currently in place or that will be adopted with the implementation of new laws.

The Intergovernmental Panel on Climate Change (IPCC), an international scientific body, has developed standard reporting protocols and methodologies for governments and agencies to follow in calculation GHG inventories. The Intergovernmental Panel on Climate Change-approved methodology for calculating the greenhouse gas emissions in an inventory is particular to the type of fossil fuel burned. In their Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual, the Intergovernmental Panel on Climate Change established the factors for oxidation, fuel-based emissions, and global warming potential.

The California Global Warming Solutions Act of 2006 (AB32) requires the ARB to adopt a statewide greenhouse gas emissions limit equivalent to the statewide GHG emissions levels in 1990 to be achieved by 2020. To achieve this, ARB has a mandate to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB is expected to adopt early action GHG reduction measures by July 2007 and establish a statewide emissions cap by January 2008. By January 1, 2008, ARB is scheduled to adopt regulations requiring mandatory GHG emissions reporting and define the statewide GHG emissions cap for 2020. ARB would adopt a plan by January 1, 2009 that would indicate how emission reductions would be achieved from significant sources of GHGs via regulations, market mechanisms, and other actions. Then, during 2009, ARB staff would draft rule language to implement its plan and hold public workshops on each measure including market mechanisms (ARB, 2006b). Strategies that the state might pursue for managing GHG emissions in California are identified in the California Climate Action Team's Report to the Governor (CalEPA, 2006). Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy) and land use planning and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA, 2006).

The Electricity Greenhouse Gas Emission Standards Act (SB1368[2]) was also enacted in 2006, requiring generation and contacts be subject to an GHG or Environmental Performance Standard. At its January 25, 2007 meeting, the CPUC adopted an Emissions Performance Standard for the state's Investor Owned Utilities of 1,100 pounds (or 0.5metric tons) CO_2 per megawatt-hour (MWh). The Emissions Performance Standard applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California.[3] A similar performance standard is currently undergoing rulemaking by the CEC. However, as a peaking power plant the requirements of SB1368 would not apply to the Starwood project.

Staff recommends condition of certification **AQ-SC9**, which requires the project owner to report the quantities of relevant greenhouse gases emitted as a result of electric power production. Staff believes that **AQ-SC9**, with the reporting GHG emissions, will enable the project to be consistent with the regulations and policies described above. The greenhouse gas emissions to be reported in condition of certification **AQ-SC9** are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs and PFCs emissions that are directly associated with the production and transmission of electric power.

COMPLIANCE WITH LORS

The San Joaquin Valley Air Pollution Control District issued a Preliminary Determination of Compliance (PDOC) for the Starwood project on May 4, 2007 (SJVAPCD 2007b) and issued a Final Determination of Compliance (FDOC) on July 13, 2007 (SJVAPCD 2007d); Compliance with all District Rules and Regulations was demonstrated to the District's satisfaction in the FDOC. The District's FDOC conditions are presented in the Conditions of Certification.

FEDERAL

The District is responsible for issuing the Federal New Source Review (NSR) permit. This project will not require a PSD permit from U.S. EPA prior to initiating construction.

STATE

The applicant will demonstrate that the project will comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury, with the issuance of the District's Final Determination of Compliance and the Energy Commission's affirmative finding for the project.

LOCAL

The District has issued an FDOC (SJVAPCD 2007d), which states that the proposed project is expected to comply with all applicable District rules and regulations.

[2] Public Utilities Code § 8340 et seq.

[3] See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

The District rules and regulations specify the emissions control and offset requirements for new sources such as the Starwood project. Best Available Control Technology will be implemented, and emission reduction credits (ERCs), proposed by the Applicant and approved and certified by the District, will fully mitigate project nonattainment pollutant (including precursors) emissions so that they would be consistent with the strategies and future emissions anticipated under the Districts air quality attainment and maintenance plans.

As part of the Energy Commission's licensing process, in lieu of issuing a construction permit to the applicant for the Starwood project, the District will prepare and present to the Commission a DOC, both a PDOC, and after a public comment period, an FDOC. The PDOC was published on May 4, 2007, and the FDOC was published on July 13, 2007. The DOC evaluates whether and under what conditions the proposed project will comply with the District's applicable rules and regulations, as described below.

Rule 1080 – Stack Monitoring

This rule grants the Air Pollution Control Officer the authority to request the installation and use of continuous emissions monitors (CEMs), and specifies performance standards for the equipment and administrative requirements for record keeping, reporting, and notification. The FDOC includes conditions to assure compliance with this rule. Compliance is expected.

Rule 1081 – Source Sampling

This rule requires adequate and safe facilities for use in sampling to determine compliance with emission limits, and specifies methods and procedures for source testing and sample collection. The FDOC includes conditions to assure compliance with this rule. Compliance is expected.

Rule 1100 – Equipment Breakdown

This rule defines a breakdown condition, the procedures to follow if one occurs, and the requirements for corrective action, issuance of an emergency variance, and reporting. This rule is applied to the owner of any source operation with air pollution control equipment, or related operating equipment that controls air emissions, or continuous monitoring equipment. The FDOC includes conditions to assure compliance with this rule. Compliance is expected.

Rule 2010 – Permits Required

This rule requires any person who is building, altering, replacing or operating any source that emits, may emit air contaminants, or may reduce emissions, to first obtain authorization from the District in the form of an Authority to Construct or a Permit to Operate. Obtaining the DOC will assure compliance with this rule.

Rule 2201 – New and Modified Stationary Source Review Rule

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

Section 4.1 – Best Available Control Technology

Best Available Control Technology (BACT) is defined as the most stringent emission limitation or control technique of the following: a) achieved in practice for a category and class of source; b) contained in any State Implementation Plan and that have been approved by the U.S. EPA for a category and class of source; c) contained in an applicable federal New Source Performance Standard; or d) any other emission limitation or control technique that the District's Air Pollution Control Officer (APCO) finds is technologically feasible and is cost effective. BACT is required for any new or modified emission unit that results in an emissions increase of 2.0 lb/day. However, Section 4.2.1 states that BACT is not required for CO emissions from any new or modified emissions unit if those sources emit less than 200,000 lb/year of CO. In the case of Starwood, BACT applies for NOx, VOC, CO, SO_2, and PM10 emissions from the natural gas turbines. The District has concluded that the project meets BACT requirements (SJVAPCD 2007d). Compliance is expected.

Section 4.5 through 4.13 – Emission Offset Requirements

Section 4.5 specifies that emissions offsets for new or modified sources are required when their emissions are equal to or exceed the following levels:

- Oxides of Nitrogen, NOx – 20,000 lbs/year;
- Volatile Organic Compounds, VOC – 20,000 lbs/year;
- Carbon Monoxide, CO – 200,000 lbs/year;
- PM10 – 29,200 lbs/year;
- Sulfur Oxides, SOx – 54,750 lbs/year.

If constructed, the Starwood project, along with the applicant owned and adjacent Calpeak Panoche Project, would exceed the above emission levels for NOx and PM10 if the facility operates for 4,000 hours per year as requested in the Application.

Section 4.6 specifies that emissions offsets are not required for increases of CO in attainment areas, if the applicant demonstrates that the emissions increase will not cause or contribute to a violation of the ambient air quality standards, and that those emissions are consistent with Reasonable Further Progress. The District has evaluated the project's CO emissions and has concluded that they are consistent with Reasonable Further Progress and do not require offsets.

Section 4.8 specifies that the emission offsets provided shall be adjusted according to the distance of the offset from the project proposed site. The ratios are:

- Internal or on-site source – 1 to 1;
- Within 15 miles of the source – 1.2 to 1 (non-major source), 1.3 to 1 (major source); and
- 15 miles or more from the source – 1.5 to 1.

Section 4.13.1 specifies that major sources (defined as those sources that emit greater than 25 tons of NOx and VOC, 100 tons CO, or 70 tons of PM10 and SO_x) that are shut

down and thus generate an ERC may not be used as an offset for a new major source (like Starwood) unless those ERCs are included in an EPA-approved attainment plan.

Section 4.13.3 allows for the use of interpollutant offsets (including PM10 precursors for

PM10) on a case-by-case basis, provided that the applicant demonstrates that the emissions increase will not cause a violation of any ambient air quality standard. The ratio for interpollutant trading shall be based on an air quality analysis and shall be equal to or greater than the minimum offsetting requirement (the distance ratios) of this rule (Section 4.8).

Section 4.13.4 requires Actual Emissions Reductions (AER) used as offsets to have occurred during the same calendar quarter as the emissions increases being offset. Exceptions to this rule (4.13.6 through 4.13.9) allow PM emission reductions that occurred from October through March to offset PM emissions occurring anytime during the year, for NOx and VOC emission reductions that occurred from April through November to offset NOx and VOC emissions occurring anytime during the year, and for CO emission reductions that occurred from November through February to offset CO emissions occurring anytime during the year.

The Districts has evaluated the offset need and offset proposal, including evaluating the proposed interpollutant offsets. The District has found that the offset proposal will comply with these regulations (SJVAPCD 2007d). Compliance with this rule is expected.

Section 4.14 – Ambient Air Quality Standards

Section 4.14.1 requires that a new source not cause, or make worse, the violation of an ambient air quality standard as demonstrated through analysis with air dispersion models. The District completed the required modeling analysis and found that the project would comply with this regulation as the emissions would not cause new violations for the attainment pollutants and would not cause a significant increase in PM10 levels. The Districts PM10 modeling determined the following comparison with U.S. EPA PM10 significance levels:

	Significance Level	Facility Impact
PM10 24-hour	5 $\mu g/m^3$	0.32 $\mu g/m^3$
PM10 Annual	1 $\mu g/m^3$	0.02 $\mu g/m^3$

Staff also reviewed the applicant's modeling analysis that indicates no new exceedances of ambient air quality standards. Compliance with this rule is expected.

Section 4.15 – Additional Requirements for new Major Sources and Federal Major Modifications

Section 4.15.2 requires that the owner of a proposed new major source or federal major modification demonstrate to the satisfaction of the District that all major stationary sources subject to emission limitations that are owned or operated by the applicant or any entity controlling or under common control with the applicant in California, are in compliance or on a schedule for compliance with all applicable emission limitations and standards. The District has determined that the Starwood project is exempt from this requirement (SJVAPCD 2007d).

Section 5.0 – Administrative Requirements

Section 5.8 applies to all power plants proposed to be constructed within the SJVAPCD, where an AFC or a Notice of Intention has been submitted to the CEC. It describes the actions to be taken by SJVAPCD to provide information to CEC and CARB to ensure that District's rules and regulations will be satisfied. After the Application has been submitted to CEC and other responsible agencies, including SJVAPCD, the APCO is required to conduct a Determination of Compliance review, identical to that which would be performed if an Application for an Authority to Construct had been received for the power plant. If the AFC does not meet the requirements of this regulation, then the APCO is required to inform the CEC within 20 calendar days following receipt of the AFC, including specifying what additional information is required. In such an instance, the AFC is considered to be incomplete and returned to the Applicant for resubmittal. With the submittal of the FDOC compliance is assumed.

Rule 2520 – Federally Mandated Operating Permits

Rule 2520 requires that a project owner file a Title V Operating Permit from the U.S. EPA with the District within 12 months of commencing operation. A project is subject to this requirement if any of the following apply: the project is a major stationary source (under PSD definitions), it has the potential to emit greater than 100 tons per year of a criteria pollutant, any equipment permitted is subject to New Source Performance Standards, the project is subject to Title IV Acid Rain program, or the owner is required to obtain a PSD Permit from the U.S. EPA. The Title V Permit application requires that the owner submit information on the operation of the air polluting equipment, the emission controls, the quantities of emissions, the monitoring of the equipment as well as other information requirements. The FDOC includes conditions to assure compliance with this rule. Compliance is expected.

Rule 2540 – Acid Rain Program

A project greater than 25 megawatts (MW) and installed after November 15, 1990, must submit an acid rain program permit application to the District. The acid rain requirements will become part of the Title V Operating Permit (Rule 2520). Monitoring of the NOx and SOx emissions and a relatively small quantity of SOx allowances (from a national SOx allowance bank) will be required as well as the use of a NOx CEM. The FDOC includes conditions to assure compliance with this rule. Compliance is expected.

Rule 4001 – New Source Performance Standards

Rule 4001 specifies that a project must meet the requirements of the Federal New Source Performance Standards (NSPS), according to Title 40, Code of Federal Regulations, Part 60, Chapter 1. Subpart KKKK, that overrides subpart GG, which pertain to Stationary Gas Turbines, requires that a project meet specific NOx and SO_2 standards, meet continuous emission monitoring system requirements, meet various emission and fuel reporting requirements, and meet specified NOx and SOx performance testing requirements. The District has carefully evaluated this rule in the FDOC (SJVAPCD 2007d) and the FDOC includes conditions to assure compliance with this rule. Compliance is expected.

Rule 4002 – National Emission Standards for Hazardous Air Pollutants

Rule 4002 incorporates the National Emission Standards for Hazardous Air Pollutants (HAPs) from Part 61 and Part 63, Chapter I, Subchapter C, Title 40 CFR and applies to major sources of HAPs. The facility is not forecast as a major HAPs source. Compliance is expected.

Rule 4101 – Visible Emissions

Prohibits visible air emissions, other than water vapor, of more than No. 1 on the Ringelmann chart (20% opacity) for more than three minutes in any one-hour. Considering the control equipment (SCR/CO catalyst) on the turbines no visible emissions are expected during normal operation of the facility. The FDOC includes conditions to assure compliance with this rule. Compliance is expected.

Rule 4102 – Nuisance

Prohibits any emissions "which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such person or public or which cause or have a natural tendency to cause injury or damage to business or property." The types of emission sources at the facility are not expected to cause the potential for nuisance. The FDOC includes a condition to assure compliance with this rule. Compliance is expected.

Rule 4201 – Particulate Matter Concentration

Limits particulates emissions from any source that emits or may emit dust, fumes, or total suspended particulate matter to less than 0.1 grain per dry standard cubic foot (gr/dscf) of gas calculated to 12% of carbon dioxide. The particulate matter grain loading expected for the proposed facility equipment are less than this standard. The FDOC includes a condition to assure compliance with this rule. Compliance is expected.

Rule 4202 – Particulate Matter Emission Rate

This rule limits particulate matter emissions for any source operation, which emits or may emit particulate matter emissions, by establishing allowable emission rates. Calculation methods for determining the emission rate based on process weight are specified. Gaseous and liquid fuels are exempt, so the gas turbines are exempt from this rule.

Rule 4301 – Fuel Burning Equipment

Rule 4301 provides limits on the concentration of combustion contaminants and specifies maximum emission rates for NOx, SO_2, and combustion contaminant emissions (particulates) for any fuel burning equipment, except for air pollution control equipment which is exempt. The specified limits are 140 lbs/hour of NOx, calculated as NO_2, 200 lbs/hour of SO_2, 0.1 gr/dscf of gas calculated to 12% of carbon dioxide, and 10 lbs/hour of combustion contaminants. The gas turbines do not meet the definition of fuel burning equipment as stated in this rule and are therefore exempt.

Rule 4703 – Stationary Gas Turbines

Limits NOx and CO emissions from stationary gas turbines. Establishes requirements for testing, monitoring, and record keeping for NOx and CO emissions from new or modified stationary gas turbines with a designed power of 0.3 MW or higher and/or a maximum heat input rating of more than 3,000,000 Btu per hour. The use of BACT will ensure that the emission requirements of this rule are met. The FDOC includes conditions to assure compliance with this rule. Compliance is expected.

Rule 4801 – Sulfur Compounds

Limits the emissions of sulfur compounds to no greater than 0.2% by volume calculated as SO_2 on a dry basis averaged over 15 consecutive minutes. The use of pipeline quality natural gas will assure compliance with this rule. Compliance is expected.

REGULATION VIII - FUGITIVE PM10 PROHIBITIONS

Rule 8011 – General Requirements

Specifies the types of chemical stabilizing agents and dust suppressant materials that can (and cannot) be used to minimize fugitive dust from anthropogenic (man-made) sources. The rule also specifies test methods for determining compliance with visible dust emission (VDE) standards, stabilized surface conditions, soil moisture content, silt content for bulk materials, silt content for unpaved roads and unpaved vehicle/ equipment traffic areas, and threshold friction velocity (TFV). Records shall be maintained only for those days that a control measure was implemented, and kept for one year following project completion to demonstrate compliance. An owner subject to Rule 2520 (Federally Mandated Operating Permits) shall keep such records for five years. A fugitive dust management plan for unpaved roads and unpaved vehicle/ equipment traffic areas is discussed as an alternative for Rule 8061 and Rule 8071. The FDOC includes conditions to assure compliance with Regulation VIII rules. Compliance is expected.

Rule 8021 – Construction, Demolition, Excavation, Extraction and Other Earthmoving Activities

Requires fugitive dust emissions throughout construction activities (from pre-activity to active operations and during periods of inactivity) to comply with the conditions of a stabilized surface area and to not exceed an opacity limit of 20%, by means of water application, chemical dust suppressants, or constructing and maintaining wind barriers. A Dust Control Plan is also required and shall be submitted to the APCO at least 30 days prior to the start of any construction activities on any site that will include 10 acres or more of disturbed surface area for residential developments, 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. The FDOC includes conditions to assure compliance with Regulation VIII rules. Compliance is expected.

Rule 8031 – Bulk Materials

Limits the fugitive dust emissions from the outdoor handling, storage and transport of bulk materials. Requires fugitive dust emissions to comply with the conditions of a

stabilized unpaved road surface and to not exceed an opacity limit of 20%. It specifies that bulk materials be transported using wetting agents, allow appropriate freeboard space in the vehicles, or be covered. It also requires that stored materials be covered or stabilized. The FDOC includes conditions to assure compliance with Regulation VIII rules. Compliance is expected.

Rule 8041 – Carryout and Trackout

Limits carryout and trackout during construction, demolition, excavation, extraction, and other earthmoving activities (Rule 8021), from bulk materials handling (Rule 8031), from paved and unpaved roads (Rule 8061), and from unpaved vehicle and equipment traffic areas (Rule 8071) where carryout has occurred or may occur. Specifies acceptable (and unacceptable) methods for cleanup of carryout and trackout. The FDOC includes conditions to assure compliance with Regulation VIII rules. Compliance is expected.

Rule 8051 – Open Areas

Requires any open area of 0.5 acres or more within urban areas, or three acres or more within rural areas, and contains at least 1,000 square feet of disturbed surface area to comply with the conditions of a stabilized unpaved road surface and to not exceed an opacity limit of 20%, by means of water application, chemical dust suppressants, paving, applying and maintaining gravel, or planting vegetation. The FDOC includes conditions to assure compliance with Regulation VIII rules. Compliance is expected.

Rule 8061 – Paved and Unpaved Roads

Specifies the width of paved shoulders on paved roads and guidelines for medians. Requires gravel, roadmix, paving, landscaping, watering, and/or the use of chemical dust suppressants on unpaved roadways to prevent exceeding an opacity limit of 20%. Exemptions to this rule include “any unpaved road segment with less than 26 annual average daily vehicle trips (AADT).” The FDOC includes conditions to assure compliance with Regulation VIII rules. Compliance is expected.

Rule 8071 – Unpaved Vehicle/Equipment Traffic Areas

This rule intends to limit fugitive dust from any unpaved vehicle and equipment traffic area by using gravel, roadmix, paving, landscaping, watering, and/or the use of chemical dust suppressants to prevent exceeding an opacity limit of 20%. Exemptions to this rule include “unpaved vehicle and equipment traffic areas with less than 50 Average Annual Daily Trips (AADT).” The FDOC includes conditions to assure compliance with Regulation VIII rules. Compliance is expected.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments have been received related to air quality for the Starwood project. However, comments from two public agencies were provided on the nearby Panoche Energy Center (PEC) project. Considering that these two nearly adjacent projects are concurrently in the licensing process, and that the public agency comments provided for the PEC project are generally relevant to the Starwood project, the comments provided by these two agencies have been addressed for the Starwood project.

Comment: The Mendota Unified School District. The school district provided general comments on the PEC project regarding a concern for the health and welfare of students and community related to increases in air pollutants from the project (MUSD 2007). Specifically, the comments were related to lung diseases (asthma, bronchitis, and emphysema) and breathing problems (lung inflammation, shortness of breath, chest pain, coughing, throat irritation, and congestion) that are created or made worse by air pollution.

Response: Staff's evaluation found that no significant impacts would occur from the construction or operation of the Starwood project or cumulatively with the Panoche Energy Center. The maximum project construction or operating impacts in Mendota would be a small fraction of the maximum impacts listed in **Air Quality Tables 18**, **19, 21** and **28**. The lower impacts in Mendota are due to the distance from the project site, the fact that Mendota is approximately 250 feet lower in elevation than the project site and it's buoyant emission sources, and the fact that the wind direction is rarely ranges from the southeast to south southeast (i.e. from the project site towards Mendota). However, staff is also concerned with the potential air quality impacts from the project and has recommended mitigation above that required by the San Joaquin Valley Air Pollution Control District, including recommending construction equipment emission mitigation and recommending that the project's operating criteria pollutants be fully offset at a minimum ratio of 1:1. With this recommended mitigation staff has determined that the air quality impacts from the Starwood project, including those to the school children and residents of Mendota, will be less than significant.

Comment: County of San Benito, Planning and Building Inspection Services. The Planning and Building Inspection Services Department commented on the PEC project that the staff analysis should include an assessment of project impacts to all bordering air basins including the County of San Benito in the North Central Coast Air Basin and to the Pinnacles National Monument Class 1 Area located within San Benito County (COSB 2007).

Response: Staff's evaluation concluded that the mitigated project impacts and cumulative impacts, including the maximum modeled pollutant impacts that were all predicted to occur within the San Joaquin Valley Air Basin, are less than significant. Therefore, the impacts from this project to surrounding air basins are also concluded to be less than significant. Pollutant transport occurs from all emission sources to one degree or another; however, for this project transport will predominately occur up and down the San Joaquin Valley within the San Joaquin Air Basin. Very little direct transport of project pollutants towards San Benito County, some 8.5 miles from the project site, is expected. This project alone or cumulatively is not expected to measurably impact ambient air quality conditions or change air quality attainment designation within San Benito County.

The Starwood project does not trigger Prevention of Significant Deterioration permitting; therefore, Class 1 Area impact modeling, including impact modeling for the Pinnacles National Monument, is not required. Staff understands the County's concern based on the fact that the Pinnacles National Monument's monitored air quality does not currently

meet State ambient ozone standards; however, this project would not be expected to measurably impact ozone conditions at Pinnacles due to 1) the prevailing wind directions that are perpendicular to the direction from the site to Pinnacles; 2) the thirty three miles and two separate mountain/hill ranges that the pollutants would have to travel to get to Pinnacles; and 3) the project's pollutant emissions in comparison to the overall pollutant emissions from the North Central Coast Air Basin and San Joaquin Valley Air Basin that both create the air quality issues at Pinnacles National Monument.

NOTEWORTHY PUBLIC BENEFITS

No air quality related noteworthy public benefits have been identified.

CONCLUSIONS

The Starwood project would likely comply with all laws, ordinances, regulations and standards and would result in a less than significant impact under CEQA if Starwood complies with all staff recommended and District required Conditions of Certification and provides the emission offsets, in quantities recommended by staff and the District in **AQ-SC8** and **AQ-1** through **AQ-3**, respectively.

Staff has considered the minority population surrounding the site (see Socioeconomics Figure 1). Since the project's direct and cumulative air quality impacts have been reduced to less than significant, there is no environmental justice issue for air quality.

The Staff has proposed a number of permit conditions that are in addition to the permit conditions that the SJVAPCD has proposed. In most cases the staff proposed permit conditions deal with air quality issues that the SJVAPCD is not required to address. The Staff proposed Conditions of Certification are summarized as follows. Conditions **AQ-SC1** through **AQ-SC5** are construction related permit conditions. Condition **AQ-SC6** formalizes the applicant's proposal to re-locate the nearest residents away from the site. Condition **AQ-SC7** provides the administrative procedure requirements for project modifications. Condition **AQ-SC8** provides the additional SOx emission offset requirements. Condition **AQ-SC9** is the Commission Greenhouse Gas reporting requirement. Condition **AQ-SC10** is a quarterly emission reporting requirement augmenting District Condition **AQ-65**.

Conditions **AQ-1** through **AQ-81** are the SJVAPCD permit conditions with staff proposed verification language.

PROPOSED CONDITIONS OF CERTIFICATION

Staff recommends the following conditions of certification to address the impacts associated with the construction and operation of the Starwood project. These Conditions include the SJVAPCD proposed Conditions from the FDOC, with appropriate staff proposed verification language for each condition, as well as Energy Commission staff proposed conditions.

STAFF CONDITIONS

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with conditions AQ-SC3, AQ-SC4 and AQ-SC5 for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and AQCMM Delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the CPM.

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the CPM for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM Delegates. The AQCMM and all Delegates must be approved by the CPM before the start of ground disturbance.

AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with conditions AQ-SC3, AQ-SC4 and AQ-SC5.

Verification: At least 60 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt. The AQCMP must be approved by the CPM before the start of ground disturbance.

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report (MCR) that demonstrates compliance with the following mitigation measures for the purposes of preventing all fugitive dust plumes from leaving the project site and linear facility routes. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

a. All unpaved roads and disturbed areas in the project and linear construction sites shall be watered as frequently as necessary to comply with the dust mitigation objectives of AQ-SC4. The frequency of watering may be reduced or eliminated during periods of precipitation.

b. No vehicle shall exceed 10 miles per hour within the construction site.

c. The construction site entrances shall be posted with visible speed limit signs.

d. All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.

e. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

f. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.

g. All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM.

h. Construction areas adjacent to any paved roadway shall be provided with sandbags or other measures as specified in the Storm Water Pollution Prevention Plan (SWPPP) to prevent run-off to roadways.

i. All paved roads within the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

j. At least the first 500 feet of any public roadway exiting from the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff from the construction site is visible on the public roadways.

k. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.

l. All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least two feet of freeboard.

m. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

n. The main travel route(s) through the site will be graveled and/or paved prior to the completion of the initial grading/site preparation phase of construction if residents will be re-occupying the multi-unit apartment property as allowed under Condition of Certification AQ-SC6. To the extent feasible onsite traffic will be limited to these graveled/paved travel routes.

Verification: The project owner shall include in the MCR (1) a summary of all actions taken to maintain compliance with this condition, (2) copies of any complaints filed with the air district in relation to project construction, and (3) any other

documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC4 Dust Plume Response Requirement: The AQCMM or an AQCMM Delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (1) off the project site or (2) 200 feet beyond the centerline of the construction of linear facilities or (3) within 100 feet upwind of any regularly occupied structures not owned by the project owner indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if Step 1 specified above fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if Step 2 specified above fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the CPM any directive from the AQCMM or Delegate to shut down an activity, provided that the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM before that time.

Verification: The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits specified.

AQ-SC5 Diesel-Fueled Engines Control: The AQCMM shall submit to the CPM, in the MCR, a construction mitigation report that demonstrates compliance with the following mitigation measures for the purposes of controlling diesel construction-related emissions. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

a. All diesel-fueled engines used in the construction of the facility shall be fueled only with ultra-low sulfur diesel, which contains no more than 15 ppm sulfur.

b. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.

c. All construction diesel engines, which have a rating of 100 hp or more, shall meet, at a minimum, the Tier 2 California Emission Standards for Off-Road Compression-Ignition Engines as specified in California Code of Regulations, Title 13, section 2423(b)(1) unless certified by the on-site AQCMM that such engine is not available for a particular item of equipment. In the event a Tier 2 engine is not available for any off-road engine larger than 100 hp, that engine shall be equipped with a Tier 1 engine. In the event a Tier 1 engine is not available for any off-road engine larger than 100 hp, that engine shall be equipped with a catalyzed diesel particulate filter (soot filter), unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is "not practical" if, among other reasons:

   1. There is no available soot filter that has been certified by either the California Air Resources Board or U.S. Environmental Protection Agency for the engine in question; or

   2. (The construction equipment is intended to be on-site for ten (10) days or less.

   3. The CPM may grant relief from this requirement if the AQCMM can demonstrate that they have made a good faith effort to comply with this requirement and that compliance is not possible.

d. The use of a soot filter may be terminated immediately if one of the following conditions exists, provided that the CPM is informed within ten (10) working days of the termination:

   1. The use of the soot filter is excessively reducing normal availability of the construction equipment due to increased downtime for maintenance, and/or reduced power output due to an excessive increase in backpressure.

   2. The soot filter is causing or is reasonably expected to cause significant engine damage.

   3. The soot filter is causing or is reasonably expected to cause a significant risk to workers or the public.

   4. Any other seriously detrimental cause which has the approval of the CPM prior to the termination being implemented.

e. All heavy earthmoving equipment and heavy duty construction related trucks with engines meeting the requirements of (c) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

f. All diesel heavy construction equipment shall not remain running at idle for more than five minutes, to the extent practical.

Verification: The project owner shall include in the MCR (1) a summary of all actions taken to maintain compliance with this condition, (2) copies of all diesel fuel purchase records, (3) a list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained, and (4) any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC6 The project owner shall ensure that the multi-unit apartment property located on property adjacent and north of the project site is vacated during the initial grading/site preparation phase of construction. The property may be used residentially after the initial grading/site preparation construction phase is complete; however, the applicant will, if requested by residents still under lease, pay for those residents to vacate the property for longer periods during the construction up to the time when the property needs to be vacated full time to comply with noise and public health Conditions of Certification.

Verification: The project owner shall provide a written declaration to the CPM signed by the owner or residents of the multi-unit apartment property that the property has been vacated prior to the initial grading/site preparation phase of construction. Additionally, in the MCR the project owner shall provide documentation regarding any requests from the residents to be relocated for longer periods during construction and the project owner's actions to meet those requests.

AQ-SC7 The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. EPA, and any revised permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any proposed air permit modification to the CPM within five working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

AQ-SC8 The project owner shall provide emission reduction credits to offset the project's PM10, SOx, and VOC emissions at a ratio of 1:1. These emission reductions shall be provided in the following quarterly amounts (lbs):

ERCs/Pollutant	Q1	Q2	Q3	Q4
SOx for PM10	5,167	5,165	9,041	6,457
SOx for SOx	911	911	1,595	1,139
VOC	2,656	2,656	4,648	3,320

The ERC certificates used shall be ERCs S-2492-5 and N-623-5 as necessary to meet the total SOx ERC burden shown above, and ERCs S-2422-1, S-2493-1, and an additional 390 pounds of VOC ERC certificate(s) that shall be obtained by the applicant prior to initiation of construction, as necessary to meet the VOC ERC burden shown above. Quarterly transfers as allowed by SJVAPCD Rules will be accepted. The project owner shall

surrender these ERCs prior to first turbine fire. This condition is in addition to the District's PM10 offset requirements provided in Conditions of Certification **AQ-1 through AQ-3** to make up the difference between the District offset requirements and the CEQA fully offset requirements.

Verification: The project owner shall submit to the CPM documentation that the required additional 390 pounds of VOC ERCs have been obtained at least two working days prior to initiating project construction. The project owner shall submit to the CPM confirmation that the appropriate quantity of SOx and VOC ERCs have been surrendered to the District at least 30 days prior to initial startup. If the CPM, in consultation with the District, approves a substitution or modification, the CPM shall file a statement of the approval with the commission docket and mail a copy of the statement to every person on the post-certification mailing list. The CPM shall maintain an updated list of approved ERCs for the project. Quarterly average fuel sulfur data from the most representative gas utility pipeline monitoring station shall be submitted with the Quarterly Operation Reports (**AQ-SC10**) and the applicant shall demonstrate that the actual annual SO2 emissions remain below the 2.28 tons of emissions that have been offset by complying with this condition.

AQ-SC9 Until the California Global Warming Solutions Act of 2006 (AB32) is implemented, the project owner shall either participate in a GHG registry approved by the CPM, or report on a annual basis to the CPM the quantity of greenhouse gases (GHG) emitted as a direct result of facility electricity production.

The project owner shall maintain a record of fuels types and carbon content used on-site for the purpose of power production. These fuels shall include but are not limited to each fuel type burned: (1) in combustion turbines, (2) HRSGs (if applicable) or auxiliary boiler (if applicable), (4) internal combustion engines, (4) flares, and/or (5) for the purpose of startup, shutdown, operation or emission controls.

The project owner may **perform** annual source tests of CO_2 and CH_4 emissions from the exhaust stacks while firing the facility's primary fuel, using the following test methods or other test methods as approved by the CPM. The project owner shall produce fuel-based emission factors in units of lbs CO_2 equivalent per MMBtu of fuel burned from the annual source tests. If a secondary fuel is approved for the facility, the project owner may also perform these source tests while firing the secondary fuel.

Pollutant	Test Method
CO_2	EPA Method 3A
CH_4	Protocol: EPA Method 18 (VOC measured as CH_4)

As an alternative to performing annual source tests, the project owner may use the Intergovernmental Panel on Climate Change (IPCC) Methodologies for Estimating Greenhouse Gas Emissions (MEGGE). If MEGGE is chosen,

the project owner shall calculate the CO_2, CH_4 and N_2O emissions using the appropriate fuel-based carbon content coefficient (for CO_2) and the appropriate fuel-based emission factors (for CH_4 and N_2O).

The project owner shall convert the N_2O and CH_4 emissions into CO_2 equivalent emissions using the current IPCC Global Warming Potentials (GWP). The project owner shall maintain a record of all SF_6 that is used for replenishing on-site transformers. At the end of each reporting period, the project owner shall total the mass of SF_6 used and convert that to a CO_2 equivalent emission using the IPCC GWP for SF_6. The project owner shall maintain a record of all PFCs and HFCs that are used for replenishing on-site refrigeration and chillers directly related to electricity production. At the end of each reporting period, the project owner shall total the mass of PFCs and HFCs used and convert that to a CO_2 equivalent emission using the IPCC GWP.

On an annual basis, the project owner shall report the CO_2 and CO_2 equivalent emissions from the described emissions of CO_2, N_2O, CH_4, SF_6, PFCs, and HFCs.

Verification: The project annual greenhouse gas emissions shall be reported, as a CO_2 equivalent, by the project owner to a climate action registry approved by the CPM, or to the CPM as part of the fourth Quarterly or the annual Air Quality Report, until such time that GHG reporting requirements are adopted and in force for the project as part of the California Global Warming Solutions Act of 2006.

AQ-SC10 The project owner shall submit to the CPM Quarterly Operation Reports, following the end of each calendar quarter that include operational and emissions information as necessary to demonstrate compliance with the Conditions of Certification herein. The Quarterly Operation Report will specifically note or highlight incidences of noncompliance.

Verification: The project owner shall submit the Quarterly Operation Reports to the CPM and APCO no later than 30 days following the end of each calendar quarter.

DISTRICT FINAL DETERMINATION OF COMPLIANCE CONDITIONS (SJVAPCD 2007D)

The SJVACPD permits each device separately, which causes duplication of conditions. Staff has compiled the SJVAPCD conditions to eliminate this duplication.

SJVAPCD Permit No. Unit C-7286-1-0: 30 MW Nominally Rated Simple-Cycle Power Generating System #1 Consisting of a 311 MMBTU/HR Pratt & Whitney Model FT8-3 Swiftpac Natural Gas-Fired Combustion Turbine Generator Served by an Inlet Air Filtration and Cooling System, Water Injection, a Selective Catalytic Reduction (SCR) System and a Oxidation Catalyst Powering a 60 MW Nominally Rated Electrical Generator (Shared With C-7286-2)

SJVAPCD Permit No. Unit C-7286-2-0: 30 MW Nominally Rated Simple-Cycle Power Generating System #2 Consisting of a 311 MMBTU/HR Pratt & Whitney Model FT8-3 Swiftpac Natural Gas-Fired Combustion Turbine Generator Served by an Inlet Air

Filtration and Cooling System, Water Injection, a Selective Catalytic Reduction (SCR) System and a Oxidation Catalyst Powering a 60 MW Nominally Rated Electrical Generator (Shared With C-7286-1)

SJVAPCD Permit No. Unit C-7286-3-0: 30 MW Nominally Rated Simple-Cycle Power Generating System #3 Consisting of a 311 MMBTU/HR Pratt & Whitney Model FT8-3 Swiftpac Natural Gas-Fired Combustion Turbine Generator Served by an Inlet Air Filtration and Cooling System, Water Injection, a Selective Catalytic Reduction (SCR) System and a Oxidation Catalyst Powering a 60 MW Nominally Rated Electrical Generator (Shared With C-7286-4)

SJVAPCD Permit No. Unit C-7286-4-0: 30 MW Nominally Rated Simple-Cycle Power Generating System #4 Consisting of a 311 MMBTU/HR Pratt & Whitney Model FT8-3 Swiftpac Natural Gas-Fired Combustion Turbine Generator Served by an Inlet Air Filtration and Cooling System, Water Injection, a Selective Catalytic Reduction (SCR) System and a Oxidation Catalyst Powering a 60 MW Nominally Rated Electrical Generator (Shared With C-7286-3)

AQ-1 Prior to initial operation of C-7286-1-0, C-7286-2-0, C-7286-3-0 or C-7286-4-0, the project owner shall provide NOx (as NO2) emission reduction credits for the following quantities of emissions: 1st quarter – 8,968 lb; 2nd quarter – 8,968 lb; 3rd quarter – 15,692 lb; and 4th quarter - 11,208 lb. Offsets shall be provided at the appropriate distance ratio specified in Rule 2201. [District Rule 2201]

Verification: At least 60 days prior to commencing CTG first fire, the project owner shall surrender NOx ERC certificates in the amounts shown to the District and provide documentation of that surrender to the CPM.

AQ-2 Prior to initial operation of C-7286-1-0, C-7286-2-0, C-7286-3-0 or C-7286-4-0, the project owner shall provide PM10 emission reduction credits for the following quantities of emissions: 1st quarter – 2,102 lb; 2nd quarter – 2,103 lb; 3rd quarter – 3,679 lb; and 4th quarter – 2,628 lb. Offsets shall be provided at the appropriate distance ratio specified in Rule 2201. SOx ERC's may be used to offset PM10 increases at an interpollutant ratio of 1.867 lb-SOx : 1.0 lb-PM10. [District Rule 2201]

Verification: At least 60 days prior to commencing CTG first fire, the project owner shall surrender PM10 and/or SOx ERC certificates in the amounts shown or based on the SOx interpollutant ratio shown to the District and provide documentation of that surrender to the CPM.

AQ-3 ERC certificate numbers (or any splits from these certificates) S-2382-2 and S-2492-5 shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this determination of compliance (DOC) shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of the DOC. [District Rule 2201]

Verification: At least 60 days prior to commencing CTG first fire, the project owner shall surrender ERC certificates in the amounts shown to the District and provide documentation of that surrender to the CPM.

AQ-4 The project owner shall submit an application to comply with SJVAPCD District Rule 2520 - Federally Mandated Operating Permits within twelve months after commencing operation. [District Rule 2520]

Verification: The project owner shall submit a copy of their Title V – Federal Mandated Operating Permit Application to the CPM within 12 months of commencing operation.

AQ-5 The project owner shall submit an application to comply with SJVAPCD District Rule 2540 - Acid Rain Program. [District Rule 2540]

Verification: The project owner shall submit to the CPM copies of the Title IV permit at least fifteen (15) days prior to the initial firing of the CTG, and shall submit proof that necessary Title IV SO_2 emission allotments have been acquired as necessary for compliance with Title IV requirements annually in the first Quarterly Compliance Report (**AQ-SC10**) that is due after the annual SO_2 allotment due date.

AQ-6 District facilities C-3811 and C-7286 are the same stationary source for District permitting purposes. [District Rule 2201]

Verification: The project owner shall maintain operation and emissions data for facilities C-3811 and C-7286 available for inspection by representatives of the District, CARB and the Commission.

AQ-7 The owner/operator of the Starwood Power-Midway, LLC (Starwood Power) shall minimize the emissions from the gas turbines to the maximum extent possible during the commissioning period. Conditions **AQ-2** through **AQ-12** shall apply only during the commissioning period as defined below. Unless otherwise indicated, Conditions **AQ-13** through **AQ-80** shall apply after the commissioning period has ended. [District Rule 2201]

Verification: The project owner shall provide in the monthly commissioning status report (see the verification for Condition **AQ-7**) information regarding the types and effectiveness of methods used to minimize commissioning period emissions.

AQ-8 Commissioning activities are defined as, but not limited to, all testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the Starwood Power construction contractor to insure safe and reliable steady state operation of the gas turbines and associated electrical delivery systems. [District Rule 2201]

Verification: The project owner shall provide written notification to the APCO and the CPM of the expected date of first turbine roll at least 15 days before the first turbine roll.

AQ-9 Commissioning period shall commence when all mechanical, electrical, and control systems are installed and individual system startup has been

completed, or when a gas turbine is first fired, whichever occurs first. The commissioning period shall terminate when the plant has completed initial performance testing and is available for commercial operation. [District Rule 2201]

Verification: The project owner shall provide written notification to the APCO and the CPM of the expected date of first turbine roll at least 15 days before the first turbine roll. The project owner shall provide written notification to the APCO within 5 day after the turbines are available for commercial operation.

AQ-10 No more than one SwiftPac Unit (two paired turbines operating under units C-7286-1 and C-7286-2 or C-7286-3 and C-7286-4) shall be operated at any one time during the commissioning period. [District Rule 2201].

Verification: The project owner shall provide operating data to demonstrate compliance with this condition, and that information shall be submitted to the CEC CPM as part of the monthly commissioning status report noted in the verification of Condition **AQ-14.**

AQ-11 At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturer and the construction contractor, the combustors of these units shall be tuned to minimize emissions. [District Rule 2201]

Verification: The project owner shall provide combustor tuning information to demonstrate compliance with this condition, and that information shall be submitted to the CEC CPM as part of the monthly commissioning status report noted in the verification of Condition **AQ-14**.

AQ-12 At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturer and the construction contractor, the Selective Catalytic Reduction (SCR) system and the oxidation catalyst shall be installed, adjusted, and operated to minimize emissions from these units. [District Rule 2201]

Verification: The project owner shall provide emission abatement system information (such as dates of catalyst installation and ammonia grid initial operation) to demonstrate compliance with this condition, and that information shall be submitted to the CEC CPM as part of the monthly commissioning status report noted in the verification of Condition **AQ-14**.

AQ-13 Coincident with the steady-state operation of the SCR system and the oxidation catalyst, NOx and CO emissions from these units shall comply with the limits specified in Condition **AQ-29**. [District Rule 2201]

Verification: The project owner shall provide NOx and CO emissions information for steady-state operations of the SCR system and oxidation catalyst to demonstrate compliance with this condition, and that information shall be submitted to the CEC CPM as part of the monthly commissioning status report noted in the verification of Condition **AQ-14**.

AQ-14 The project owner shall submit a plan to the District at least four weeks prior to the first firing of these units, describing the procedures to be followed during the commissioning period. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the combustors, the installation and operation of the SCR systems and the oxidation catalyst, the installation, calibration, and testing of the NOx and CO continuous emissions monitors, and any activities requiring the firing of this unit without abatement by the SCR system or oxidation catalyst. [District Rule 2201]

Verification: The project owner shall submit a single commissioning plan to the District and the CPM at least four weeks prior to the first firing of the combustion turbine, describing in detail the procedures to be followed for the turbines. The project owner shall submit, commencing one month from the time of gas turbine first fire, a monthly commissioning status report throughout the duration of the commissioning phase that demonstrates compliance with the commissioning plan and demonstrates compliance with all other substantive requirements listed in Conditions **AQ-7** through **AQ-19**. The monthly commissioning status report shall be submitted to the CPM by the 10th of each month for the previous month, for all months with turbine commissioning activities following the turbine first fire date.

AQ-15 Emission rates from each CTG, during the commissioning period, shall not exceed any of the following limits: NOx (as NO_2) – 41.65 lb/hr; CO – 21.33 lb/hr; VOC (as methane) – 0.83 lb/hr; PM10 – 1.85 lb/hr; or SOx (as SO_2) – 0.89 lb/hr. [District Rule 2201]

Verification: The project owner shall provide CEM-derived emissions data for NOx and CO and shall provide calculated PM10 and VOC emissions from fuel consumption data and source test results to demonstrate compliance with this condition as part of the quarterly operation report (**AQ-SC10**)..

AQ-16 During the commissioning period, the project owner shall demonstrate compliance with the NOx and CO limits specified in Condition **AQ-15** through the use of properly operated and maintained continuous emissions monitors and recorders as specified in Conditions **AQ-53** and **AQ-54**. The monitored parameters for these units shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation). [District Rule 2201]

Verification: The project owner shall provide CEM data to demonstrate compliance with Conditions **AQ-13**, **AQ-15**, and **AQ-29** and that data shall be submitted to the CEC CPM as part of the monthly commissioning phase status report noted in the verification of Condition **AQ-14**.

AQ-17 The continuous monitors shall be installed, calibrated, and operational prior to the first firing of these units. After first firing, the detection range of the CEMS shall be adjusted as necessary to accurately measure the resulting range of NOx and CO emission concentrations from each CTG and each Swiftpac unit. [District Rule 2201]

Verification: The project owner shall provide notification to the District and the CPM of the anticipated dates for installation, calibration and testing for the CEMS at least ten (10) days prior to installation. The project owner shall provide a report to the District and CPM for approval demonstrating compliance with CEMS calibration requirements prior to turbine first fire. The project owner shall provide ongoing calibration data in the monthly commissioning status reports (see verification of Condition **AQ-14**).

AQ-18 The total number of firing hours of each CTG without abatement of emissions by the SCR system and the oxidation catalyst shall not exceed 100 hours during the commissioning period. Such operation of each CTG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system and the oxidation catalyst in place. Upon completion of these activities, the project owner shall provide written notice to the District and the unused balance of the 100 firing hours without abatement shall expire. [District Rule 2201]

Verification: The project owner shall provide to the District and the CPM a reporting of the number of firing hours without abatement for the turbine in the monthly commissioning status reports (see verification of Condition **AQ-14**).

AQ-19 The total mass emissions of NOx, CO, VOC, PM10, and SOx that are emitted during the commissioning period shall accrue towards the consecutive twelve month emission limits specified in Condition **AQ-40**. [District Rule 2201]

Verification: The project owner shall provide emissions data to demonstrate compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-20 A selective catalytic reduction (SCR) system and an oxidation catalyst shall serve each Swiftpac unit. Exhaust ducting may be equipped (if required) with a fresh air inlet blower to be used to lower the exhaust temperature prior to inlet of the SCR system catalyst. The project owner shall submit SCR and oxidation catalyst design details to the District at least 30 days prior to commencement of construction. [District Rule 2201]

Verification: The project owner shall submit SCR and oxidation catalyst design details that demonstrate compliance with this condition to the APCO and the CPM 30 days prior to commencement of construction.

AQ-21 The project owner shall submit continuous emission monitor design, installation, and operational details to the District at least 30 days prior to commencement of construction. [District Rule 2201]

Verification: The project owner shall submit continuous emission monitor design, installation, and operational details to the APCO and the CPM 30 days prior to commencement of construction.

AQ-22 The project owner shall submit to the District before issuance of the Permit to Operate information correlating the NOx control system operating parameters to the associated measured NOx output. The information must be sufficient to allow the District to determine compliance with the NOx emission limits of this permit when no continuous emission monitoring data for NOx is available or

when continuous emission monitoring system is not operating properly. [District Rule 4703]

Verification: The project owner shall compile the required NOx control system and emissions data and submit the information to the CPM and the APCO before issuance of the Permit to Operate.

AQ-23 All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District Rule 2201]

Verification: The project owner shall submit maintenance records for all equipment to the CPM and the APCO in the Quarterly Operation Report (**AQ-SC10**).

AQ-24 No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

Verification: The project owner will document any complaints that it has received from the public in the Quarterly Operation Report (**AQ-SC10**). The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission.

AQ-25 No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

Verification: The project owner shall document any known opacity violations in the Quarterly Operation Report (AQ-SC10). The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission.

AQ-26 Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

Verification: The project owner shall submit the results of the initial and annual source tests per Condition **AQ-47**.

AQ-27 Combustion turbine generator (CTG) and electrical generator lube oil vents shall be equipped with mist eliminators. Visible emissions from lube oil vents shall not exhibit opacity of 5% or greater, except for up to three minutes in any hour. [District Rules 2201 and 4101]

Verification: The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission to verify the installation and proper operation of the lube oil vent mist eliminators.

AQ-28 The CTGs shall be fried exclusively on PUC-regulated natural gas with a sulfur content of no greater than 1.0 grain of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201 and 40 CFR 60.4330(a)(2)]

Verification: The project owner shall compile the required data on the sulfur content of the natural gas and submit the information to the CPM and the APCO in the Quarterly Operation Report (**AQ-SC10**).

AQ-29 Emission rates from each CTG, except during startup and shutdown periods, shall not exceed any of the following limits: NOx (as NO_2) – 2.8 lb/hr and 2.5 ppmvd @ 15% O_2; CO – 4.19 lb/hr and 6.0 ppmvd @ 15% O_2; VOC (as methane) – 0.82 lb/hr and 2.0 ppmvd @ 15% O_2; PM10 – 1.85 lb/hr; or SOx (as SO_2) – 0.89 lb/hr. NOx (as NO_2) emission rates are one hour rolling averages. All other emission rates are three hour rolling averages. [District Rules 2201 and 4703 and 40 CFR 60.4320(a) & (b)]

Verification: The project owner shall submit to the CPM and APCO CTG emissions data demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-30 Combined emission rates from the two Swiftpac unit CTG's operating under permit units C-7286-1 and C-7286-2, and the two Swiftpac unit CTG's operating under permit units C-7286-3 and C-7286-4, except during startup and shutdown periods, shall not exceed any of the following Swiftpac two turbine limits: NOx (as NO_2) – 5.6 lb/hr and 2.5 ppmvd @ 15% O_2; CO – 8.38 lb/hr and 6.0 ppmvd @ 15% O_2; VOC (as methane) – 1.64 lb/hr and 2.0 ppmvd @ 15% O_2; PM10 – 3.70 lb/hr; or SOx (as SO_2) – 1.78 lb/hr. NOx (as NO_2) emission rates are one hour rolling averages. All other emission rates are three hour rolling averages. [District Rules 2201 and 4703 and 40 CFR 60.4320(a) & (b)]

Verification: The project owner shall submit to the CPM and APCO CTG emissions data demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-31 The ammonia (NH_3) emissions from each CTG shall not exceed either of the following limits: 4.24 lb/hr or 10 ppmvd @ 15% O_2 over a 24 hour rolling average. [District Rules 2201 and 4102]

Verification: The project owner shall submit to the CPM and APCO CTG emissions data demonstrating compliance with this condition, using approved calculation methods (**AQ-33**), as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-32 During start-up of each CTG, exhaust emission rates for that CTG shall not exceed any of the following limits: NOx (as NO2) – 4.17 lb/hr; CO – 12.5 lb/hr; VOC (as methane) – 0.83 lb/hr; PM10 – 1.85 lb/hr; or SOx (as SO2) – 0.89 lb/hr, based on a one hour average. [District Rules 2201 and 4703]

Verification: The project owner shall submit to the CPM and APCO CEM-derived emissions data for NOx and CO (except when source testing is required for startups) and shall provide calculated PM10 and VOC emission from fuel consumption data and source test results to demonstrate compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-33 During shutdown of each CTG exhaust emission rates for that CTG shall not exceed any of the following limits: NOx (as NO2) – 1.50 lb/hr; CO – 21.33 lb/hr; VOC (as methane) – 0.83 lb/hr; PM10 – 1.85 lb/hr; or SOx (as SO2) – 0.89 lb/hr, based on a one hour average. [District Rules 2201 and 4703]

Verification: The project owner shall submit to the CPM and APCO CEM-derived emissions data for NOx and CO (except when source testing is required for shutdowns) and shall provide calculated PM10 and VOC emission from fuel consumption data and source test results to demonstrate compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-34 Startup shall be defined as the period of time during which a unit is brought from a shutdown status to its SCR operating temperature and pressure, including the time required by the unit's emission control system to reach full operations. Shutdown shall be defined as the period of time during which a unit is taken from an operational to a non-operational status as the fuel supply to the unit is completely turned off. [District Rules 2201 and 4703]

Verification: The project owner shall submit to the CPM and APCO the CTG startup and shutdown event duration data demonstrating compliance with Condition **AQ-35** as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-35 The duration of each startup or shut down time shall not exceed two hours. Startup and shutdown emissions shall be counted toward all applicable emission limits. [District Rules 2201 and 4703]

Verification: The project owner shall submit to the CPM and APCO the CTG startup and shutdown event duration data demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-36 The emission control systems shall be in operation and emissions shall be minimized insofar as technologically feasible during startup and shutdown. [District Rule 4703]

Verification: The project owner shall submit to the CPM and APCO the CTG startup and shutdown emissions data demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-37 Daily emissions from each CTG shall not exceed any of the following limits: NOx (as NO2) – 67.3 lb/day; CO – 126.0 lb/day; VOC – 19.7 lb/day; PM10 – 44.4 lb/day; or SOx (as SO2) – 21.4 lb/day. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO CTG emissions data demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-38 Combined daily emissions from the two Swiftpac unit CTG's operating under permit units C-7286-1 and C-7286-2, and the two Swiftpac unit CTG's operating under permit units C-7286-3 and C-7286 shall not exceed any of the following Swiftpac two turbine limits: NOx (as NO2) – 134.6 lb/day; CO – 252.0 lb/day; VOC – 39.4 lb/day; PM10 – 88.8 lb/day; or SOx (as SO2) – 42.8 lb/day. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO CTG emissions data demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-39 Quarterly hours of operation of each CTG shall not exceed any of the following limits: 1st Quarter – 800 hours, 2nd Quarter – 800 hours, 3rd Quarter – 1,400 hours, or 4th Quarter – 1,000 hours. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO CTG operations data demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-40 Annual emissions from each CTG, calculated on a twelve month rolling basis, shall not exceed any of the following limits: NOx (as NO2) – 11,209 lb/year; CO – 19,546 lb/year; VOC – 3,320 lb/year; PM10 – 7,400 lb/year; or SOx (as SO2) – 3,560 lb/year. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO CTG emissions data demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-41 Combined annual emissions from the two Swiftpac unit CTG's operating under permit units C-7286-1 and C-7286-2, and the two Swiftpac unit CTG's operating under permit units C-7286-3 and C-7286 calculated on a twelve consecutive month rolling basis, shall not exceed any of the following Swiftpac two turbine limits: NOx (as NO2) – 22,416 lb/year; CO – 39,096 lb/year; VOC – 6,400 lb/year; PM10 – 14,800 lb/year; or SOx (as SO2) – 7,120 lb/year. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO CTG emissions data demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-42 Each one hour period shall commence on the hour. Each one hour period in a three hour rolling average will commence on the hour. The three hour average will be compiled from the three most recent one hour periods. Each one hour period in a twenty-four hour average for ammonia slip will commence on the hour. [District Rule 2201]

Verification: The project owner shall compile required emission compliance data using these standards and shall submit the information to the CPM and the APCO as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-43 Daily emissions will be compiled for a twenty-four hour period starting and ending at twelve-midnight. Each month in the twelve consecutive month rolling average emissions shall commence at the beginning of the first day of the month. The twelve consecutive month rolling average emissions to determine compliance with annual emissions limitations shall be compiled from the twelve most recent calendar months. [District Rule 2201]

Verification: The project owner shall compile required emission compliance data using these standards and submit the information to the CPM and the APCO as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-44 Compliance with the ammonia emission limits shall be demonstrated utilizing one of the following procedures: 1) calculate the daily ammonia emissions

using the following equation: (ppmvd @ 15% O2) = ((a - (b x c/1,000,000)) x (1,000,000 / b)) x d, where a = ammonia injection rate (lb/hr) / (17 lb/lb mol), b = dry exhaust flow rate (lb/hr) / (29 lb/lb mol), c = change in measured NOx concentration ppmvd @ 15% O2 across the catalyst, and d = correction factor. The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip; 2.) Utilize another District-approved calculation method using measured surrogate parameters to determine the daily ammonia emissions in ppmvd @ 15% O2. If this option is chosen, the project owner shall submit a detailed calculation protocol for District approval at least 60 days prior to commencement of operation; 3.) Alternatively, the project owner may utilize a continuous in-stack ammonia monitor to verify compliance with the ammonia emissions limit. If this option is chosen, the project owner shall submit a monitoring plan for District approval at least 60 days prior to commencement of operation. [District Rules 2201 and 4102]

Verification: The project owner shall submit for approval their proposed ammonia calculation procedure using one of the methods identified above to the CPM and the APCO for approval 15 days prior to turbine first fire, and then submit to the CPM and APCO for approval any requested modifications to the calculation procedure, not including revised source test correction factors, at least 15 days prior to the Quarterly Operation Report (**AQ-SC10**) where the modified calculation procedure is first used.

AQ-45 Source testing to measure startup and shutdown NOx, CO, and VOC mass emission rates shall be conducted for one of the gas turbines (C-7286-1, C-7286-2, C-7286-3, or C-7286-4) prior to the end of the commissioning period and at least once every seven years thereafter. CEM relative accuracy shall be determined during startup source testing in accordance with 40 CFR 60, Appendix B. If CEM data is not certifiable to determine compliance with NOx and CO startup emission limits, then source testing to measure startup NOx and CO mass emission rates shall be conducted at least once every 12 months. [District Rules 1081 and 2201]

Verification: The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing. Testing shall be conducted for the CTG upon initial operation, and at least once every seven years.

AQ-46 Initial source testing to determine compliance with the NOx, CO and VOC emission rates (lb/hr and ppmvd @ 15% O2) NH3 emission rate (ppmvd @ 15% O2) and PM10 emission rate (lb/hr) shall be conducted within 120 days after initial operation. Initial source testing shall be conducted while unit C-7286-1 is operating independently and while unit C-7286-2 is operating independently and while units C-7286-1 and C-7286-2 are operating simultaneously. [District Rules 1081, 2201 and 4703 and 40 CFR 60.4400(a)]

Verification: The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing.

AQ-47 Source testing to determine compliance with the NOx, CO, VOC and NH3 emission rates (lb/hr and ppmvd @ 15% O2) and PM10 emission rate (lb/hr)

shall be conducted at least once every 12 months. Source testing shall be conducted while units C-7286-1 and C-7286-2 and units C-7286-3 and C-7286-4 are operating simultaneously. If any of units C-7286-1, C-7286-2, C-7286-3, or C-7286-4 are operated independently for more than 400 hours during any given calendar year, source testing for those units shall also be conducted while they are operating independently. [District Rules 1081, 2201 and 4703 and 40 CFR 60.4400(a)]

Verification: The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing.

AQ-48 The sulfur content of each fuel source shall be: (i) documented in a valid purchase contract, a supplier certification, a tariff sheet or transportation contract or (ii) monitored within 60 days of the end of the commission period and weekly thereafter. If the sulfur content is demonstrated to be less than 1.0 gr/100 scf for eight consecutive weeks, then the monitoring frequency shall be every six months. If the result of any six month monitoring demonstrates that the fuel does not meet the fuel sulfur content limit, weekly monitoring shall resume. [40 CFR 60.4360, 60.4365(a) and 60.4370(c)]

Verification: The result of the natural gas fuel sulfur monitoring data and other fuel sulfur content source data shall be submitted to the CPM and the APCO in the Quarterly Operation Report (AQ-SC10).

AQ-49 The following test methods shall be used: NOx - EPA Method 7E or 20; CO - EPA Method 10 or 10B; VOC - EPA Method 18 or 25; PM10 - EPA Method 5/202 (front half and back half) or 201 and 202a; ammonia - BAAQMD ST-1B; and O2 - EPA Method 3, 3A, or 20. EPA approved alternative test methods, as approved by the District, may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4703 and 40 CFR 60.4400(1)(i)]

Verification: The project owner shall notify the CPM and the District 30 days prior to any compliance source test. The project owner shall provide a source test plan to the CPM and District for the CPM and District approval 15 days prior to testing.

AQ-50 Fuel sulfur content shall be monitored using one of the following methods: ASTM Methods D1072, D3246, D4084, D4468, D4810, D6228, D6667 or Gas Processors Association Standard 2377. [40 CFR 60.4415(a)(1)(i)]

Verification: The fuel sulfur content data shall be submitted to the CPM and the APCO in the Quarterly Operation Report (**AQ-SC10**).

AQ-51 The exhaust stacks shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]

Verification: Prior to construction of the turbine stacks the project owner shall provide to the CPM for approval detailed plan drawings of the turbine stacks that show the sampling ports and demonstrate compliance with the requirements of this condition. The project owner shall make the site available for inspection of the turbine stacks by representatives of the District, CARB and the Commission.

AQ-52 Compliance demonstration (source testing) shall be District witnessed, or authorized and samples shall be collected by a California Air Resources Board certified testing laboratory. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified 30 days prior to any compliance source test, and a source test plan must be submitted for approval 15 days prior to testing. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081 and 40 CFR 60.4375(b)]

Verification: The project owner shall notify the CPM and the District 30 days prior to any compliance source test. The project owner shall provide a source test plan to the CPM and District for approval 15 days prior to testing. The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing.

AQ-53 Each CTG shall be equipped with a continuous monitoring system to measure and record fuel consumption. [District Rules 2201 and 4703]

Verification: The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission to verify the continuous monitoring system is properly installed and operational.

AQ-54 The owner or operator shall install, certify, maintain, operate and quality-assure a Continuous Emission Monitoring System (CEMS) which continuously measures and records the exhaust gas NOx, CO and O2 concentrations. Continuous emissions monitor(s) shall be capable of monitoring emissions during normal operating conditions, and during startups and shutdowns, provided the CEMS passes the relative accuracy requirement for startups and shutdowns specified herein. If relative accuracy of CEMS cannot be demonstrated during startup conditions, CEMS results during startup and shutdown events shall be replaced with startup emission rates obtained from source testing to determine compliance with emission limits contained in this document. [District Rules 1080 and 4703 and 40 CFR 60.4335(b)(1)]

Verification: The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission to verify the continuous monitoring system is properly installed and operational.

AQ-55 The CEMS shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period or shall meet equivalent specifications established by mutual agreement of the District, the ARB and the EPA. [District Rule 1080 and 40 CFR 60.4345(b)]

Verification: The project owner shall submit to the CPM and APCO CEMS audits demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-56 The NOx, CO and O2 CEMS shall meet the requirements in 40 CFR 60, Appendix F Procedure 1 and Part 60, Appendix B Performance Specification 2 (PS 2), or shall meet equivalent specifications established by mutual agreement of the District, the ARB, and the EPA. [District Rule 1080 and 40 CFR 60.4345(a)]

Verification: The project owner shall submit to the CPM and APCO CEMS audits demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-57 Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and compliance source testing are both performed, in accordance with EPA guidelines. The District shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080]

Verification: The project owner shall submit to the CPM and APCO the CEMS audits demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-58 The owner/operator shall perform a relative accuracy test audit (RATA) for the NOx, CO and O2 CEMS as specified by 40 CFR Part 60, Appendix F, 5.11, at least once every four calendar quarters. The project owner shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F. [District Rule 1080]

Verification: The project owner shall submit to the CPM and APCO CEMS audits demonstrating compliance with this condition as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-59 Results of the CEM system shall be averaged over a one hour period for NOx emissions and a three hour period for CO emissions using consecutive 15-minute sampling periods in accordance with all applicable requirements of CFR 60.13. [District Rule 4703 and 40 CFR 60.13]

Verification: The project owner shall submit to the CPM and APCO emission data required in the Quarterly Operation Reports (**AQ-SC10**) that follows the definitions of this condition.

AQ-60 Excess emissions shall be defined as any operating hour in which the 4-hour or 30-day rolling average NOx concentration exceeds applicable emissions limit and a period of monitor downtime shall be any unit operating hour in which sufficient data are not obtained to validate the hour for either NOx or O2 (or both). [40 CFR 60.4380(b)(1)]

Verification: The project owner shall submit to the CPM and APCO emission data and monitor downtime data in the Quarterly Operation Reports (**AQ-SC10**) that follows the definitions of this condition.

AQ-61 Results of continuous emissions monitoring shall be reduced according to the procedures established in 40 CFR, Part 51, Appendix P, paragraphs 5.0 through 5.3.3, or by other methods deemed equivalent by mutual agreement with the District, the ARB, and the EPA. [District Rule 1080]

Verification: The project owner shall submit to the CPM and APCO emission data required in the Quarterly Operation Reports (**AQ-SC10**) that follows the definitions of this condition.

AQ-62 The facility shall install and maintain equipment, facilities, and systems compatible with the District's CEM data polling software system and shall make CEM data available to the District's automated polling system on a daily basis. [District Rule 1080]

Verification: The project owner shall provide a Continuous Emission Monitoring System (CEMS) protocol for approval by the CPM and the APCO at least 60 days prior to installation of the CEMS. The project owner shall make the site available for inspection of the CEMS by representatives of the District, CARB and the Commission.

AQ-63 Upon notice by the District that the facility's CEM system is not providing polling data, the facility may continue to operate without providing automated data for a maximum of 30 days per calendar year provided the CEM data is sent to the District by a District-approved alternative method. [District Rule 1080]

Verification: The project owner shall provide required non-polled CEM data to the District by a District-approved alternative method.

AQ-64 The owner or operator shall, upon written notice from the APCO, provide a summary of the data obtained from the CEM systems. This summary shall be in the form and the manner prescribed by the APCO. [District Rule 1080]

Verification: The project owner shall submit to the CPM and APCO CEMS summary data upon written notice from the APCO.

AQ-65 The owner or operator shall submit a written report of CEM operations for each calendar quarter to the APCO. The report is due on the 30th day following the end of the calendar quarter and shall include the following: Time intervals, data and magnitude of excess NOx emissions, nature and the cause of excess (if known), corrective actions taken and preventative measures adopted; Averaging period used for data reporting corresponding to the averaging period specified in the emission test period used to determine compliance with an emission standard; Applicable time and date of each period during which the CEM was inoperative (monitor downtime), except for zero and span checks, and the nature of system repairs and adjustments; A negative declaration when no excess emissions occurred. [District Rule 1080 and 40 CFR 60.4375(a) and 60.4395]

Verification: The project owner shall submit to the CPM and APCO the CEMS audits demonstrating compliance with this condition as part of the Quarterly Operation Report required by this condition and condition **AQ-SC10**.

AQ-66 APCO or an authorized representative shall be allowed to inspect, as determined to be necessary, the required monitoring devices to ensure that such devices are functioning properly. [District Rule 1080]

Verification: The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission to verify monitoring devices are functioning properly.

AQ-67 The project owner shall notify the District of any breakdown condition as soon as reasonably possible, but no later than one hour after its detection, unless the owner or operator demonstrates to the District's satisfaction that the longer reporting period was necessary. [District Rule 1100, 6.1]

Verification: The project owner shall comply with the notification requirements of the District and submit written copies of these notification reports to the CPM and the APCO as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-68 The District shall be notified in writing within ten days following the correction of any breakdown condition. The breakdown notification shall include a description of the equipment malfunction or failure, the date and cause of the initial failure, the estimated emissions in excess of those allowed, and the methods utilized to restore normal operations. [District Rule 1100, 7.0]

Verification: The project owner shall comply with the notification requirements of the District and submit written copies of these notification reports to the CPM and the APCO as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-69 The project owner shall maintain the following records: date and time, duration, and type of any startup, shutdown, or malfunction; performance testing, evaluations, calibrations, checks, adjustments, any period during which a continuous monitoring system or monitoring device was inoperative, and maintenance of any continuous emission monitor. [District Rules 1080, 2201, and 4703 and 40 CFR 60.8(d)]

Verification: The project owner shall make the site available for inspection of records by representatives of the District, CARB and the Commission.

AQ-70 The project owner shall maintain the following records: hours of operation, fuel consumption (scf/hr and scf/rolling twelve month period), continuous emission monitor measurements, calculated ammonia slip, and calculated NOx mass emission rates (lb/hr, lb/qtr and lb/twelve month rolling period). [District Rules 2201 and 4703]

Verification: The project owner shall make the site available for inspection of records by representatives of the District, CARB and the Commission.

AQ-71 All records shall be maintained and retained on-site for a period of at least five years and shall be made available for District inspection upon request. [District Rules 1070, 2201, and 4703]

Verification: The project owner shall make the site available for inspection of records by representatives of the District, CARB and the Commission.

AQ-72 Disturbances of soil related to any construction, demolition, excavation, extraction, or other earthmoving activities shall comply with the requirements for fugitive dust control in District Rule 8021 unless specifically exempted under Section 4.0 of Rule 8021 or Rule 8011. [District Rules 8011 and 8021]

Verification: The project owner shall document compliance with Rule 8021 in the Monthly Compliance Report (**AQ-SC3**), and as necessary after construction is complete in the Quarterly Operation Report (**AQ-SC10**).

AQ-73 An owner/operator shall submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. [District Rules 8011 and 8021]

Verification: The project owner shall submit a Dust Control Plan to the CPM and APCO at least 30 days prior to the start of any construction activities to show compliance with this condition and Condition **AQ-SC2**.

AQ-74 An owner/operator shall prevent or cleanup any carryout or trackout in accordance with the requirements of District Rule 8041 Section 5.0, unless specifically exempted under Section 4.0 of Rule 8041 (8/19/04) or Rule 8011(8/19/04). [District Rules 8011 and 8021]

Verification: The project owner shall document compliance with Rule 8041 in the Monthly Compliance Report (**AQ-SC3)**, and as necessary after construction is complete in the Quarterly Operation Report (**AQ-SC10**).

AQ-75 Whenever open areas are disturbed, or vehicles are used in open areas, the facility shall comply with the requirements of Section 5.0 of District Rule 8051, unless specifically exempted under Section 4.0 of Rule 8051 or Rule 8011. [District Rules 8011 and 8051]

Verification: The project owner shall document compliance with Rule 8051 in the Monthly Compliance Report (**AQ-SC3)**, and as necessary after construction is complete in the Quarterly Operation Report (**AQ-SC10**).

AQ-76 Any paved road or unpaved road shall comply with the requirements of District Rule 8061 unless specifically exempted under Section 4.0 of Rule 8061 or Rule 8011. [District Rules 8011 and 8061]

Verification: The project owner shall document compliance with Rule 8061 in the Monthly Compliance Report (**AQ-SC3)**, and as necessary after construction is complete in the Quarterly Operation Report (**AQ-SC10**).

AQ-77 Water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure shall be applied to unpaved vehicle travel areas as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8011 and 8071]

Verification: The project owner shall document compliance with Rule 8071 in the Monthly Compliance Report (**AQ-SC3)**, and as necessary after construction is complete in the Quarterly Operation Report (**AQ-SC10**).

AQ-78 Where dusting materials are allowed to accumulate on paved surfaces, the accumulation shall be removed daily or water and/or chemical/organic dust stabilizers/suppressants shall be applied to the paved surface as required to maintain continuous compliance with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011 and limit Visible Dust Emissions (VDE) to 20% opacity. [District Rule 8011 and 8071]

Verification: The project owner shall document compliance with Rule 8071 in the Monthly Compliance Report (**AQ-SC3)**, and as necessary after construction is complete in the Quarterly Operation Report (**AQ-SC10**).

AQ-79 On each day that 50 or more Vehicle Daily Trips or 25 or more Vehicle Daily Trips with 3 axles or more will occur on an unpaved vehicle/equipment traffic area, the project owner shall apply water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8011 and 8071]

Verification: The project owner shall document compliance with Rule 8071 in the Monthly Compliance Report (**AQ-SC3)**, and as necessary after construction is complete in the Quarterly Operation Report (**AQ-SC10**).

AQ-80 Whenever any portion of the site becomes inactive, the project owner shall restrict access and periodically stabilize any disturbed surface to comply with the conditions for a stabilized surface as defined in Section 3.58 of District Rule 8011. [District Rules 8011 and 8071]

Verification: The project owner shall document compliance with Rules 8011 and 8071 in the Monthly Compliance Report (**AQ-SC3)**, and as necessary after construction is complete in the Quarterly Operation Report (**AQ-SC10**).

AQ-81 Records and other supporting documentation shall be maintained as required to demonstrate compliance with the requirements of the rules under Regulation VIII only for those days that a control measure was implemented. Such records shall include the type of control measure(s) used, the location and extent of coverage, and the date, amount, and frequency of application of dust suppressant, manufacturer's dust suppressant product information sheet that identifies the name of the dust suppressant and application instructions.

Records shall be kept for one year following project completion that results in the termination of all dust generating activities. [District Rules 8011, 8031, and 8071]

Verification: The project owner shall document compliance with Regulation VIII rules in the Monthly Compliance Report (**AQ-SC3)**, and as necessary after construction is complete in the Quarterly Operation Report (**AQ-SC10**).

ACRONYMS

AERMOD	ARMS/EPA Regulatory Model
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
APCO	Air Pollution Control Officer (SJVAPCD)
BACT	Best Available Control Technology
bhp	brake horse power
ARB	California Air Resources Board
CEC	California Energy Commission (or Energy Commission)
CEQA	California Environmental Quality Act
CEM	Continuous Emission Monitor
CO	Carbon Monoxide
CTG	Combustion Turbine Generator
CPM	(CEC) Compliance Project Manager
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
GHG	Greenhouse Gas
gr	Grains (1 gr $\cong$ 0.0648 grams, 7000 gr = 1 pound)
GTE	Gas Turbine Engine
HRSG	Heat Recovery Steam Generator
ISCST3	Industrial Source Complex Short Term, version 3
MCR	Monthly Compliance Report (project construction)
MMBtu	Million British thermal units
MW	Megawatts (1,000,000 Watts)
NH_3	Ammonia
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen *or* Nitrogen Oxides
NSR	New Source Review
OLM	Ozone Limiting Method
PDOC	Preliminary Determination Of Compliance
PEC	Panoche Energy Center
PM10	Particulate Matter less than 10 microns in diameter
PM2.5	Particulate Matter less than 2.5 microns in diameter
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
ppmvd	Parts Per Million by Volume, Dry
PSA	Preliminary Staff Assessment (this document)
PSD	Prevention of Significant Deterioration
scf	Standard Cubic Feet
SCR	Selective Catalytic Reduction
SIP	State Implementation Plan
SJVAPCD	San Joaquin Valley Air Pollution Control District (also District)
SO_2	Sulfur Dioxide
SOx	Oxides of Sulfur
U.S. EPA	United States Environmental Protection Agency
$\mu g/m^3$	Microgram per cubic meter
VOC	Volatile Organic Compounds

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BIOLOGICAL RESOURCES

Testimony of Heather Blair

SUMMARY OF CONCLUSIONS

The proposed Starwood Power Project is located in western Fresno County within the northern population of the state threatened and federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*) and within an area that has been designated by the US Fish and Wildlife Service to be preserved for the habitat connectivity of this species. Consultation with US Fish and Wildlife Service under Section 7 of the federal Endangered Species Act is required. Implementation of the proposed Conditions of Certification presented in this final staff assessment will mitigate impacts to biological resources to less than significant levels. A biological opinion was issued by the US Fish and Wildlife Service on August 21, 2007.

INTRODUCTION

This section provides the California Energy Commission (Energy Commission) staff's analysis of potential impacts to biological resources from the construction and operation of the Starwood Power Project (SPP) as proposed by Starwood Power-Midway, LLC (the applicant). This analysis addresses potential impacts to state and federally listed species, California species of special concern, and other areas of critical biological concern. Information contained in this document includes a detailed description of the existing biotic environment, an analysis of potential impacts to biological resources and, where necessary, specifies mitigation planning and compensation measures to reduce potential impacts to less than significant levels. Additionally, this analysis determines compliance with applicable laws, ordinances, regulations, and standards (LORS), and identifies applicable conditions of certification.

This analysis is based, in part, on information provided in the SPP application for certification, ongoing contact with the applicant, responses to staff data requests, staff site visits conducted on January 19 and February 28, 2007, and discussions with the US Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the California Energy Commission (Energy Commission) are reviewed to ensure compliance with all applicable laws, ordinances, regulations, and standards (LORS). Although the Energy Commission has preemptive authority over local laws, it typically ensures compliance with local LORS. Applicable LORS for biological resources are listed in **Biological Resources Table 1**.

BIOLOGICAL RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Endangered Species Act (Title 16, United States Code, sections 1531 et seq.; Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for the protection of threatened and endangered plant and animal species and their critical habitat. The administering agency is USFWS.
Migratory Bird Treaty Act (Title 16, United States Code, sections 703-711)	Prohibits the take or possession of any migratory nongame bird (or any part of such migratory nongame bird), including nests with viable eggs. The administering agency is USFWS.
State	
California Endangered Species Act (Fish and Game Code, sections 2050 et seq.)	Protects California's rare, threatened, and endangered species.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals that are classified as rare, threatened, or endangered in California. The administering agency is CDFG.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits take of such species. The administering agency is CDFG.
Native Plant Protection Act (Fish and Game Code, section 1900 et seq.)	Designates rare, threatened, and endangered plants in California, and prohibits the taking of listed plants. The administering agency is CDFG.
Nest or Eggs (Fish and Game Code, section 3503)	Prohibits take, possession, or needless destruction of the nest or eggs of any bird. The administering agency is CDFG.
Migratory Birds (Fish and Game Code, section 3513)	Prohibits take or possession of any migratory nongame bird as designated in the Migratory Bird Treat Act or any part of such migratory nongame bird. The administering agency is CDFG.
Local	
Fresno County General Plan – Open Space and Conservation Element	Requires that proposed development projects be compatible with policies set forth in the natural resources section, which provide for the protection and enhancement of fish and wildlife species, riparian and wetland habitats, and native vegetation resources.

SETTING

REGIONAL SETTING

The SPP site is located in the western portion of the San Joaquin Valley in an unincorporated area of western Fresno County, approximately 50 miles west of the City of Fresno and two miles east of Interstate 5. Historically, this portion of the San Joaquin Valley contained many natural habitats that supported a variety of native plant and animal species. However, these natural environments have been largely converted to agricultural and urban land uses. The nearest natural areas, where the majority of the special-status species near the proposed project area have been recorded, are located

to the south and west of the project area and include Tumey Hills, Panoche Hills, Ciervo Hills, and Monocline Ridge. The nearest natural area is Tumey Hills, located approximately 4.4 miles west of the SPP site.

PROJECT SITE AND VICINITY DESCRIPTION

Near the proposed project, agricultural production is the dominant land use, with other mixed uses including urban areas, industrial, and commercial facilities. The SPP site is bordered to the southwest by the existing CalPeak Panoche peaking power plant and to the southeast by the existing Wellhead peaking power plant. The existing PG&E Panoche Substation is also located adjacent to the CalPeak Panoche facility. Another power plant, the Panoche Energy Center, at a 12.8-acre site approximately 0.2 miles east of the SPP site, and is currently occupied by an active pomegranate orchard. The SPP site (5.6 acres) is entirely located within an area that is currently used as a storage yard by CalPeak Power. The adjacent land uses support electricity generation and agricultural production.

Existing Vegetation and Wildlife

The applicant conducted a reconnaissance-level survey of biological resources within the project area and within a one-mile radius surrounding the proposed project area on April 21, 2006. The survey included an inventory of all plant and wildlife species observed and an assessment of potential habitat suitability for special-status species. The applicant has a pending application at the Energy Commission for the Panoche Energy Center (06-AFC-5), which is located 0.2 mile east of the SPP site. Biological surveys included a one-mile buffer of the Panoche Energy Center, which encompassed the SPP site. The following description of existing biological resources presents the results of the applicant's reconnaissance survey and observations from staff's site visits on January 19 and February 28, 2007.

The SPP site had been previously graded and was largely devoid of vegetation with the exception of sparse nonnative grasses and weeds. The area in the immediate vicinity of the SPP site is highly disturbed due to intensive agricultural operations, including regular herbicide application to manage vegetation in the pomegranate orchard understory. As a result, native plant communities are not present near the SPP site. Herbaceous cover, when present, was limited to weedy annuals including redstem filaree (*Erodium cicutarium*), common groundsel (*Senecio vulgaris*), foxtail chess (*Bromus madritensis*), and sow-thistle (*Sonchus* sp.). The only native plant species documented during the survey was miner's lettuce (*Claytonia perfoliata*), an understory plant that commonly occurs in orchards within the San Joaquin Valley.

Direct observations in the project area included various common wildlife species such as coyote (*Canis latrans*), western toad (*Bufo boreas*), and a variety of bird species typically found in disturbed and developed areas such as house finch (*Carpodacus mexicanus*), northern mocking bird (*Mimus polyglottus*), mourning dove (*Zenaida macroura*), brown-headed cowbird (*Molothrus ater*), killdeer (*Charadrius vociferus*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), American crow (*Corvus branchyrhynchos*), cliff swallow (*Petrochelidon fulva*), and Brewer's blackbird (*Euphagus cyanocephalus*). Additional bird species identified during surveys include red-tailed hawk (*Buteo jamaicensis*), western kingbird (*Tyrannus verticalis*),

American goldfinch (*Carduelis tristis*), and American pipit (*Anthus rubescens*). Agricultural lands provide foraging and breeding habitat for populations of Botta's gophers (*Thomomys bottae*), voles (*Microtus* sp.), western harvest mice (*Reithrodontomys megalotis*), house mice (*Mus musculus*), and California ground squirrels (*Spermophilus beecheyi*). The SPP site is highly disturbed, surrounded by a chain-link fence, and is not expected to support a wide diversity of native wildlife species. However, the site is accessible to avian species and mammals that are able to breach the chain-link fence.

Agricultural land uses near the SPP site may still provide foraging habitat for migrating and resident birds and various mammals including coyotes and foxes. Suitable habitat for denning and nesting may occur along the weedy edges of fields and irrigation canals as well as in fallow agricultural fields.

Wetlands were not identified within the proposed project area. Two agricultural drainages are located immediately south of the existing Panoche Substation and east of Davidson Avenue. These drainages are unvegetated and are not considered jurisdictional waters of the U.S. by the U.S. Army Corps of Engineers or CDFG. The SPP site is located approximately 2 miles southwest of Panoche Creek and approximately 2.5 miles west of the California Aqueduct. The nearest blue-line or first order stream, which originates in the Tumey Hills, is located approximately 1.6 miles southwest of the project area.

Special-status Species

Special-status species include those listed as threatened or endangered under the federal or California Endangered Species Acts, species proposed for listing, California species of special concern, and other species that have been identified by the USFWS or CDFG as unique or rare. **Biological Resources Table 2** identifies the special-status species that were historically present or have the potential to be present within the vicinity of the project area.

Special-status plant and wildlife species were not observed in or adjacent to the project area during biological surveys. Although not observed in the project area, several special-status wildlife species are known to use disturbed areas in the region and thus have suitable habitat near the SPP site. These species include burrowing owl (*Athene cunicularia*) and San Joaquin kit fox (*Vulpes macrotis mutica*). These species are indicated with an asterisk in **Biological Resources Table 2**.

Special-status plant species are not expected to occur in the project area. Searches of the California Natural Diversity Database and California Native Plant Society database identified 12 plant species that are known to occur in the general vicinity. However, there are no recorded occurrences of special-status plant species within 1 mile of the project area. These species were determined to have little or no potential to occur on site due to the high level of disturbance and the resulting lack of suitable environmental conditions to support them.

BIOLOGICAL RESOURCES Table 2
Special-Status Species Historically or Potentially Occurring in the Vicinity of the Starwood Site

Scientific name	Common name	Status	Habitat Type	Potential To Occur
Plants				
Atriplex vallicola	Lost Hills crownscale	CNPS List 1B	Chenopod scrub, valley and foothill grasslands, vernal pools; elevation 50-635 m	low
Cordylanthus mollis ssp. *hispidus*	Hispid bird's-beak	CNPS List 1B	Meadows and seeps, playas, valley and foothill grasslands (alkaline); elevation 1-155 m	low
Deinandra halliana	Hall's tarplant	CNPS List 1B	Chenopod scrub, cismontane woodland, valley and foothill grassland (clay); elevation 300-950 m	low
Delphinium recurvatum	Recurved larkspur	CNPS List 1B	Chenopod scrub, cismontane woodland, valley and foothill grassland (alkaline); elevation 3-750 m	low
Eriogonum temblorense	Temblor buckwheat	CNPS List 1B	Valley and foothill grassland (clay or sandstone); elevation 300-1000 m	low
Erodium macrophyllum	Round-leaved filaree	CNPS List 1B	Cismontane woodland, valley and foothill grassland/clay; elevation 15-1200 m	low
Layia heterotricha	Pale-yellow layia	CNPS List 1B	Cismontane woodland, pinyon-juniper woodland, valley and foothill grassland (alkaline or clay); elevation 300-1705 m	low
Layia munzii	Munz's tidy-tips	CNPS List 1B	Chenopod scrub, valley and foothill grassland (alkaline or clay); elevation 150-700 m	low
Lepidium jaredii ssp. *album*	Panoche pepper-grass	CNPS List 1B	Valley and foothill grassland (alluvial fans, washes); elevation 185-275 m	low
Madia radiata	Showy madia	CNPS List 1B	Cismontane woodland, valley and foothill grassland; elevation 25-900 m	low
Monolopia congdonii	San Joaquin woollythreads	FE, CNPS List 1B	Chenopod scrub, valley and foothill grassland (sandy); elevation 60-800 m	low
Sagittaria sanfordii	Sanford's arrowhead	CNPS List 1B	Marshes and swamps; elevation 0-610 m	low
Insects and Crustaceans				
Branchinecta lynchi	Vernal pool fairy shrimp	FT	Vernal pools	low
Coelus gracilis	San Joaquin dune beetle	FC	Vegetated sand dunes	low
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	FE	Elderberry shrubs in riparian and oak savannah habitats	low
Reptiles and Amphibians				
Ambystoma californiense	California tiger salamander	FT	Small ponds, lakes or vernal polls	low

Scientific name	Common name	Status	Habitat Type	Potential To Occur
Anniella pulchra pulchra	Silvery legless lizard	CSC	Beaches, sandy washes, woodland, chaparral and riparian areas; requires loose soil for burrowing or thick duff or leaf litter	low
Emys (=Clemmys) marmorata	Western pond turtle	CSC	Woodlands, grasslands and open forests; occupies aquatic habitats	low
Gambelia sila	Blunt-nosed leopard lizard	FE, CE	Open habitats with scatted low bushes on alkali flats, low foothills, plains, washes, arroyos	low
Masticophis flagellum ruddocki	San Joaquin whipsnake	CSC	Open, dry grassland and saltbush scrub habitats with little to no tree cover	low
Phrynosoma coronatum frontale	California horned lizard	CSC	Grasslands, brushlands, woodlands and open coniferous forests with sandy or loose soil; requires abundant ant colonies	low
Rana draytonii	California red-legged frog	FT	Permanent and semi-permanent aquatic habitats; may aestivate in rodent burrows or cracks	low
Thamnophis gigas	Giant garter snake	FT, CT	Sloughs, canals and other small waterways; requires grassy banks and emergent vegetation for basking	low
Fish				
Hypomesus transpacificus	Delta smelt	FT	Brackish water within the Sacramento-San Joaquin estuary	Low
Oncorhynchus mykiss	Central valley steelhead	FT	Streams, rivers, lakes in Sacramento River basin	low
Birds				
Agelaius tricolor	Tricolored blackbird	CSC	Nests colonially in dense vegetation with water and open grassland foraging habitat nearby	low
Asio flammeus	Short-eared owl	CSC	Freshwater and salt marshes, lowland meadows and irrigated alfalfa fields	low
**Athene cunicularia*	Burrowing owl	CSC	Open, dry grasslands, agricultural and range lands, and desert habitats; often associated with burrowing animals such as ground squirrels	moderate
Buteo swainsoni	Swainson's hawk	CT	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, grain fields	low
Coccyzus americanus occidentalis	Western yellow-billed cuckoo	FC, CE	Wide, dense riparian forests	low
Falco mexicanus	Prairie falcon	CSC	Nests in cliffs or escarpments; forages in adjacent dry, open terrain or uplands, marshes and seasonal marshes	low

Scientific name	Common name	Status	Habitat Type	Potential To Occur
Haliaeetus leucocephalus	Bald eagle	FT, CE	Nests and roosts in coniferous forests within 1 mile of water	low
Eremophila alpestris actia	California horned lark	CSC	Open habitats without trees and large shrubs; ground nesters	low
Riparia riparia	Bank swallow	CT	Nests in bluffs or banks, usually adjacent to water	low
Mammals				
Ammospermophilus nelsoni	San Joaquin antelope squirrel	CT	Arid grasslands with loamy soils and moderate shrub cover	low
Antrozous pallidus	Pallid bat	CSC	Roosts in rocky outcrops, cliffs and crevices; forages in open habitat	low
Eumops perotis californicus	Western mastiff bat	CSC	Roosts and breeds in rock crevices, may also use trees, buildings, tunnels; forages in arid to semi-arid habitats	low
Dipodomys ingens	Giant kangaroo rat	FE, CE	Restricted to flat, sparsely vegetated areas with annual grassland or shrubland habitats; requires uncultivated soils for burrowing	low
Dipodomys nitratoides exilis	Fresno kangaroo rat	FE	Alkali sink habitats; elevation 60-90 m	low
Onychomys torridus tularensis	Tulare grasshopper mouse	CSC	Grasslands, chaparral, sagebrush and bitterbrush scrub, alkali desert scrub	low
Taxidea taxus	American badger	CSC	Open areas with scattered shrubs and trees for cover, loose soil for digging	low
**Vulpes macrotis mutica*	San Joaquin kit fox	FE, CT	Native grasslands and scrublands, agriculture matrix of row crops, irrigated and non-irrigated pasture, orchards, vineyards	high

Source: (URS 2006a, USFWS 2007a, CNPS 2007)

Status Key

State Status
CE = State-listed as endangered
CT = State-listed as threatened
CSC = California species of special concern

California Native Plant Society (CNPS) Status
CNPS List 1B = Plants rare, threatened, or endangered in California, but more common elsewhere

Federal Status
FE = Federally listed as endangered
FT = Federally listed as threatened
FC = Candidate for federal listing

Potential to Occur
High = Suitable habitat is present within the proposed site; occurrence records exist for species in proximity to the site; species expected to occur on site
Moderate = Low-quality suitable habitat is present within or near the proposed site; species was not identified during reconnaissance surveys of the site; species not expected to occur
Low = Suitable habitat is not present on site; species not expected to occur

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Identifying the threshold for significance is based on the biological resources present or potentially present in consideration of the project description, which includes the applicant-proposed avoidance and minimization measures. A proposed project would have a significant impact to biological resources if it would:

- have an adverse impact, either directly through take, or indirectly through habitat modification or interruption of migration corridors, on any state- or federally listed species;
- have an indirect or direct adverse effect on any sensitive natural community identified in federal, state, or local plans, policies, or regulations;
- interfere with the movement of any native wildlife species (resident or migratory) or with established native wildlife (resident or migratory) corridors; or
- conflict with applicable federal, state, or local laws, ordinances, regulations and standards protecting biological resources, as listed in **Biological Resources Table 1**.

DIRECT/INDIRECT IMPACTS AND MITIGATION

According to the California Environmental Quality Act Guidelines, direct impacts are a result of construction or operation of the project, occur at the same time, and place as project activities. Indirect impacts are caused by the project, but can occur later in time or are farther removed in distance from the project site, but are reasonably foreseeable and project-related. This section analyzes the potential for direct and indirect impacts of construction and operation of the proposed project to biological resources and provides mitigation, as necessary, in an effort to reduce the severity of potentially adverse impacts.

Applicant-proposed impact avoidance and minimization measures have been incorporated into the project description and considered part of the proposed project to reduce impacts to biological resources. These measures are separate from the conditions of certification, which are proposed in addition to the project description for mitigating significant impacts. Following is a list of applicant-proposed impact avoidance and minimization measures (URS 2006a, p 5.6-13).

- To minimize trapping of common wildlife, set up fences around construction zones and relocate any trapped wildlife. Fenced areas and trenches should be checked regularly by a biological monitor to rescue and relocate any trapped animals.
- Provide biological orientation training for workers on site to educate them on procedures for minimizing impacts to common wildlife species and any occurrences of special-status species that have potential to occur in the project area.
- An approved, Designated Biologist shall implement the above measures.

Construction Impacts and Mitigation

The project consists of various components related to the generation and transmission of electricity, including those described below.

- **Power Plant Site.** The SPP would permanently occupy 5.6 acres within a 128-acre parcel comprising electric generation and transmission facilities and an active pomegranate orchard.
- **Evaporation Pond.** The proposed project would filter water prior to demineralization using a reverse osmosis unit, and the waste water from the unit would be discharged for evaporation into an onsite, lined 25,000-square-foot pond with a capacity of 30 acre-feet per year. Refer to the **Soil and Water Resources** section of this FSA for additional information regarding the evaporation pond.
- **Laydown and Parking Area.** The construction laydown area, which would accommodate equipment staging and parking, would be located within the confines of the 5.6-acre SPP site and is considered part of the permanent disturbance area of the project.
- **Electric Interconnection.** Electricity generated from the SPP would be connected to the PG&E transmission grid through a 115-kV bus via a new 300-foot overhead 115-kV transmission line to the existing PG&E Panoche Substation. The proposed 115-kV conductors would be supported by two dead-end take off structures, one existing at the adjacent PG&E Panoche Substation and one proposed as part of the Starwood Power project. The new structure would be an A-frame type, approximately 50 feet tall with 15-foot lightning masts attached to the structure peaks. The transmission line would extend from the northwest edge of the SPP site to the northeast corner of the existing Panoche Substation.
- **Water Supply Pipeline.** Water would be supplied to the proposed project through a connection to the existing CalPeak Panoche well. The water supply pipeline would consist of a 1,200-foot pipeline that would be installed along the property line between the existing CalPeak Panoche site and the SPP site. Pipeline installation would require a trench approximately 18 inches wide and 48 inches deep.

Construction Impacts to General Vegetation

Construction impacts to vegetation could occur in a variety of ways, including the direct removal of plants during construction. As these impacts are generally localized and are primarily temporary in nature, they are not usually considered significant unless the habitat type is regionally unique or is known to support special-status species. The proposed project would result in the permanent disturbance of approximately 5.6 acres. However, as the proposed project site is located entirely within a highly disturbed and previously graded area that is primarily devoid of vegetation, impacts to native vegetation would not occur and no mitigation is proposed.

Construction Impacts to General Wildlife

Direct loss of small mammals, reptiles, and other less mobile species could occur during construction of the proposed project. This would result primarily from the use of construction vehicles at the SPP site. Small burrowing animals (lizards, snakes, and small mammals) could be harmed through crushing of burrows, loss of refugia from

predators, and direct mortality from construction activities. Construction activities and human presence could also alter or disrupt breeding and foraging habitats and activities for common wildlife species.

Birds could nest in the pomegranate trees adjacent to the project site. The site itself does not contain suitable nesting habitat for most birds, although some species adapted to disturbed environments (e.g., the house finch) could nest in the equipment stored on site. Significant impacts to nesting birds would not be expected because of project construction.

Wildlife may become entrapped in open trenches during construction. As an impact avoidance and minimization measure, the applicant would set up fences around construction zones to prevent the entrapment of wildlife. Fenced areas and trenches would be inspected prior to construction activities each day. Additionally, staff recommends implementation of Condition of Certification **BIO-9** (Mitigation Management to Avoid Harassment or Harm), which would also require the installation of escape ramps so that animals that fall in the trench can escape. Implementation of these measures is expected to mitigate adverse impacts to wildlife from entrapment.

Waterfowl and shorebirds could seasonally inhabit or use evaporation ponds for resting or foraging. The proposed 25,000-square-foot evaporation pond could attract birds and other wildlife. Water for the project would be extracted from the existing CalPeak Panoche Well, which contains upper aquifer groundwater. The waste water directed to the evaporation pond would contain some contaminants, including selenium and salt. Selenium is a naturally occurring element in the sedimentary rocks of San Joaquin Valley; however, excess use of irrigation water has caused the water table to rise, resulting in mobilization of selenium in the groundwater supply (Letey et al. 2002).

Evaporation would increase concentrations of selenium and salt in the evaporation pond, which could lead to accumulation of selenium in pond invertebrates and in wildlife consuming those invertebrates. Water birds could be adversely impacted from exposure and bioaccumulation of selenium in their food chain (EPTC 1999). To prevent adverse impacts to waterbirds, CDFG has recommended the following (Sloan 2007, pers. comm):

- water should be kept at a depth less than 2 feet;
- pond slopes should be as steep as possible; and
- CalPeak Panoche Well water should be tested for selenium, mercury, uranium, boron, arsenic and vanadium prior to use by the project and after discharge into the pond.

These CDFG guidelines have been included in staff's proposed Conditions of Certification **BIO-10** (Evaporation Pond Design) and **BIO-11** (Evaporation Pond Monitoring), which would require monitoring of evaporation pond water quality and wildlife use. Implementation of these measures is expected to mitigate adverse impacts to wildlife from possible exposure to toxins in the evaporation pond.

Construction Impacts to Special-Status Species

Plants

Special-status plants are not expected to occur in the project area. Twelve special-status plants are known to occur within the vicinity of the project, but none is known from within 1 mile, and habitat suitability is generally poor at the SPP site. Therefore, significant adverse impacts to special-status plant species are not expected to occur from construction of the SPP.

Wildlife

The SPP site is nearly devoid of vegetation and is currently used as an equipment storage yard. Of the special-status wildlife species identified near the project area, only San Joaquin kit fox is known to use such disturbed habitats and thus have potential to occur in the project area.

Critical habitat is a formal designation under the federal Endangered Species Act where specific areas are designated as essential to the conservation and recovery of a federally listed species. These areas may require special management consideration or protection. Critical habitat for special-status wildlife does not occur in the project area (CDFG 2007).

The burrowing owl, a California species of special concern, is a yearlong resident of open, dry grassland, prairie, or desert floor habitats and is thought to be semi-colonial. Burrowing owls may be diurnal, crepuscular, or nocturnal, although hunting typically occurs at night. The burrowing owl is known to occur in urban, disturbed areas and at the edges of agricultural fields and typically hunts from a perch or hops after prey on the ground. It typically nests in the vacant burrow of a ground squirrel or other small mammal although it is also known to occupy manmade structures including culverts, pipes, nest boxes, and piles of construction debris (CDFG 2007). The equipment that is currently stored on the SPP site may provide artificial nesting habitat for the burrowing owl. However, it is unlikely that burrowing owl would occur due to the high frequency and intensity of disturbance at the proposed site.

The San Joaquin kit fox, a federally endangered and California threatened species, uses agricultural lands within the San Joaquin Valley. As illustrated in **Biological Resources Figure 1**, the site is within the eastern boundary of the northern core population, as identified by USFWS. Additionally, the site is located in an area that has been identified by USFWS to be preserved for kit fox habitat connectivity. The nearest known occurrence record for this species is approximately 3 miles west and was documented in 1999 (URS 2006a). Because kit foxes can travel up to 10 miles in one night during the breeding season (USFWS 1998) and there is contiguous nonirrigated agricultural habitat between the known core population and the SPP site, kit foxes may use the SPP site for foraging, cover, or as a movement corridor. USFWS categorizes suitable kit fox habitat according to three levels of quality to determine habitat compensation ratios: 1) natural, 2) grassland, 3) agricultural/ruderal (AEG 2007a, pers. comm.). The agricultural/ruderal classification (lowest habitat quality) applies to the SPP site. CDFG has determined that the SPP site is not suitable for denning (URS 2007b); however, there is the potential for adverse impacts to habitat connectivity and SJKF

movement cooridors, as well as individuals to be directly impacted by project construction and operation.

Loss of kit fox habitat would be considered significant without mitigation and requires consultation with the USFWS and CDFG to develop mitigation measures and provisions for incidental take. USFWS has identified a consultation process by which the applicant and USFWS enter into a Memorandum of Understanding (MOU), thereby providing a federal nexus for the proposed project and triggering section 7 consultation. The MOU was signed by USFWS on July 12, 2007 and by the applicant on July 25, 2007. A Biological Assessment (BA) was submitted to the USFWS on June 5, 2007 and a Biological Opinion was issued by the USFWS on August 21, 2007. The BO specifies actions that are required to avoid, minimize, or compensate for any potentially adverse impacts to SJKF and their habitat. Habitat compensation is also required and USFWS has identified the Krayenhagen Hills Conservation Bank in nearby western Fresno County as a preferred location to purchase mitigation credits at a ratio of 1.1:1 for permanent disturbance and 0.3:1 for temporary disturbance (AEG 2007a, pers. comm.). In the BO, USFWS requires additional protective measures pursuant to the federal ESA consultation process (USFWS 2007b).

Implementation of the following conditions of certification will further avoid and mitigate potentially adverse impacts: **BIO-4** (Designated Biologist and Biological Monitor Authority), **BIO-5** (Worker Environmental Awareness Program), **BIO-6** (Biological Resources Mitigation Implementation and Monitoring Plan), **BIO-8** (Impact Avoidance Mitigation Features), **BIO-9** (Mitigation Management to Avoid Harassment or Harm), and **BIO-12** (Habitat Compensation). Condition of Certification **BIO-9** contains the measures contained in the Biological Opinion (USFWS 2007b) and adapted from *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 1999).

General Construction Impacts

Construction activities have the potential to create a variety of temporary impacts to biological resources including:

- **Noise** (for a complete analysis, see the **Noise** section of this Staff Assessment). Construction activities would result in a short-term, temporary increase in the ambient noise level. Such activities have the potential to disrupt the nesting, roosting, or foraging activities of local wildlife. The existing Wellhead and CalPeak Panoche plants, PG&E Substation, traffic on West Panoche Road, and intensive agricultural operations in the immediate vicinity of the SPP site create elevated ambient noise levels to which local wildlife species have acclimated.
- **Lighting** (for a complete analysis, see the **Visual Resources** section of this Staff Assessment). Since night construction would not occur (URS 2006a, p 5.12-12), excess lighting would not significantly impact wildlife during construction. The applicant would direct lighting downward and toward the interior of the plant to avoid excessive glare and backscatter (URS 2006a, p 5.13-17). Existing energy facilities provide an elevated ambient level of lighting to which local wildlife, including nocturnal species, have acclimated.

Operation Impacts and Mitigation

Potential impacts resulting from operation of the Starwood Power Project include avian collision with and/or electrocution by the electric interconnection facilities and disturbance to wildlife due to increased noise and lighting.

Avian Collision and Electrocution

The project includes two 50-foot CTG units, each with an associated 50-foot exhaust stack, and one 65-foot transmission support structure (consisting of a 50-foot tower with 15-foot lightning mast). The transmission support structure is an A-frame dead-end take-off structure with a 300-foot transmission span to connect to an existing dead-end structure at the Panoche Substation.

Bird collisions with power lines and transmission structures generally occur when a power line or other structure transects a daily flight path used by a concentration of birds and these birds are traveling at reduced altitudes and encounter tall structures in their path (Brown 1993). Collision rates generally increase in low light conditions, during inclement weather, during strong winds, and during panic flushes when birds are startled by a disturbance or are fleeing from danger. Collisions are more probable near wetlands, within valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths (APLIC 1996). There are no such features near the project area. Therefore, staff concludes that the SPP transmission structures would not pose a significant collision threat to resident or migratory bird populations.

Red-tailed hawks and other large aerial perching birds, including those offered state and/or federal protection, are susceptible to transmission-line electrocution. Because raptors and other large perching birds often perch on tall structures that offer views of potential prey, the design characteristics of transmission towers and poles are a major factor in raptor electrocutions (APLIC 1996). Electrocution occurs only when a bird simultaneously contacts two energized phase conductors or an energized conductor and grounded hardware. This happens most frequently when a bird attempts to perch on a transmission tower or pole with insufficient clearance between these elements.

Raptor species that use the towers for nesting could be electrocuted while landing. Furthermore, nests may be built in areas that are susceptible to electrical charges that may result in fire as well as an electrical outage. The majority of raptor electrocutions are caused by lines that are energized at voltage levels between 1 kV and 60 kV. The likelihood of electrocutions occurring at voltages greater than 60 kV is low because phase-to-phase and phase-to-ground clearances for lines greater than 60 kV are typically sufficient to prevent bird electrocution (APLIC 2006).

Potential impacts to wildlife resulting from electrocution by transmission lines may be mitigated by incorporating the construction design recommendations provided in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) (see Condition of Certification **BIO-9**). Specifically, the phase conductors should be separated by a minimum of 60 inches. Where adequate separation is not feasible, bird perch diverters and/or specifically designed avian protection materials

should be used to cover electrical equipment (APLIC 2006). With implementation of this mitigation, significant avian mortality from electrocution is not expected to occur.

Noise

Wildlife species near the proposed project are accustomed to elevated ambient noise levels because of the existing Wellhead and CalPeak Panoche plants, the PG&E Panoche Substation, traffic on West Panoche Road, and intensive agricultural operations. Although SPP operation would create additional noise, significant impacts to biological resources are not expected.

Light

Existing energy facilities adjacent to the site provide an elevated ambient level of lighting to which local wildlife, including nocturnal species, have acclimated. The applicant would direct lighting downward to avoid excessive glare and backscatter. Although SPP operation of would create additional light, significant impacts to biological resources are not expected.

CUMULATIVE IMPACTS AND MITIGATION

Cumulative impacts are those that result from the incremental impacts of a proposed action considered with other past, present, and reasonable foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time.

The proposed project would permanently remove approximately 5.6 acres of San Joaquin kit fox habitat, requiring consultation with USFWS. In addition to the SPP, there are other projects proposed in western Fresno County that require consultation with USFWS for impacts to kit foxes, including habitat compensation:

- Panoche Energy Center, LLC has submitted an application to the Energy Commission (06-AFC-5) for the Panoche Energy Center, which is a 400-MW peaking facility located approximately 0.2 mile west of the site.
- The US Department of Justice, Federal Bureau of Prisons, is expected to complete construction of a medium-security federal correctional institution requiring approximately 960 acres of primarily agricultural land near the City of Mendota, approximately 10 miles east of the SPP site. The biological opinion for this project was finalized in March 2004 (CEC 2007x).

Construction and operation of these projects would adversely affect kit foxes due to habitat destruction and fragmentation. However, consultation with USFWS and habitat compensation at a USFWS-approved mitigation bank are intended to address long-term impacts to this species, and compliance with the requirements of section 7 of the federal Endangered Species Act will mitigate cumulative impacts to less than significant levels.

COMPLIANCE WITH LORS

To be in compliance with applicable LORS, specifically the federal Endangered Species Act (ESA), the applicant initiated consultation with the USFWS on June 5, 2007 for a

determination under Section 7 of the federal ESA, as undertaken by USFWS. The USFWS Biological Opinion (BO) identifies additional mitigation requirements in addition to the Conditions of Certification presented in this document. The Energy Commission's certifying power supersedes that of any State or local regulatory agency (i.e., CDFG) per the Warren Alquist Act (section 25500); therefore, a CDFG section 2080.1 Consistency Determination is not required by the Energy Commission. Staff has recommended mitigation measures and Conditions of Certification which, when considered together with the Biological Assessment (BA) and federal BO, will meet the requirements of the California Endangered Species Act that any impacts to listed species be minimized and fully mitigated.

USFWS has identified an ESA consultation process by which the applicant and USFWS enter into a MOU, thereby providing a federal nexus for the project and triggering Section 7 consultation. The MOU was signed by USFWS on July 12, 2007 and by the applicant on July 25, 2007. On June 5, 2007, the applicant submitted a BA to USFWS. After reviewing the BA, USFWS issued a BO on August 21, 2007.

Following repeated correspondence with USFWS, staff concludes that the proposed SPP project would comply with the federal ESA during construction and operation. Implementation of the applicant's proposed mitigation measures and staff's Conditions of Certification will result in the project being in compliance with all state, federal, and local LORS.

NOTEWORTHY PUBLIC BENEFITS

Construction and operation of the proposed project would not result in any noteworthy public benefits with regard to biological resources.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff did not receive any agency or public comments pertaining to biological resources.

CONCLUSIONS

Without mitigation, the SPP project would result in significant adverse impacts to biological resources. The project is located within the eastern boundary of the northern core San Joaquin kit fox population, thereby requiring federal endangered species act consultation with USFWS. The Conditions of Certification proposed in this Final Staff Assessment, including measures provided in the USFWS BO, are necessary to mitigate impacts to biological resources to less than significant levels.

The applicant has prepared a biological assessment for the USFWS (submitted on June 5, 2007). A Biological Opinion was issued by the USFWS on August 21, 2007. Staff concludes that the proposed SPP project will not result in any significant unmitigated impacts to biological resources with implementation of the Conditions of Certification and compliance with the federal ESA and other LORS discussed in this staff assessment.

PROPOSED CONDITIONS OF CERTIFICATION

Designated Biologist Selection

BIO-1 The project owner shall assign a Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist, with at least 3 references and contact information, to the Energy Commission compliance project manager (CPM) for approval.

The Designated Biologist must have at least the following minimum qualifications:

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

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

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

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, that the proposed Designated Biologist or alternate Designated Biologist has the appropriate training and background to effectively implement the Conditions of Certification.

Verification: The project owner shall submit the specified information at least 90 days prior to the start of any site (or related facilities) mobilization. No site or related facility activities shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least ten working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

Designated Biologist Duties

BIO-2 The project owner shall ensure that the Designated Biologist performs the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist may be assisted by the approved biological monitor(s), but remains the contact for the project owner and CPM. The Designated Biologist shall:

1. advise the project owner's construction and operation managers on the implementation of the biological resources Conditions of Certification;

2. consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), to be submitted by the project owner;

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

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

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

6. notify the project owner and the CPM of any noncompliance with any biological resources condition of certification;

7. respond directly to inquiries of the CPM regarding biological resource issues;

8. maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the monthly compliance report and the annual report; and

9. train the biological monitors as appropriate, and ensure their familiarity with the BRMIMP, worker environmental awareness program (WEAP) training, and all permits.

Verification: The Designated Biologist shall submit in the monthly compliance report to the CPM copies of all written reports and summaries that document biological resources activities. If actions may affect biological resources during operation, a Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the annual compliance report unless their duties are ceased as approved by the CPM.

Biological Monitor Qualifications

BIO-3 The project owner's CPM-approved Designated Biologist shall submit the resume, at least 3 references, and contact information of the proposed biological monitors to the CPM for approval. The resume shall demonstrate to the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks.

Biological monitor(s) training by the Designated Biologist shall include familiarity with the Conditions of Certification and the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), Worker Environmental Awareness Program (WEAP), and all permits.

Verification: The project owner shall submit the specified information to the CPM for approval at least 30 days prior to the start of any site (or related facilities) mobilization. The Designated Biologist shall submit a written statement to the CPM confirming that individual biological monitor(s) have been trained including the date when training was completed. If additional biological monitors are needed during construction, the specified information shall be submitted to the CPM for approval 10 days prior to their first day of monitoring activities.

Designated Biologist and Biological Monitor Authority

BIO-4 The project owner's construction and operation manager shall act on the advice of the Designated Biologist and biological monitor(s) to ensure conformance with the biological resources Conditions of Certification.

If required by the Designated Biologist and biological monitor(s), the project owner's construction and operation manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist.

The Designated Biologist shall:

1. require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;

2. inform the project owner and the construction and operation manager when to resume activities; and

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

If the Designated Biologist is unavailable for direct consultation, the biological monitor shall act on behalf of the Designated Biologist.

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

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

Worker Environmental Awareness Program

BIO-5 The project owner shall develop and implement a CPM-approved worker environmental awareness program (WEAP) in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation and closure, are informed about sensitive biological resources associated with the project.

The WEAP must:

1. be developed by or in consultation with the Designated Biologist and consist of an onsite or training center presentation in which supporting written material and electronic media are made available to all participants;

2. discuss the locations and types of sensitive biological resources on the project site and adjacent areas;

3. present the reasons for protecting these resources;

4. present the meaning of various temporary and permanent habitat protection measures;

5. identify whom to contact if there are further comments and questions about the material discussed in the program; and

6. include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

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

Verification: At least 60 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM two (2) copies of the proposed WEAP and all supporting written materials and electronic media prepared or reviewed by the designated biologist and a resume of the person(s) administering the program.

The project owner shall provide in the monthly compliance report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least 10 days prior to site and related facilities mobilization submit two copies of the CPM approved materials.

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

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

Biological Resources Mitigation Implementation and Monitoring Plan

BIO-6 The project owner shall submit two copies of the proposed biological resources mitigation implementation and monitoring plan (BRMIMP) to the CPM (for review and approval) and to CDFG and USFWS (for review and comment) and shall implement the measures identified in the approved BRMIMP.

The BRMIMP shall be prepared in consultation with the designated biologist and shall identify:

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

2. all biological resources Conditions of Certification identified as necessary to avoid or mitigate impacts;

3. all biological resource mitigation, monitoring, and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion;

4. all biological resources mitigation, monitoring, and compliance measures required in local agency permits, such as site grading and landscaping requirements;

5. all sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;

6. all required mitigation measures for each sensitive biological resource;

7. required habitat compensation strategy, including provisions for acquisition, enhancement, and management for any temporary and permanent loss of sensitive biological resources;

8. a detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;

9. all locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;

10. aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities — one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography and a description of why times were chosen;

11. duration for each type of monitoring and a description of monitoring methods and frequency;

12. performance standards to be used to help decide if and when proposed mitigation is or is not successful;

13. all performance standards and remedial measures to be implemented if performance standards are not met;

14. a preliminary discussion of biological resources-related facility closure measures;

15. a restoration and revegetation plan;

16. a process for proposing plan modifications to the CPM and appropriate agencies for review and approval; and

17. a copy of all biological resources-related permits obtained.

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

The CPM, in consultation with the CDFG, the USFWS, and any other appropriate agencies, will determine the BRMIMP's acceptability within 45 days of receipt. If there are any permits that have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to the CPM, the CDFG, and USFWS within five (5) days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition within 10 days of their receipt by the project owner. Ten days prior to site and related facilities mobilization, the revised BRMIMP shall be resubmitted to the CPM.

The project owner shall notify the CPM no less than five working days before implementing any modifications to the approved BRMIMP to obtain CPM approval. Any changes to the approved BRMIMP must also be approved by the CPM in consultation with CDFG, the USFWS, and appropriate agencies to ensure no conflicts exist.

Implementation of BRMIMP measures will be reported in the monthly compliance reports by the Designated Biologist (i.e., survey results, construction activities that were monitored, species observed). Within thirty (30) days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction closure report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.

Closure Plan Measures

BIO-7 The project owner shall incorporate into the permanent or unexpected permanent closure plan and the BRMIMP measures that address the local biological resources.

The planned permanent or unexpected permanent closure plan shall address the following biological resource-related mitigation measures:

1. removal of transmission conductors when they are no longer used and useful;

2. removal of all power plant site facilities and related facilities;

3. measures to restore wildlife habitat to promote the reestablishment of native plant and wildlife species; and

4. revegetation of the plant site and other disturbed areas using an appropriate seed mixture.

Verification: Draft permanent or unexpected closure measures shall be made part of the BRMIMP. At least 12 months prior to commencement of closure activities, the project owner shall address all biological resources-related issues associated with facility closure, and provide final measures, in a biological resources element. The biological resources element shall be incorporated into the facility closure plan and include a complete discussion of the local biological resources and proposed facility closure mitigation measures.

Impact Avoidance Mitigation Features

BIO-8 Any time the project owner modifies or finalizes the project design, it shall incorporate all feasible measures that avoid or minimize impacts to the local biological resources. The project owner shall:

1. design, install, and maintain transmission line poles, access roads, pulling sites, and storage and parking areas to avoid identified sensitive resources;
2. design, install, and maintain transmission lines and all electrical components in accordance with the *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) to reduce the likelihood of electrocutions of large birds;
3. eliminate any California exotic pest plants of concern List A species as defined by the California Exotic Pest Plant Council from landscaping plans;
4. prescribe a road sealant that is nontoxic to wildlife and plants; and
5. design, install, and maintain facility lighting to prevent side casting of light toward wildlife habitat.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Implementation of the measures shall be reported in the monthly compliance reports by the Designated Biologist. Within thirty (30) days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

Mitigation Management to Avoid Harassment or Harm

BIO-9 The project owner shall implement the following measures to manage its construction site, and related facilities, in a manner to avoid or minimize

impacts to the local biological resources. To minimize and avoid impacts to San Joaquin kit foxes, the following measures shall be implemented. These were extracted directly from the federal Biological Opinion, issued August 27, 2007 (USFWS 2007b):

1. Impacts to kit fox habitat will be offset through a contribution to a local conservation bank. Pursuant to discussions with Service, total compensation has been determined based on the area permanently impacted (5.6), SPM will purchase 6 conservation credits. This contribution will occur at Kreyenhagen Hills conservation bank. This contribution will occur at Kreyenhagen Hills conservation bank, or by fee title acquisition or purchase of a conservation easement on a service-approved parcel, following all the requirements in Selected Review Criteria for Conservation Banks and Section 7 Offsite Compensation April 11, 2006 (enclosed).

2. Project-related vehicles shall observe a 20-mph speed limit in all project areas, except on county roads and State and Federal highways; this is particularly important at night when kit foxes are most active. To the extent possible, night-time construction should be minimized. Off-road traffic outside of designated project areas should be prohibited.

3. To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2 feet deep shall be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the procedures under number 13 of this section must be followed.

4. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipe becoming trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the Service has been consulted. if necessary, and under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity, until the fox has escaped.

5. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in closed containers and removed at least once a week from a construction or project site.

6. No firearms shall be allowed on the project site.

7. To prevent harassment, mortality of kit foxes or destruction of dens by dogs or cats, no pets will be permitted on project sites.

8. Use of rodenticides and herbicides in project areas will be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds should observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional project-related restrictions deemed necessary by the Service, if rodent control must be conducted, zinc phosphide should be used because of proven lower risk to kit fox.

9. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped individual. The representative will be identified during the employee education program. The representative's name and telephone number shall be provided to the Service.

10. An employee education program shall be conducted. The program will consist of a brief presentation by persons knowledgeable in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and military and agency personnel involved in the project. The program will include the following: a description of the kit fox and its habitat needs; a report of the occurrence of kit fox in the project area; an explanation of the status of the species and its protection under the Endangered Species Act; and a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet conveying this information should be prepared for distribution to the above-mentioned people and anyone else who may enter the project site. The program will be conducted in languages other than English, as appropriate.

11. Upon completion of the project, all areas subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, etc. will be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to "temporary" disturbance means any area that is disturbed during the project, but that after project completion will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas should be determined on a site-specific basis in consultation with the Service, California Department of Fish and Game (CDFG), and revegetation experts.

12. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the Service should be contacted for advice.

13. Any contractor, employee, or military or agency personnel who inadvertently kills or injures a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact the CDFG and the Service immediately in the case of a dead, injured or entrapped kit fox. The CDFG contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden or biologist.

14. The Sacramento Fish and Wildlife Office and CDFG will be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The Service contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers given below. The CDFG contact is Mr. Ron Schlorff at Street, Sacramento, California 95814, (916) 654-4262.

15. Limits of grading and construction activities should be clearly delineated so that no vegetation outside the delineated grading limits would be disturbed by construction personnel or equipment. Project personnel will drive only on existing roads outside of construction limits.

16. SPM will implement the Best Management Practices identified in the project specific Storm Water Pollution Prevention Plan (SWPPP).

17. In order to comply with the Migratory Bird Treaty Act and relevant sections of the CDFG Code (e.g., 3503, 3503.4, 3504, 3505, et seq.), any vegetation clearing would take place outside of the typical avian nesting season (i.e., February 1st — August 3 1st), to the maximum extent practical. If this is not possible, prior to ground-disturbing activities, construction, and so forth within the study area, a qualified biologist will conduct and submit a migratory nesting bird and raptor survey report. A qualified biologist is an individual with sufficient education and field experience in local California ecology and biology to adequately identify local plant and wildlife species. The survey shall occur not more than 72 hours prior to initiation of Project activities and any occupied passerines and/or raptor nests occurring within or adjacent to the study area will be delineated. To the maximum extent practicable, a minimum buffer zone from occupied nests will be maintained during physical ground-disturbing activities. Once nesting has been determined to cease, the buffer may be removed.

18. SPM will retain the services of a Biological Monitor who will be responsible for overseeing project environmental protection measures. All encounters with listed species will be reported to the Biological Monitor, who will record the following information: species name; location (narrative and maps) and dates of observations; general condition and health, including injuries and state of healing; diagnostic markings,

including identification numbers or markers; and locations moved from and to (if appropriate).

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Implementation of the measures will be reported in the monthly compliance reports by the Designated Biologist. Within thirty (30) days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

Evaporation Pond Design

BIO-10 The project owner shall submit copies of technical drawings for the design of the evaporation pond. The project owner shall design and build the pond with slopes as steep as practicable and of sufficient size to keep water to a depth of less than 2 feet.

Verification: No less than thirty (30) days prior to the start of evaporation pond construction, the project owner shall provide copies of the evaporation pond design drawings to the CPM for review and approval, and CDFG for review and comment.

Evaporation Pond Monitoring

BIO-11 Following the start of operations, the evaporation pond shall be monitored twice monthly (once every two weeks), for two hours for wildlife usage and water quality by the Designated Biologist or biological monitor. Monitoring is not required if the pond does not contain water. If a substantial number of birds and other wildlife are using the pond and water quality is poor, remedial actions to reduce wildlife use shall be implemented. An evaporation pond monitoring plan shall be developed prior to the start of operations and evaporation pond monitoring reports shall be submitted after the start of operations.

1. **Evaporation Pond Monitoring Plan.** Prior to the start of operations, the project owner shall develop an evaporation pond monitoring plan that shall include wildlife survey and water quality testing methods and specific remedial actions in the case that wildlife usage thresholds are exceeded. The wildlife usage thresholds shall also be defined in coordination with USFWS and CDFG and included in the plan. Elements to be tested shall include selenium, mercury, uranium, boron, arsenic, and vanadium. All wildlife use and water quality indices, thresholds, and remedial actions to be taken must be approved by the CPM, in consultation with USFWS and CDFG.

2. **Evaporation Pond Monitoring Report.** The project owner shall submit an evaporation pond monitoring report to the CPM once every three months after the start of operations. Records shall include the date, time, bird species, number of individuals, and behavior. The reports shall contain all records of monitoring dates, data collected, certified lab results, and any corrective actions taken. This monitoring shall occur for the first two years of plant operation, and depending on the results, could be

discontinued after consultation with the CPM and USFWS and CDFG or continue as needed. A request to lessen or stop monitoring before the end of the second year of operation must be submitted in writing to the CPM, and to USFWS and CDFG for consideration.

Verification: No less than thirty (30) days prior to the start of power plant operations, the project owner shall provide copies of the evaporation pond monitoring plan and all supporting materials to the CPM for approval. The project owner shall submit copies of the evaporation pond monitoring report to the CPM, USFWS, and CDFG four times each year (once every three months).

Habitat Compensation

BIO-12 The project owner shall provide habitat compensation for temporary and permanent impacts to San Joaquin kit fox habitat at a location and amount approved by USFWS.

Verification: No less than 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit written verification to the CPM and USFWS that the transaction for habitat compensation has occurred.

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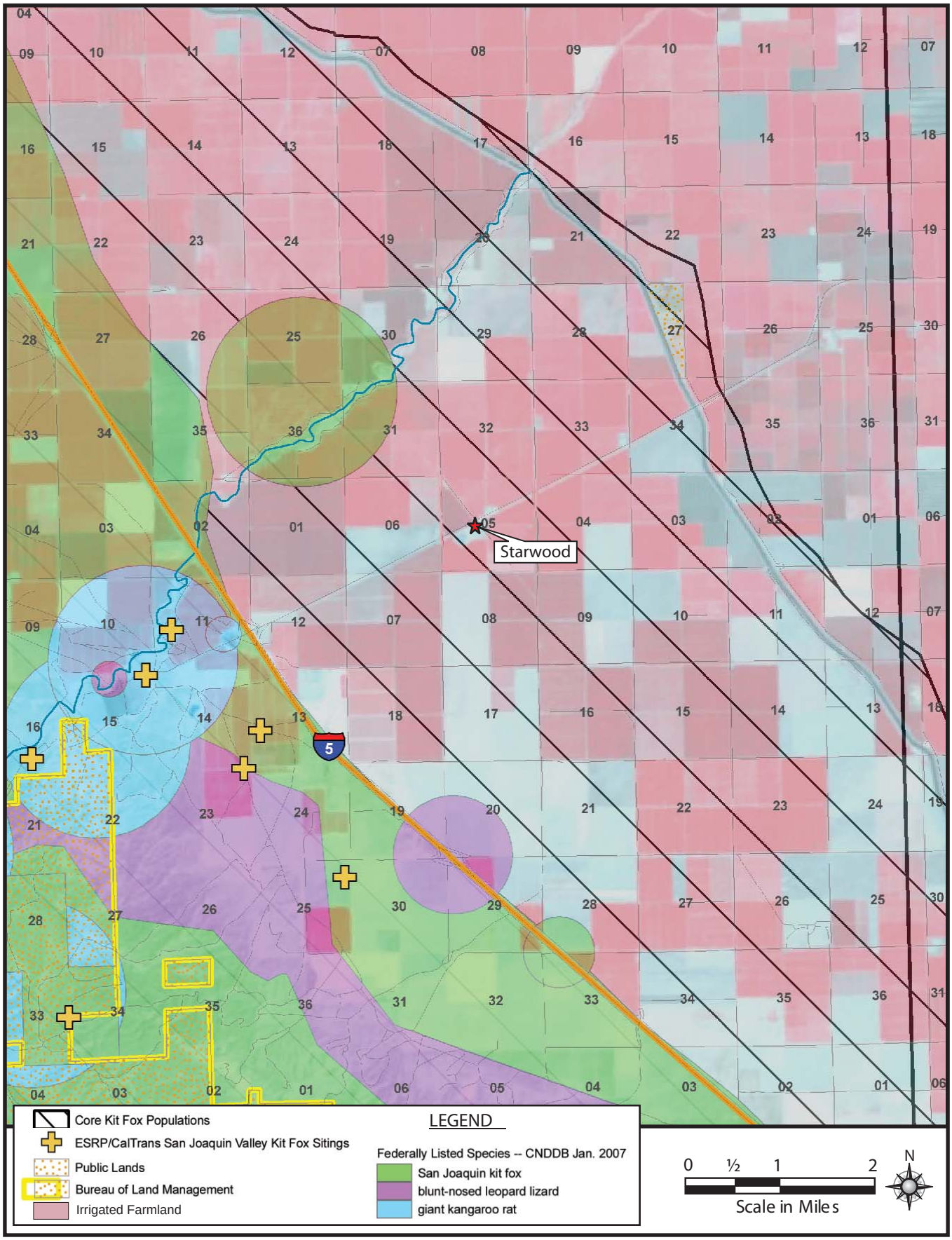
BIOLOGICAL RESOURCES - FIGURE 1

Starwood Peaking Project - Sensitive Species in the Project Vicinity



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, OCTOBER 2007
SOURCE: FSA, April 2007, Biological Resources, Figure 1

CULTURAL RESOURCES

Testimony of Michael K. Lerch, Amanda C. Cannon, and Beverly E. Bastian

SUMMARY OF CONCLUSIONS

Staff has determined that the Starwood Power Project would not have a significant impact on known significant archaeological resources, historic structures, or ethnographic resources. With the adoption and implementation of the proposed Conditions of Certification, **CUL-1** through **CUL-7**, the Starwood Power Project would not have a significant impact on potentially significant archaeological resources that may be discovered during construction.

INTRODUCTION

This cultural resources assessment identifies the potential impacts of the proposed Starwood Power Project (SPP) to cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, and historic districts. Three kinds of cultural resources are considered in this assessment: prehistoric, historic, and ethnographic.

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 Native American human behavior. In California, the prehistoric period began over 11,500 years ago and extended through the eighteenth century until 1769, the time when the first Spaniards settled in what is now the state of California.

Historic-period resources are those materials, archaeological and architectural, 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, buildings and structures, traveled ways, artifacts, or other evidence of human activity. Under federal and state requirements, historical cultural resources must be more than 50 years old to be considered of potential historical importance. A resource less than 50 years of age may be historically important if the resource is of exceptional significance.

Ethnographic resources are those materials important to the heritage of a particular ethnic or cultural group, such as African Americans, Mexican Americans, Native Americans, or European, Asian, or Latino immigrants and their descendants. They may include traditional resource-collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and structures.

For the proposed SPP, staff provides an overview of the environmental setting and cultural history of the project area, an inventory of the cultural resources identified in the project vicinity, a consideration of the significance of those cultural resources, and an analysis of the effects of possible project impacts on those cultural resources, using significance criteria from the California Environmental Quality Act (CEQA). Where impacts to significant cultural resources, both known and not yet discovered, cannot be avoided, measures to mitigate the adverse effects on or loss of the resources are

proposed. The primary concerns are to ensure that all potential impacts to cultural resources are identified and that conditions are imposed on the project that ensure that any significant impacts are reduced to a less than significant level.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the California Energy Commission (Energy Commission) are reviewed to ensure compliance with all applicable laws, ordinances, regulations, and standards (LORS). For this project, in which there is no federal involvement with respect to cultural resources,[1] the applicable laws are primarily state laws, in particular, CEQA. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies.

[1] Cultural resources are indirectly protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, Section 431 et seq.) and subsequent related legislation, policies, and enacting responsibilities, e.g., federal agency regulations and guidelines for implementation of the Antiquities Act.

CULTURAL RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
State	
Public Resources Code, section 21083.2	The lead agency may require reasonable steps to preserve a unique archaeological resource in place. Otherwise, the project applicant is required to fund mitigation measures to the extent prescribed in this section. This section also allows a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find (CEQA).
California Code of Regulations, Title 14, section 15064.5, subsections (d), (e), and (f)	Subsection (d) allows the project applicant to develop an agreement with Native Americans on a plan for the disposition of remains from known Native American burials impacted by the project. Subsection (e) requires the landowner (or authorized representative) to rebury Native American remains elsewhere on the property if other disposition cannot be negotiated within 24 hours of accidental discovery and required construction stoppage. Subsection (f) directs the lead agency to make provisions for historical or unique archaeological resources that are accidentally discovered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find (CEQA Guidelines).
California Code of Regulations, Title 14, section 15126.4(b)	This section describes options for the lead agency and for the project applicant to arrive at appropriate, reasonable, enforceable mitigation measures for minimizing significant adverse impacts from a project. It prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project's impact on a historical resource; discusses documentation as a mitigation measure; and advises mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan (CEQA Guidelines).

Public Resources Code 5024.1	The California Register of Historical Resources (CRHR) is established and includes: properties determined eligible for the National Register of Historic Places (NRHP) under four criteria (A. events; B. important persons; C. distinctive construction; and D. data); State Historic Landmark No. 770 and subsequent numbered landmarks; points of historical interest recommended for listing by the State Historical Resources Commission; and historical resources, historic districts, and landmarks designated or listed by a city or county under a local ordinance. CRHR eligibility criteria are: (1) events, (2) important persons, (3) distinctive construction, and (4) data.
Public Resources Code 5020.1 (h)	"Historic district" means a definable unified geographic entity that possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.
California Health and Safety Code, Section 7050.5	This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
Fresno County General Plan (2000) Policy OS-J.1	The County shall require discretionary development projects to identify and protect important historical, archaeological, paleontological, and cultural sites and their contributing environment, as part of any required CEQA review.
Fresno County General Plan (2000) Policy OS-J.2	The County shall hold the locations of archaeological sites confidential.
Fresno County General Plan (2000) Policy OS-J.3	The County shall solicit the views of the local Native American community regarding development projects affecting sites of concern to Native Americans.
Fresno County General Plan (2000) Policy OS-J.4	The County shall maintain an inventory (Index of Historical Properties in Fresno County) of sites and structures determined to be of historical significance.

SETTING

REGIONAL SETTING

The project area is located in the western San Joaquin Valley, in the Central Valley Physiographic Province of California. The upper portion of the Panoche Creek alluvial fan borders the proposed SPP site to the west, extending from the base of the low-lying foothills of the Diablo Range. Panoche Creek is located approximately two miles northwest of the proposed SPP site. The regional terrain gently slopes downward to the northeast toward the San Joaquin River and Fresno Slough, located approximately 15 miles from the site. Within the project area, the topography is relatively flat, ranging from

395 to 400 feet above mean sea level, with a gradual slope to the northeast. Soils encountered in test borings at the proposed project site include silt near the surface underlain by discontinuous layers of silty sand, lean clay, and poorly graded sand (URS 2006a, App. L, pp. A1–A9). These soils, under the normal rainfall regime, support a sparse growth of weeds and grasses.

The proposed SPP would be an addition to the existing CalPeak Panoche Peaker Plant located immediately southwest of the proposed location. A short distance southwest of the site, the proposed Panoche Energy Center (PEC) is currently under review for Energy Commission certification (PEC 2006). The adjacent Wellhead Peaker Plant is situated southeast of the proposed SPP site. The Panoche Substation, owned by Pacific Gas & Electric (PG&E), is to the west. Thus the area immediately surrounding the proposed SPP represents a concentration of electric power generation facilities in the region, but land use within 10 miles of the proposed SPP site is predominantly agricultural, including almond and pomegranate groves.

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed SPP site is located immediately south of West Panoche Road in northwestern Fresno County, approximately two miles east of Interstate 5, three miles west of the California Aqueduct, and 50 miles west of the City of Fresno. The proposed plant would be constructed on a 5.6-acre site within a 128-acre parcel. Since 2001, the CalPeak Panoche Peaker Plant has used the proposed site as a storage yard. The remainder of the 128-acre parcel not used for electric generation facilities or storage is currently a pomegranate orchard (URS 2006a, p. 3-1).

An apartment building, known as “the 5-plex” and occupied by farm workers, is located on the south side of West Panoche Road along the northern edge of the proposed SPP site. Three additional groupings of residential and agricultural buildings are located within a 0.5-mile radius of the project impact area. These groupings each contain structures old enough to be considered potentially historic. One cluster of buildings, located at 43405 West Panoche Road, is within the agricultural complex known, perhaps inaccurately, as the Chaney Ranch.[2] The other two clusters of buildings have the same address, 43946 West Panoche Road, and are both located north of that road. One cluster consists of three farm worker houses situated adjacent to West Panoche Road. The second cluster, made up of five farm worker houses, is located approximately 0.5 mile north of West Panoche Road (Herbert, et al. 2006, p. 9).

The proposed SPP consists of the construction and operation of a simple-cycle electric generation plant with a nominal output of 120 megawatts (MW). The plant equipment, located in the western portion of the site, would include two natural-gas-fired combustion turbine generator units within two primary and one secondary control enclosures. A 115-kV interconnection line would convey the proposed SPP’s output to the existing Panoche Substation via the existing CalPeak Panoche Plant’s generator tie line, requiring the installation of a dead end structure, located on the western edge of the proposed SPP site, and 300 feet of above-ground transmission line. A new wooden

[2] Because the agricultural complex at 43405 West Panoche Road is not in the same location as the historical Chaney Ranch, in this document, the term, “original Chaney Ranch,” refers to the ranch’s 1920 location south of West Panoche Road, while the term, “later Chaney Ranch,“ refers to the extant agricultural complex north of West Panoche Road, at the 43405 address.

pole would be installed at the substation, just north of the CalPeak Panoche Peaker Plant, to receive the proposed SPP interconnect line. Other proposed project components include a natural gas pipeline connecting to a new gas metering station at the Panoche Substation, a process water pipeline connecting the proposed SPP to the existing CalPeak Panoche Peaker Plant's well, a 20-foot by 1,400-foot graded gravel/asphalt roadway, and a water treatment system that includes a reverse osmosis unit, three 75,000-gallon water storage tanks, and a 25,000-square-foot evaporation pond to collect wastewater discharge. Additionally, a wastewater drain system would be installed in the southern portion of the site, consisting of sumps to collect oily waste that would then be pumped to a 4,700-gallon above-ground storage tank situated near the middle of the southern boundary of the site (URS 2006a, sec. 3.0).

Approximately 800 feet of new 6-inch-diameter underground natural gas pipeline (600 feet of which would be located on site) would be installed, running north along the western perimeter of the site, then west along West Panoche Road, and connecting to a new gas-metering station at the Panoche Substation. Approximately 1,200 feet of new 3-inch-diameter underground water pipeline would be installed as well, running from the existing CalPeak Panoche Peaker Plant well around the west, south, and east sides of the plant perimeter before connecting to the proposed SPP (URS 2006a, pp. 3-37 to 3-38). Optimal trench dimensions for both the natural gas and water pipelines would be about 18 inches wide and 48 inches deep. In areas of loose soil, a trench up to 8 feet wide at the top and 2 feet wide at the bottom may be required. The pipelines would be buried with a minimum cover of 36 inches (URS 2006a, p. 3-38).

If water cannot be obtained from the CalPeak Panoche Peaker Plant well, two alternate water sources have been proposed for the SPP plant: using a water delivery system currently serving neighboring farms with State Water Project water via the California Aqueduct, and drilling a new 1,500-foot on-site well, which would be located near the reverse osmosis unit, to access the lower regional aquifer (URS 2006a, pp. 4-4 to 4-6).

Access to the proposed SPP site would be from West Panoche Road by way of a 20-foot-wide road just east of the CalPeak Panoche Peaker Plant. A 250-foot-long graded gravel road would extend from a gated entrance just south of West Panoche Road. Extending from the gravel road, a 1,150-foot-long asphalt road and turnaround area would provide access to the site (URS 2006a, p. 3-29).

A gravel laydown area, construction parking area, and storage areas are proposed for a 0.25-acre area located in the northwestern portion of the proposed site. Following the completion of the plant, the gravel laydown area would be used for parking, as needed, and security fencing would be installed surrounding the perimeter of the site (URS 2006a, p. 3-42).

Prior to construction, site preparation would include clearing the site of existing stored materials and excess earth, sand, gravel, vegetation, organic material, loose rock, and boulders (URS 2006a, pp. 5.4-3 to 5.4-4). Debris would be removed from the site and disposed of at predetermined locations, whereas materials suitable for backfill would be stored on site. The proposed SPP is not expected to import or export soils (URS 2007b, Data Response No. 35). Finish grade would be approximately one foot higher than existing grade, and the tops of foundations would be approximately three feet higher

than existing grade (URS 2007f). All fill needed for the project is expected to come from the following on-site locations: excavation of the evaporation/retention pond area, excavation of equipment foundations, and grading in the southern/eastern area of the proposed site (URS 2007b, Data Response No. 34). Excavation may be deeper than five feet in areas determined suitable, based on soil bearing results (URS 2006a, App. L). Excavations would extend to a maximum depth of three feet in foundation areas, whereas, elsewhere on site, excavations and cutting of up to five feet in depth would occur (URS 2007b, Data Response No. 34).

Prehistoric Setting

Regional Climatic and Environmental History

The proposed SPP is located in the western San Joaquin Valley, a large interior valley composed of alluvial plains and river channels. In the past, prior to a dramatic warming trend and modern reclamation projects, almost 2,000 square miles of the valley were covered in wetlands, marshes, sloughs, and ancient lakes (Moratto 1984, p. 168). Until the late nineteenth century, a large, seasonal, shallow lake, Tulare Lake, was located southeast of the project area. Depending on the lake's fluctuating levels, the project area was at times covered by marshlands whose plant and wildlife resources made it attractive to Native Americans (PEC 2006, p. 5.7-2). The run-off from rivers rising in the south-central Sierra Nevada fed the lake, so the extent of the lake varied with the season and with regional precipitation. Geologists believe the average level of Tulare Lake fluctuated seven or eight times during the past 11,500 years. The lake level was generally higher during the early Holocene (prior to ~6,200 years before the present, or "B.P."), but reached a major high level from ~750 to 150 years B.P. (Negrini et al. 2005). In 1862, Tulare Lake reached its highest recorded level, covering 486,000 acres (Lindsay n.d.). Starting in the 1870s, American grain farmers on the east side of the valley began building levees and irrigating crops with water from the rivers that fed Tulare Lake, resulting in the disappearance of the lake by 1895 (Menefee and Dodge 1913, Ch. 24). Since then, in especially wet years, Tulare Lake reappears—visible as an extensive but shallow flooding of the agricultural fields that replaced the lake (Balkin, Halbur, and Stringfellow 2006).

Human Occupation in the San Joaquin Valley

The lower San Joaquin Valley "remains one of the least known archaeological areas in California" (Moratto 1984, p. 215). California prehistorians have divided the prehistory of the San Joaquin Valley into three periods. The Early Period is the least well known and the least well evidenced in known archaeological sites, although the Middle Period is only marginally better represented. Sites of the Late Period have had the most archaeological attention, and they have been richer in artifacts than sites of the earlier periods. Because the Late Period ends with the advent of Europeans in California, the early historical record also provides important information on the lifeways of California Native Americans, and this information is useful for interpreting the archaeological sites of the Late Period. Consequently, the reconstruction of prehistoric lifeways for the Late Period is both fuller and better anchored in time than the earlier two periods.

Historians recognize three periods, as well: the eighteenth- and nineteenth-century Spanish exploration and settlement of California, the brief tenure of Mexico, and the

subsequent American takeover and annexation. All three historical periods are contemporaneous with the ethnographic period for California Native Americans, during which any written records regarding Native Americans, all anthropological writings about Native Americans, and the contributions of Native Americans themselves compose what scholars know about Native American lifeways in California since Euro-American contact.

Early Period (~12,000-7,000 B.P.)

The earliest generally accepted evidence for the human occupation of the North American continent, dating from about 12,000 years ago, is the occurrence of large, very skillfully made stone spear points, sometimes in association with the remains of large game animals. This occupation is known archaeologically as the Big Game Hunting Tradition. The Big Game Hunting Tradition, centered in the Great Plains and American Southwest, but evidenced all over the continent, apparently had a nearly exclusive focus on the exploitation of now-extinct giant mammals, such as giant bison and wooly mammoths, collectively referred to as megafauna. This tradition coincided with the end of the last major North American glaciation, known geologically as the Late Pleistocene, followed by the Holocene, our own geological era.

Archaeologists have not identified the Big Game Hunting Tradition in its classic form in California, although its characteristic fluted projectile points have been found all over the state. Such projectile points, known as Clovis points, have been recovered from the relict shores of Tulare Lake in association with the bones of such extinct animals as horse, bison, giant sloth, and mammoth/mastodon, indicating a date for the occupation of Tulare Lake before 11,000 B.P. (Moratto 1984, pp. 81-82). When the glaciers of the Pleistocene era retreated and the warmer and drier climate of the Holocene caused the sea level to rise along the coast, the formerly plentiful inland lakes began to shrink or dry up, and the megafauna became extinct (Moratto 1984, pp. 78-81). California's late Pleistocene peoples were forced to adopt a general hunter-forager subsistence mode and to live near reliable water sources where food and plant resources were consistently available.

As the Pleistocene gave way to the Holocene, technological and lifestyle adaptations enabled Native Americans to expand their resource base to include a wide variety of seasonal and locally available resources. For the Early Holocene time period, archaeologists have identified a prevailing region-wide hunting tradition in central and southern California. Moratto presents a discussion of this synthesis of archaeological findings known as the Western Pluvial Lakes Tradition (WPLT), characterized by the following (Moratto 1984, pp. 90-103):

- site locations on or near shorelines of bodies of water;
- an economy based on hunting a variety of animals and birds and on gathering shellfish and vegetal products;
- the absence of groundstone artifacts (indicating that hard seeds were not used as food);
- characteristic percussion-flaked stone artifacts;
- and a diverse stone toolkit, including distinctive flaked-stone crescent-shaped tools, core/cobble tools, choppers, scraper plane-tools, and leaf-shaped ovate and lanceolate bifaces.

As with fluted projectile points, the WPLT is represented at Tulare Lake, but “it is likely that most of the archaeological evidence of Central Valley habitation prior to circa 4,000-5,000 B.C. lies deeply buried under alluvium” (Moratto 1984, p. 214).

One putatively Early Period site on the margins of ancient Tulare Lake is the Tranquility site (CA-FRE-48). The site was discovered in 1939 a short distance north of the town of Tranquility, approximately 18 miles east of the proposed SPP location, along the Kings River. Highly mineralized human skeletons of 25 adults, eight children, and two infants were found in apparent association with fossilized bones of extinct bison, camel, and horse, as well as more recent animals. Ultimately, the fossils and human remains were determined to lie in separate strata, and associated artifacts and a radiocarbon date placed the site within the late Middle Period at 2,550 B.P. (Angel 1966; Hewes 1946; Moratto 1984, pp. 65-66). Nevertheless, the data from the Tranquility site confirm early human use of marsh resources in the project region.

Additional evidence of early occupation in the San Joaquin Valley occurs at site CA-KER-116, situated on the ancient shores of Buena Vista Lake, another Central Valley vanished lake, at one time located just south of Tulare Lake. Radiocarbon dating of freshwater shell suggests CA-KER-116 may have been occupied as early as 8,000 B.P., and probably reflects the WPLT (Fredrickson 1964; Fredrickson and Grossman 1977).

Middle Period (7,000 to 2,500 B.P.)

After 7,000 B.P., for the most part, the fluctuating climate and environment stabilized, resulting in present conditions in California. Such San Joaquin Valley sites as are known for this period represent the younger end of the Middle Period time span and evidence a two eras of significant occupation, one between 4,000 and 1,500 years B.P., and another between 500 and 150 years B.P. The interval between the two may indicate a period of climatic aridity. The known sites of the period suggest cultural affiliations with both the Santa Barbara coast and the Mojave Desert, but not with the Delta region to the north (Moratto 1984, p. 215). Sites occupied during this time period in the lower San Joaquin Valley, as is the case elsewhere in California, contain higher numbers of groundstone milling artifacts used to process hard seeds into meal, suggesting an increased use of vegetal food sources (Hatoff, et al. 2006, p. 1-10).

Late Period (2,500 to 300 years B.P.)

In this period, known prehistoric sites are, again, not many, but there is evidence that populations expanded and villages increased in numbers after about 500 B.P. in the southern and western parts of the San Joaquin Valley (Moratto 1984, p. 215). The archaeological evidence indicates that significant changes occurred from the Middle to the Late Period. Important differences include groundstone artifacts associated with acorn processing, bow-and-arrow technology, and large occupation sites representing permanent villages with large, semi-subterranean communal structures (Hatoff, et al. 2006, p. 1-10). Other types of artifacts typical of the Late Period include freshwater and marine shell ornaments, ornaments and utilitarian implements made of steatite and bone, obsidian from eastern California sources, and notched cobbles possibly associated with fishing activities (URS 2006a, p. 5.7-3).

Local Chronological Sequence

A more detailed local chronological sequence for the western San Joaquin Valley during the Middle and Late Periods is based on excavations at sites CA-FRE-128 and 129 at Little Panoche Reservoir (Olsen and Payen 1968); the Grayson site (CA-MER-94) at San Luis Reservoir (Olsen and Payen 1969); CA-MER-130 at Pacheco Pass (Olsen and Payen 1983); CA-MER-3, the Menjoulet site (Pritchard 1970); and CA-MER-119, the San Luis Forebay site (Pritchard 1983). The Merced County sites are located west of Los Banos and approximately 40 miles northwest of the proposed SPP location, whereas the Fresno County sites at Little Panoche Reservoir are situated about 15 miles northwest of the project location.

The earliest period in the western San Joaquin Valley sequence is the Positas Complex (ca. 5,200-4,500 B.P.), which is characterized by small, shaped mortars, short cylindrical pestles, milling stones, and spire-lopped *Olivella* (olive shell) beads. Positas Complex deposits were the basal cultural component at the Grayson site, where they were overlain by sediments containing an artifact assemblage consistent with the Early Period. The Positas Complex has not been as well accepted as the other phases in the sequence (Moratto 1984, p. 191), due to anomalous radiocarbon dates from the Grayson site. Dates of 450 $\pm$ 100 B.C. and 1305 $\pm$ 90 A.D. from the Positas component at the Grayson site are more consistent with the Middle- and Late-Period occupations and indicate that this component is actually younger than the overlying Pacheco deposits.

The succeeding Pacheco Complex includes two phases. The earlier one, Pacheco B (ca. 4,500-2,500 B.P.) is poorly documented but includes characteristic leaf-shaped bifaces, large, stemmed and side-notched points, rectangular *Haliotis* (abalone) ornaments, thick rectangular *Olivella* beads, as well as abundant milling stones, mortars, and pestles. The Pacheco A Complex (2,500-1,000 B.P.) is represented by flexed burials associated with distinctive *Olivella* and *Macoma* (clam) bead types, both mortars-and-pestles and millingslabs-and-handstones, and a variety of projectile points. The earliest evidence of architecture appears in the form of small circular houses about 10 to12 feet in diameter.

The Gonzaga Complex (ca. 1,000-450 B.P.) is marked by extended and flexed burials, bowl mortars, shaped pestles, relatively rare squared- and tapered-stemmed projectile points, distinctive Haliotis ornaments, and thin rectangular, split-punched, and oval Olivella beads. Bone artifacts include awls, pins, mammal-bone tubes, bird-bone whistles, and grass cutters made from the scapulae of large mammals. Distinctive spool-shaped polished stone ear ornaments and cylindrical plugs are also found. Milling equipment continues include both mortars and milling slabs. House pits increase in size up to 20 to 30 feet in diameter, some with evidence of center posts.

The protohistoric Panoche Complex (450-200 B.P.) is separated from the earlier Gonzaga Complex by a hiatus that may reflect abandonment of the region due to adverse environmental conditions. Panoche Complex deposits are identified by large circular structures, up to 75 feet in diameter, and smaller dwellings about 30 to 50 feet in diameter. Mortuary practices include flexed burials, as well as primary and secondary cremations. Artifacts typical of this complex include small side-notched arrow points and a varied assortment of shell and groundstone artifacts. Beads recovered from Panoche

deposits include clamshell disk; *Haliotis* epidermis disk; and *Olivella* lipped, side-ground, and rough disk.

In their review of the above sequences for a regional study, Hildebrandt and Mikkelsen (1993, p. 44) observed:

> Based on regional comparisons of numerous traits, it was noted that each major temporal period seemed to reflect occupations by different populations, or at least populations with divergent cultural/geographic affinities. The Positas Complex, although poorly represented, showed relationships to the south coast while the Pacheco Complex was thought to possibly represent intrusion of peoples from the Monterey Bay area. Most conspicuous of all was the Gonzaga Complex with its extended burials similar to the delta, followed by the protohistoric Panoche Complex, probably representing the ethnographically recorded Yokuts.

Ethnographic Setting

The project area is located within the boundaries of the Northern Valley Yokuts territory, at the northeastern end of the San Joaquin Valley, south of Panoche Creek. “Yokuts” is a term applied to a large and diverse group of native people inhabiting the San Joaquin Valley and Sierra Nevada foothills of central California. The Northern Valley Yokuts occupied a 40- to 60-mile-wide area straddling the San Joaquin River, south of the Mokelumne River, east of the Diablo Range, and north of the sharp bend that the San Joaquin River takes to the northeast. For the Northern Valley Yokuts, the San Joaquin River and its main tributaries served as a lifeline to the valley, as a source of fish and game, and as an environment favorable to another important food source, the valley oak (*Quercus lobata*). Acorns, in addition to other types of nuts, seeds, fruits, and roots, were important subsistence items (Hatoff, et al. 2006, pp. 1-11 to 1-12; Wallace 1978).

The Northern Valley Yokuts built their villages on mounds along river banks to avoid the spring floods that resulted from heavy Sierra snow melts. Living beside rivers and streams provided plentiful river perch, Sacramento pike, salmon, and sturgeon. Hunting provided waterfowl such as geese and ducks, and animals such as antelope, elk, deer, and brown bear, although by all indications fish constituted the major portion of the Northern Yokuts diet. The surrounding woodland, grasslands, and marshes provided acorns, seeds, and tule roots. A chief headed each tribal village, which averaged around 300 people. Family houses were round or oval, with sunken floors, a conically shaped pole-frame structure, and woven tule mat coverings. Each village also had a lodge for dances and other community functions, as well as a sweathouse (Hatoff, et al. 2006, pp. 1-11 to 1-12; Kroeber 1976; Wallace 1978).

The Northern Valley Yokuts used bone harpoon tips for fishing, stone sinkers for nets, chert projectile points for hunting, and mortars, pestles, scrapers, knives, and bone awl tools to process food. Marine shells, traded from coastal tribes, were used for necklaces and other adornments, and marine shell beads sometimes accompanied the dead. The Yokuts used rafts made of tule reeds to navigate the waterways for fishing and fowling. They also manufactured intricate baskets for a variety of purposes, including gathering, storing, cooking, eating, winnowing, and transporting food materials. Although very little is known of Northern Valley Yokuts clothing, their tattoos served not only as personal

decoration but also as a form of individual identification. The Northern Valley Yokuts either cremated their dead or buried them in a flexed position (Hatoff, et al. 2006, pp. 1-11 to 1-12; Wallace 1978).

According to early accounts, the Yokuts traded with neighboring tribes and were fairly peaceful. The Northern Valley Yokuts trade network extended to the Costanoans (Ohlone) in the Monterey Bay region, the Salinans in the North Coast Ranges, and in particular, the Sierra Miwok, to the east. Initially, the Coast Ranges served as a natural barrier against heavy recruitment by the coastal Spanish missions. By the early nineteenth century, however, Spanish missionaries began to explore the interior valley, searching both for fugitive Native American neophytes, who had fled the missions, and for fresh converts. Many native populations in the valley were relocated to Missions San Juan Bautista, San José, Santa Clara, Soledad, and San Antonio. In the missions, native peoples were forced into hard labor and suffered from malnutrition and a loss of traditional social relations. Native populations in the San Joaquin Valley continued to decline, in part, as a result of a malaria epidemic in the summer of 1833 and the arrival of American miners and settlers in the late 1840s. Representatives of three Northern Valley Yokuts tribes signed land cession treaties in exchange for large reservations. However, these reservations never materialized, and the treaties were never ratified by the United States Senate (Hatoff, et al. 2006, pp. 1-11 to 1-12; Wallace 1978).

Although available information is limited and often equivocal, ethnographic accounts indicate that as many as 63 groups may have inhabited the Northern Valley Yokuts territory (Latta 1999). According to Latta's map of the San Joaquin Valley Yokuts region, the Kahwatchwah occupied the area surrounding Little Panoche Creek and the towns of Firebaugh, Los Banos, and Ingomar. A village, Kahtomah, was located just north of Los Banos on the south bank of Los Banos Creek. During the era of the Spanish missions, many of the Kahtomah villagers were taken to Mission San Juan Bautista (Hatoff, et al. 2006, pp. 1-11 to 1-12; Latta 1999, p. 145).

Other ethnographic groups within the area and surrounding the Chowchilla and Fresno Rivers included the Chauchela and Hueche, respectively. Between present-day Mendota and Fresno, the Hoyumne inhabited the area north of the San Joaquin River, whereas the Pitkache occupied the area to the south (Latta 1999). For the most part, Wallace describes a similar distribution of ethnographic groups within the Northern Valley Yokuts territory. However, Wallace identifies the Nopchinchi, rather than the Kahwatchwah, as the group occupying the area west of the San Joaquin River near the extant towns of Firebaugh, Los Banos, and Ingomar (1978, p. 462).

Historic Setting

Because the aridity of much of the San Joaquin Valley made it unsuitable for the kind of agriculture Euro-Americans practiced, non-Native American settlement did not occur on any significant scale in the project area until the early twentieth century, when irrigation systems were developed (Herbert, et al. 2006, p. 3).

Spanish Period (1769 to 1821)

Starting in 1769 at what would become San Diego, Spain sought to reinforce its claims to California by establishing a series of missions to pacify and Christianize the Indians

of the territory, with the object of making them stable, tax-paying citizens of New Spain, as Mexico was then called. Expeditions in the early nineteenth century, sent from the established coastal missions into the interior to find suitable locations for new missions, were met with resistance from the Native Americans living there, and one explorer-missionary's 1806 journal described the interior as a dry, miserable place, unsuitable for settlement (Smith 2004). Nonetheless, sporadic Spanish, and later Mexican, Russian, and American, explorations in the "Great Valley" fed international tensions, but resulted in no Euro-American settlement (PEC 2006, p. 5.7-6)

Mexican Period (1821 to 1848)

Mexico gained her independence from Spain in 1821, and Alta California became one of the provinces of the new Republic of Mexico. After the government secularized the missions, starting in 1834, the Mexican governors of Alta California began making large rancho grants of former mission lands to Mexican citizens, particularly to soldiers and members of prominent families who had financed various government initiatives. In the 1840s, the Mexican authorities made a few large rancho grants of San Joaquin Valley land, but no actual homesteads were established there under the Spanish or Mexican authorities. Rancho Laguna de Tache, consisting of over 48,000 acres of land straddling the boundary of present-day Fresno and Kings Counties and granted to Mañuel de Jesus Castro in 1846, was the only Mexican land grant in modern Fresno County. The SPP area was not included in any Mexican land grant (PEC 2006, p. 5.7-6; Herbert, et al. 2006, p. 2).

American Period (1848 to the Present)

Following the conclusion of the Mexican War in 1848, the SPP area came under the control of the United States. The Gold Rush of 1849 brought settlers to the Upper Kings River (part of what would become Fresno County in the 1850s), but the northwestern part of the county, where the proposed project area is located, did not appeal to American settlers. Following unsuccessful attempts at mining, however, many settlers turned to farming in the Central Valley. The vast network of valley marshes, wetlands, and lakes, including Tulare Lake, were drained to create farmland. Chinese workers, who had originally come to California to work in the mines, later began to work as farmhands. Chinese and other immigrant workers met with some hostility, and in the 1890s, Fresno was the site of anti-immigrant riots.

In the 1860s, stock-raising became a dominant business in the area. In the 1870s, the establishment of the railroad provided a larger market to farmers and also an easier mode by which settlers could come to California, ushering in an era of general farming (Fresno County 2006). However, the arid climate finally caused a community of Basque families, who had been raising stock in the project area for some 20 years, to abandon their homesteads, and later attempts at dry-farming wheat and barley in the area were short-lived (Herbert, et al. 2006, p. 3).

The proposed SPP site lies on the southwestern outskirts of the small community of Mendota. In 1891, the Southern Pacific Railroad established a storage and switching facility in Mendota and soon added a roundhouse. The railroad brought an economic boom to the region that fostered the growth of Mendota. The local economy declined in 1910, however, following the abandonment of the roundhouse and the cessation of

diatomite mining operations in the area (URS 2006a, App. J, p. 4-14). Today, agriculture is the primary industry of Mendota.

The city of Firebaugh is also located near the project area. During the Gold Rush, Firebaugh was a major San Joaquin River ferry crossing for prospectors heading for gold country (URS 2006a, App. J, p. 4-14). Incorporated in 1914, Firebaugh has grown from a ferry crossing to a city whose economy is based on agriculture.

Panoche Road, as West Panoche Road was originally called, was established in the mid-1870s and runs southwest from the area of present-day White's Bridge Ferry to the mountains. It was the earliest historic-period development in the project area. This road was designated a county road in 1892 and a principal California Automobile Association route in 1914. By 1922, it was the only oiled road in the area. Fresno County's later network of paved and unpaved county and farm roads mostly followed north-south and east-west section lines, but Panoche Road remained distinctive, with its generally diagonal route and gentle curves (Herbert, et al. 2006, p. 5).

By the early twentieth century, irrigated agriculture, using canals to divert the waters of eastern Fresno County rivers, proved the great fertility of the region's soils, and land speculators began buying large parcels west of Mendota in an area called Mendota Plains. The speculators enticed buyers through promotional campaigns touting the abundant groundwater of the area and the probability of future irrigation projects. Drawing water from shallow wells, farmers near Mendota began irrigating their fields, but suffered crop failures due to the high boron content of the groundwater. During the 1920s, cotton emerged as a valuable crop that thrived despite the boron in the well water. In the late 1920s, the Firebaugh Canal Company was established, drawing water from the San Joaquin River (Stroshane 2002, pp. 4, 7), and with better-quality water now available, west Fresno County farmers began to grow wheat and barley profitably. World War II greatly raised the demand for cotton and grain crops, but after the war local agricultural production diversified into vegetables, melons, flax, and alfalfa, with the aid of federal agricultural subsidies. In 1968, irrigation water from the State Water Project arrived in western Fresno County via the San Luis Canal, located about three miles east of the project area. This continuous supply of good water has allowed the area's agricultural productivity to expand to its present high level (Herbert, et al. 2006, pp. 3-5).

The name of one of the early twentieth-century land speculators has survived in a local place name: "Chaney Ranch." Andrew J. Chaney, of Hollister, was one of five San Benito County partners who formed the Silver Creek and Panoche Land Company, incorporated in 1891. In 1907, the partnership owned the entire section (Section 5) where the project is located. The earliest reference to a "Chaney Ranch" appears on the 1913 topographic map of the area (the survey for which was done between 1908 and 1911). The USGS 1922 "Chaney Ranch" quadrangle shows the original Chaney Ranch, including a road network and buildings, located in the vicinity of the proposed SPP site. By 1920, the Chaney family had reportedly sold Section 5 to a C. D. Hillman and moved to Yolo County, but the ranch name apparently was preserved in the area as a place name. Sometime between 1920 and 1937, another agricultural complex was developed on the other side of West Panoche Road from the original Chaney Ranch (at 43405 West Panoche Road). It is not known whether or not this complex was an expansion of

the original Chaney Ranch. Between 1937 and 1950, the Chaney Ranch buildings south of West Panoche Road were removed, while the complex north of West Panoche Road continues in that location to this day (Herbert, et al. 2006, pp. 5-6, 23-24; URS 2007d, Att. B, p. 3, blow-up of 1922 USGS "Chaney Ranch" topographic map, 1937 aerial photograph, and 1950 aerial photograph).

Resources Inventory

Methods: Records Search, Background Research, and Native American Contacts

URS Corporation archaeologist Laurie Solis carried out all cultural resources work for the proposed SPP under the direct supervision of Dr. Diane Douglas, a URS Registered Professional Archaeologist. In October, 2006, an archaeological records search was conducted at the California Historical Resources Information System (CHRIS,) South San Joaquin Valley Information Center at California State University, Bakersfield, to identify all known cultural resources located within the boundaries of the 5.6-acre proposed SPP parcel and within a one-mile radius of this parcel and the adjacent CalPeak Panoche Peaker Plant. The records search sought to identify previous cultural resource surveys, archaeological sites, and historic structures within the study area that may be impacted by the proposed project. Additional information was obtained from the California Office of Historic Preservation's website for California Historical Landmarks, the National Park Service's database for listings in the National Register of Historic Places (NRHP), and the National Park Service's database for National Natural Landmarks. In addition, the applicant reviewed the USGS 1922 "Chaney Ranch" topographic quadrangle for the presence of historic structures and properties (URS 2006a, App. J, p. 5-1).

Rand F. Herbert, a qualified architectural historian, Steven J. Melvin, and Nathan Hallam, of JRP Historical Consulting, in May, 2006, undertook a review of inventories of known historic properties for the PEC project, proposed for a location just southwest of the proposed SPP site. The JRP team sought to identify any known or evaluated historic-period standing structures located within a 0.5-mile-radius around the proposed PEC plant site, laydown area, and substation expansion. Thus, the JRP study area included the proposed SPP site as well. JRP reviewed the NRHP, the California Register of Historical Resources (CRHR), the list of California Historical Landmarks, and the list of California Points of Historical Interest. They also consulted with the Fresno County Assessor's Office, Fresno County Clerk's Office, the Fresno County Planning Department, and the First American Real Estate Property Solutions; and researched local and regional history at the California State Library, the Shields Library at the University of California, Davis, the Central Library of the Fresno County Public Library, and the Henry Madden Library of Fresno State University (Herbert, et al. 2006, section 2, p. 1). Additionally, they conducted a field survey, discussed below, of the PEC study area.

In reviewing a photocopy of the USGS 1922 "Chaney Ranch" topographic quadrangle (URS 2007b, Data Response No. 33), staff noted that the Chaney Ranch buildings were shown in a location south of West Panoche Road, in what might have been the southern part of the proposed SPP parcel. This observation raised the possibility that the Chaney Ranch buildings were moved or removed sometime after 1920 (when the survey for the 1922 quadrangle was done), and that, as a result, historic-period

archaeological remains attributable to the original Chaney Ranch could be present on or near the proposed SPP parcel. Consequently, on March 23, 2007, staff requested that the applicant conduct additional historical research to determine the location of the historical Chaney Ranch relative to the proposed SPP site.

In response to this request, URS architectural historian Jeremy Hollins conducted historical research on April 1 through April 4, 2007. Hollins accessed historical materials at the Fresno County Public Library's California History and Genealogy Room; the Government Publications and Maps Department and Special Collections and Archives Department of the Madden Library at California State University, Fresno; the Fresno County Hall of Records; and the Fresno County Department of Public Works and Planning. He reviewed records, historic maps, and aerial photographs specific to the proposed project location and covering a time span from 1855 to 1987 (URS 2007d, Att. B, p. 1).

On October 20, 2006, Laurie Solis wrote to the Native American Heritage Commission (NAHC) asking that the database of Native American sacred lands be searched for any known properties within a one-mile radius of the study area and requesting contact information for Native Americans who have expressed an interest in being notified about development projects in Fresno County (URS 2006a, p. 5.7-8). The NAHC responded on October 20, 2006, stating that it has no listings of known sacred sites within the project area. On October 20, 2006, Laurie Solis sent letters to four Native Americans on the NAHC-provided list, asking them to provide information on any cultural resources that could be affected by the proposed project (URS 2006a, p. 5.7-8, App. J, Att. B). In February, 2007, she followed up with telephone calls to any Native Americans individuals who had not responded to the earlier letters (URS 2007b, Data Response No. 38).

On January 26, 2007, Energy Commission staff also obtained from the NAHC the names and addresses of Native Americans interested in the western Fresno County area. On January 31, 2007, staff sent a letter to nine Native American groups or individuals, informing them of the project and asking that they contact staff if they had any concerns about the project's potential effects on cultural resources.

Methods: Field Surveys

On October 18, 2006, using transects three to five meters wide, Laurie Solis conducted an intensive pedestrian survey for archaeological resources on the proposed 5.6-acre proposed SPP parcel. Areas of exposed soil were closely inspected for cultural resources, particularly in locations where rodent activity had disturbed the ground surface (URS 2006a, App. J, p. 6-1).

The applicant also conducted a geotechnical exploration at the proposed SPP site on July 13-14, 2006, to obtain soil condition data to aid in the design of plant foundations. The information gleaned from such studies provides an opportunity for an archaeologist to discover, within the restricted windows of the test borings, what kinds of soils exist below the surface of a proposed power project site. An archaeologist can examine the soil profiles resulting from the geotechnical borings to see if any evidence of human activity, such as discolored soil or shell or charcoal fragments, were found in the

borings. If such remains are identified, they may indicate the presence of a buried archaeological deposit.

The geotechnical study consisted of nine test borings within the project site. Eight of the borings were drilled to a depth of 41.5 feet below the existing ground surface, whereas one boring extended to a depth of 101.5. The near-surface soil encountered in the test borings consisted of silt to depths ranging from 4.5 to 14.5 feet. Soils near the ground surface were underlain by discontinuous layers of silty sand, lean clay, and poorly graded sand, to the depth explored (URS 2006a, App. L, p. 5).

Findings: Prehistoric and Historic Archaeological Resources Identified and Evaluated for Historical Significance

The applicant's CHRIS records search sought information on any previously identified prehistoric and historic-period archaeological sites, historic architectural properties, and Native American sacred sites within a one-mile radius of the 5.6-acre proposed SPP parcel and adjacent CalPeak Panoche Peaker plant. The records search, conducted in October, 2006, found that none of the impact areas associated with the proposed SPP had been previously surveyed. There were five previous cultural resources surveys conducted in the larger study area, but no known cultural resources had been identified within a 0.5-mile radius of the proposed project site (URS 2006a, p. 5.7-9). The nearest known prehistoric sites are located about two miles north of the project area, along Panoche Creek. Several lithic scatters and milling sites were identified, which were probably associated with a nearby single extensive village site (CA-FRE-372). These sites were characterized as "occupational sites used frequently and over time by the local prehistoric occupants" (URS 2006a, App. J, p. 5-3).

The applicant's recent archaeological survey of the 5.6-acre proposed SPP parcel identified no archaeological resources, including no indications of remains associated with the original Chaney Ranch. The cultural resources technical report states that there may be 6 to 12 inches of fill on the proposed SPP site, based on the information provided by the CalPeak Panoche Peaker Plant site manager, who indicated that the CalPeak Plant was built on imported fill material, and on the observation that both the proposed SPP site and the CalPeak Plant site are higher than the land to the south of them (URS 2006a, App. J, p. 7-2). Applied fill in the area could obscure any subsurface archaeological deposits, but neither the applicant's soils assessment nor the geotechnical study identified a surface fill layer at the proposed SPP site (URS 2006a, p. 5.4-2, App. L)

On April 12, 2007, the applicant provided to staff the results of Jeremy Hollins's efforts to determine through historical research the location of the original Chaney Ranch relative to the proposed SPP site. The historic maps and aerial photographs show that in 1920 the original Chaney Ranch was located south of West Panoche Road. Then, sometime between 1920 and 1937, an agricultural complex was developed north of West Panoche Road (across the road and east of the proposed project area), while at least two original Chaney Ranch buildings were still present in the 1920 location south of the road. It has not been established that the two clusters of buildings, contemporaneous in 1937, were both part of the Chaney Ranch, but by 1950, the buildings in the 1920 location were gone. Between 1950 and 1957, the location of the original Chaney Ranch was put under cultivation and has remained so since. Hollins

found that the original Chaney Ranch was located some 400 feet east of the proposed SPP parcel (URS 2007d, Att. B,, USGS "Chaney Ranch" topographic map and aerial photographs dated 1937, 1950, 1957, 1961, 1965, 1973, 1977, and 1987). Consequently, staff agrees with Hollins's conclusion that construction-associated activities of the SPP on the proposed site are unlikely to encounter archaeological deposits associated with the core area of the original Chaney Ranch. However small, a possibility remains that archaeological deposits from some Chaney Ranch satellite activity, such as trash disposal, could be buried on the proposed project site.

In addition to archival research and field surveys, nine borings were conducted as part of a geotechnical study. The borings were not observed by an archaeologist, but staff finds that the soil descriptions in the report and in the detailed boring logs are not consistent in color, composition, or content with the kinds of soils usually indicative of archaeological deposits (URS 2006a, App. L, Figs. A-2 to A-9).

Other historic-period remains could be encountered during ground-disturbing activities at the proposed SPP site. The geotechnical study conducted for the PEC speculated on the possibility of encountering subsurface irrigation and water supply lines on the proposed PEC site (PEC 2006, App. L, p. 8). As close to the proposed PEC site as it is, the proposed SPP site could hold the same prospect: subsurface irrigation and water supply lines associated with the original Chaney Ranch could be present. If encountered, depending on their age and significance, these could be considered archaeological remains or underground vernacular structures. To be historically significant, they would have to be more than 45 years old and would have to be unusual or unique in materials (not-mass-produced) or in design.

Despite the negative findings of the applicant's archaeological survey and the lack of indications of subsurface cultural material in the borings of the geotechnical study, there remains a possibility of encountering buried archaeological materials, considering the presence of the original Chaney Ranch in the vicinity and with a known prehistoric occupation site located approximately two miles north of the proposed SPP site.

Findings: Historic Structures Identified and Evaluated for Historical Significance

The applicant identified no standing historic structures within the project area from either the records search or the field survey. For the PEC project, located approximately 980 feet to the southwest of the proposed SPP site, JRP Historical Consulting conducted a review of historical resources within a 0.5-mile radius of the proposed project. Rand F. Herbert, Steven J. Melvin, and Nathan Hallam, of JRP, identified no known historical resources either listed or determined eligible for listing within that study area around the proposed PEC plant site, laydown area, and substation expansion (Herbert, et al. 2006, sect. 2, p. 1).

The JRP team's historic architecture intensive field survey entailed field observation and recording. The JRP team produced Department of Parks and Recreation (DPR) 523 forms and detailed descriptions and evaluations of CRHR eligibility for several historical resources located near the proposed PEC plant site (Hatoff, et al. 2006, pp. 9-17; PEC 2007, Data Response No. 62 Rev):

- Three buildings (a large storage building, a residence, and an auxiliary building) located at 43405 West Panoche Road (on the north side of the road) that are part of the later Chaney Ranch agricultural complex;
- Two groups of residences located at 43946 West Panoche Road. One cluster consists of three farm worker houses located immediately north of West Panoche Road and across from the proposed PEC project site. The second residential cluster is made up five farm worker houses situated approximately 0.5 mile north of West Panoche Road;
- West Panoche Road itself; and
- The Panoche Substation, located just south of West Panoche Road and adjacent to the western edge of the proposed SPP site.

The JRP team concluded that none of the evaluated resources was eligible for the CRHR. They recommended the later Chaney Ranch agricultural complex at 43405 West Panoche Road as ineligible for the CRHR because none of the three buildings older than 45 years was associated with any significant historic event or person, or possessed architectural merit or distinction. Moreover, none of the later Chaney Ranch buildings could be dated to the original ranch. Additionally, the three buildings lacked physical integrity due to alterations (Herbert, et al. 2006, pp. 20-22). The two clusters of farm worker houses located at 43946 West Panoche Road similarly have no association with historically significant events or persons and no architectural merit. They too, lack integrity, due to dilapidation (Herbert, et al. 2006, pp. 22-23). West Panoche Road itself was recognized as having historically played an important role in the region, but it lacks integrity due to its having been repeatedly improved over the years (Herbert, et al. 2006, pp. 23-24). Although the Panoche Substation is over 50 years old, it is a ubiquitous type throughout California and, consequently, could not provide important technical or cultural information. Additionally, the substation does not reflect the work of a master architect or craftsman and is not associated with people or events of local, state, or national importance (PEC 2007, Data Response 62 Rev).

The "5-plex," a multi-unit, one-story apartment building located on the north end of the proposed SPP site, is currently providing housing to farm labor families working for the landowner, PAO Investments, LLC. If the proposed SPP is approved by the Energy Commission, the tenants would be relocated to other housing, and the "5-plex" would be leased by the SPP owner and converted to some other, unspecified use (URS 2006a, p. 5.10-6). In their field survey, the JRP team did not identify the "5-plex" as a potential historical resource, and Hollins's Chaney Ranch background research yielded a Fresno County Building Permit for the apartment building, dated 1975. Thus, not having reached the age of 45 years, the "5-plex" cannot be considered a potential historical resource (URS 2007d, Att. B, App. B, 1975 Building Permit for 43649 West Panoche Road).

No standing structures either on or near the proposed SPP power plant have been recommended as eligible for the CRHR, so staff does not need to consider this class of cultural resources when evaluating the impacts of the construction of the proposed SPP plant.

Findings: Ethnographic Resources Identified and Evaluated for Historical Significance

On October 20, 2006, the NAHC informed the applicant that no known Native American cultural resources in the project area were found in the NAHC's sacred lands database. On October 20, 2006, URS archaeologist Laurie Solis sent out letters (with maps of the project) to Native American individuals the NAHC identified as concerned about development projects in Fresno County, representing four Native American groups. No responses were received (URS 2006a, p. 5.7-8). On February 21, 2007, to ensure that all potentially concerned groups had an opportunity to comment on the proposed SPP, the applicant made follow-up telephone calls to the four previously contacted individuals. Messages were left with three individuals, whereas the representative of the fourth group, the Traditional Choinumni Tribe, could not be reached due to an incorrect telephone number provided by the NAHC (URS 2007b, Data Response No. 36). No additional effort was made to contact the Traditional Choinumni Tribe representative.

On February 28, 2007, follow-up telephone messages were left with two individuals; however, no responses were received. On February 22, 2007, Lalo Franco, a representative of the Santa Rosa Rancheria, spoke with the applicant indicating that the tribe considers the project area to be sensitive due to its proximity to Panoche Creek (URS 2007b, Data Response No. 36). Providing additional support for concerns over the potential for prehistoric sites in the area, Mr. Franco sent URS archaeologist Laurie Solis an article from *California Geology* describing past Native American use of local Cretaceous calcareous-cemented sandstone concretions to manufacture stone mortars and to create rock art carvings known as petroglyphs (Prokopovich 1976).

Mr. Franco suggested that monitoring by a Native American representative during project activities might not be necessary, but would depend upon the extent of excavation. Additionally, he would like the applicant to keep the tribe informed regarding project activities, and he recommends that, prior to beginning construction, the contractor and crew participate in cultural sensitivity training and that the applicant enter into a Burial Agreement with the tribe (URS 2007b, Data Response No. 36). Laurie Solis e-mailed Mr. Franco on February 22 and February 26, 2007, and followed up with a second telephone call on February 28, 2007, requesting details of recommendations for consultation (URS 2007b, Data Response No. 36). To date, no response has been received.

Unless further communications with Native Americans disclose significant sites of ethnographic concern, at this time no significant ethnographic sites have been identified that must be considered when evaluating the impacts of the construction of the proposed SPP plant.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Various laws apply to the evaluation and treatment of cultural resources. CEQA requires the Energy Commission to evaluate resources by determining whether they meet several sets of specified criteria. These evaluations then influence the analysis of potential impacts to the resources and the mitigation that may be required to ameliorate any such impacts.

The CEQA Guidelines provide a definition of a historical resource as a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR," or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of Section 5024.1 (g) of the Public Resources Code," or "any object , building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record" (Cal Code Regs, tit. 14, § 15064.5(a)). Historical resources that are automatically listed in the CRHR include California historical resources listed in or formally determined eligible for the NRHP and California Registered Historical Landmarks from No. 770 onward (Pub Resources Code, § 5024.1(d)).

Under the CEQA Guidelines, a resource is generally considered to be historically significant if it meets the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old,[3] a resource must meet at least one of the following four criteria: is associated with events that have made a significant contribution to the broad patterns of our history (Criterion 1); or, is associated with the lives of persons significant in our past (Criterion 2); or, that embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values (Criterion 3); or, that has yielded, or may be likely to yield, information important to history or prehistory (Criterion 4) (Pub Resources Code § 5024.1). In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (Cal Code of Regs, tit. 14, § 4852(c)).

Even if a resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows the lead agency to make a determination as to whether the resource is a historical resource as defined in Public Resources Code sections 5020.1 (j) or 5024.1. Whether a proposed project would cause a substantial adverse change in the significance of historical resources is the issue that staff analyzes to determine if the project may have a significant effect on the environment.

[3] The Office of Historic Preservation's Instructions for Recording Historical Resources (1995) endorses recording and evaluating resources over 45 years of age to accommodate a five-year lag in the planning process.

DIRECT/INDIRECT IMPACTS AND MITIGATION

In the abstract, direct impacts to cultural resources are those associated with project development, construction, and coexistence. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic standing structures when those structures must be removed to make way for new structures or when the vibrations of construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those that may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction creates improved accessibility, and vandalism and/or greater weather exposure become possible.

Ground disturbance accompanying construction at the proposed plant site and along the associated linear facilities has the potential to directly impact archaeological resources, unidentified at this time. The potential direct, physical impacts of the proposed construction on unknown archaeological resources are commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed plant into this particular setting could have a direct impact on the integrity of association, setting, and feeling of nearby standing historic structures.

Construction Impacts and Mitigation

Direct Impacts on Previously Unknown Archaeological Resources and Proposed Mitigation

The applicant's records search revealed no previously recorded sites located within a one-mile radius of the study area. Contacted Native Americans also disclosed no archaeological sites in the area, but one Native American, citing known Native American use of the area, expressed concern over the possibility of buried prehistoric deposits. The applicant's field survey found no archaeological resources in any of the proposed SPP impact areas. However, the location of the original Chaney Ranch buildings in the vicinity of the project site holds out the possibility of buried historical archaeological deposits associated with the Chaney Ranch.

Staff agrees with the applicant that construction impacts from the proposed SPP would affect no known archaeological resources (URS 2006a, p. 5.7-15), and consequently, no mitigation would be required.

Because the proposed SPP construction requires subsurface ground disturbance in an area that was utilized in prehistory and history (as indicated in the sections on prehistoric and historic settings), staff must consider the possibility proposed SPP construction encountering as yet unknown archaeological resources. The possibility of prehistoric archaeological deposits is suggested by the proximity of the prehistoric sites on Panoche Creek, by the resource-rich nature of the marshy early prehistoric landscape, and by the geologic landform on which the proposed SPP would be built—an alluvial fan—which could mask buried prehistoric archaeological remains under the deposited sediments. The possibility of historic-period archaeological deposits is suggested by the proximity of the original Chaney Ranch. If any newly found archaeological resources are eligible for the CRHR, the direct impacts from construction could materially impair the resources. Staff anticipates the following kinds of direct impacts to potential but as yet undiscovered archaeological deposits:

- Ground disturbance, from such proposed SPP activities as: (1) the removal, storage, and/or disposal of earth, vegetation, loose rock, and debris; (2) excavations for project component foundations, for a 25,000 square-foot evaporation pond, for underground water and natural gas pipelines, for on-site fill acquisition, and for an optional 1,500-foot well; (3) grading to the appropriate slope desired for drainage; (4) application of fill to raise the finished site grade to approximately one foot above the present grade and to slope fill up the tops of foundations approximately three feet above the present grade; and (5) installation of security fencing, could directly impact archaeological resources, unidentified at this time, which could be present in the native soils of the site;
- Ground disturbance potentially resulting from the construction of internal roads connecting the proposed SPP site to West Panoche Road, including a 20-foot-wide and 250-foot-long graded gravel road and a 1,150-foot-long asphalt road and turnaround area, could directly impact archaeological resources, unidentified at this time, that could be present in the native soils of the site;
- Ground disturbance from the installation of a dead end structure on the proposed SPP site and a new transmission line pole at the Panoche Substation, as supports for the 115-kV transmission system; installation of the transmission structure foundations could entail excavations into either or both imported fill and natural undisturbed soils at the proposed SPP site and the substation, potentially impacting buried archaeological resources, unidentified at this time, that could be present in the native soils of the site;
- Ground disturbance by the trench required for the 3-inch-diameter, 1,200-foot-long underground water pipeline, connecting the proposed SPP to the adjacent CalPeak Panoche Peaker Plant's groundwater well, the open trench, optimally 48 inches deep and 18 inches wide, would potentially be excavated into undisturbed soils; excavation of this trench could directly impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the trench;
- Ground disturbance by the trench required for the 6-inch-diameter, 800-foot-long (200 feet of which would be off-site) underground natural gas transmission line, connecting the proposed SPP to a new gas-metering station at the nearby Panoche Substation, the open trench, optimally 48 inches deep and 18 inches wide, would potentially be excavated into undisturbed soils; excavation of this trench could

directly impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the trench.

In recognition of the possibility that archaeological deposits could be encountered during construction, CEQA advises a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, and the project owner may be required to train workers to recognize cultural resources, fund mitigation, and delay construction in the area of the find (Pub Resources Code, § 21083.2; Cal Code of Regs, tit. 14, §§ 15064.5(f) and 15126.4(b)). Consequently, staff recommends that procedures for identifying, evaluating, and possibly mitigating impacts to newly discovered archaeological resources be put into place by means of conditions of certification to reduce those impacts to a less than significant level.

The applicant provided three mitigation measures for the appropriate treatment of potentially significant buried and previously unknown cultural resources encountered during construction (URS 2006a, p. 5.7-16 to 5.7-17). The applicant's CUL-1, proposes to:

- Halt construction activities in the immediate vicinity of the newly identified resources, and have a qualified archaeologist identify the nature and boundary of the finds and assess whether the construction activities would impinge upon a potentially significant cultural resource;
- Modify construction activities to avoid the resource, if feasible, and have the archaeologist identify the proper course of testing, excavation, recovery, and documentation to be undertaken to reduce project-related impacts to the resource to a less than significant level; and
- Have a qualified archaeologist monitor construction activities within 100 feet of a potentially significant, newly discovered archaeological resource.

The applicant's CUL-2 proposes having a Native American monitor present during testing and/or data recovery if a newly discovered archaeological resource appears to have a prehistoric or ethnographic component. The applicant's CUL-3 sets out the appropriate actions to be taken if human remains should be encountered during construction, as prescribed by law.

All of the applicant's proposed treatment procedures for newly discovered archaeological resources have been incorporated into staff's proposed measures for identifying, evaluating, and possibly mitigating impacts to previously unknown archaeological resources discovered during construction (see Proposed Conditions of Certification, **CUL-1** through **CUL-7**, below). Staff proposes having an archaeologist monitor all construction activities entailing earthwork, and, in addition, for a Native American to join the archaeologist in monitoring construction activities where any prehistoric cultural resources have been discovered. The construction activities which staff would have an archaeologist monitor are:

1. The initial soil stripping and any grading of the proposed plant site;

2. The excavation of structural foundations, trenches for the natural gas and water pipelines, and the 25,000 square-foot evaporation pond; and

3. The drilling of the 1,500-foot well, if this alternate water source is necessary.

Staff believes that providing archaeological monitoring is warranted because the area has a long history of human utilization, including both prehistoric and historic-period occupations. A known prehistoric habitation site is located two miles away, the past ecology of the area would have made it attractive to Native Americans, and the geology of the area would have contributed to the burial of prehistoric deposits. One Native American tribal representative recommended Native American monitoring if prehistoric or ethnographic remains are found during construction. Additionally, a known historic-period occupation, the original Chaney Ranch, was located near the proposed project site, which further justifies requiring archaeological monitoring.

The Energy Commission assumes SVEP compliance with all applicable laws, ordinances, regulations, and standards, including Public Resources Code (PRC) 5097.98, which, as revised in 2006, governs the treatment of Native American human remains discovered during construction. PRC 5097.98 authorizes the NAHC to designate a Most Likely Descendant (MLD). The statute gives the MLD 48 hours after gaining access to the site where the remains were found to make a recommendation to the landowner regarding the treatment of the remains and any associated grave goods. The treatment options include removal and analysis, preservation in place, or return to the MLD for appropriate disposition. If no MLD is named, or the MLD makes no recommendations for treatment and disposition, PRC 5097.98 requires the landowner to rebury the remains and associated grave goods elsewhere on the property in a place where they will not be further disturbed. **CUL-3**, **CUL-6**, **CUL-7**, and **CUL-8** provide for the evaluation and treatment of all inadvertent discoveries, and such discoveries involving Native American human remains would be governed by the provisions of PRC 5097.98.

On August 8, 2007, the applicant provided staff with comments on the proposed conditions in the Preliminary Staff Assessment (URS 2007j, pp. 10-11). The applicant expressed concern about two provisions in **CUL-6**, as to what construction-related activities must be monitored and as to how many monitors would have to work simultaneously.

The applicant disagreed with the **CUL-6** requirement for archaeological monitoring during six listed construction-related activities because the applicant believes the nature and historic use of the proposed project site do not indicate that degree of rigor. Conversely, staff believes that because of the presence of a known large habitation site on Panoche Creek, about two miles north, monitoring all native soil removal at the plant site, along linears, and at the laydown areas is necessary. Years of agricultural use and a lack of surface indications of archaeological deposits do not validate the assumption that no archaeological deposits are present. Staff must assume that archaeological deposits could be present. Additionally, staff has included in **CUL-6** the provision that the project's cultural resources specialist can request a reduction in monitoring, and the change will be approved if sufficiently justified by the circumstances.

The six activities listed in **CUL-6** ("preconstruction site mobilization; construction ground disturbance; construction grading, boring and trenching; and construction") are defined in the part of the Preliminary Staff Assessment entitled, "General Conditions, Including

Compliance Monitoring and Closure Plan," beginning on p. 7-1. Because these definitions explicitly identify ground disturbances as expected to occur during the defined activities, staff lists all of these activities in **CUL-6** as requiring archaeological monitoring. While the applicant may define these six activities differently, the definitions in the General Conditions are what will be considered by the Energy Commission's Compliance Project Manager when assessing the SPP's compliance during construction. Consequently, staff relies on these definitions when writing cultural resources conditions and includes all ground-disturbing activities in those conditions.

The applicant also expressed concern that staff's description of full-time archaeological monitoring could be interpreted to mean that a monitor would have to be assigned to each earth-moving machine. Staff's intent in having one monitor per active machine was to assure monitoring coverage of simultaneous earth-moving activities in different parts of the construction site, so staff changed the language of **CUL-6** to better reflect that intent. The full-time monitoring description now assigns monitors based on the number of areas on the construction site being actively excavated by machines.

Direct Impacts on Historic Structures and Proposed Mitigation

No significant standing historic structures were identified in the area within 0.5 mile of the proposed project, so no impact to the integrity of setting, the integrity of association, or the integrity of feeling of any such resources in the area surrounding the proposed SPP would result from the plant introducing a new visual element into the wider, otherwise mostly flat historic landscape. Due to the absence of historically significant standing structures within 0.5 mile of the project site and the absence of project-related impacts to the integrity of setting, integrity of association, and integrity of feeling that would materially impair the significance of such historical resources, no mitigation measures would be required for this class of cultural resources.

Direct Impacts on Ethnographic Resources and Proposed Mitigation

No ethnographic resources, either previously recorded or newly disclosed in the communications with Native Americans initiated by the applicant or by the Energy Commission for the proposed project, were identified in the vicinity of the project.

Indirect Impacts

Neither the applicant nor staff identified any indirect impacts to cultural resources in the impact area of the proposed project, and so no mitigation of indirect SPP impacts would be required for any class of cultural resources.

Operation Impacts and Mitigation

During operation of the proposed SPP, if a leak should develop in the gas or water pipelines supplying the plant, repair of the buried utility could require the excavation of a large hole. Such repairs could impact previously unknown subsurface archaeological resources in areas unaffected by the original trench excavation. The measures proposed for mitigating impacts to previously unknown archaeological resources during the construction of the plant and linear facilities (below) would also serve to mitigate impacts from repairs occurring during operation of the plant.

Cumulative Impacts and Mitigation

A cumulative impact refers to a proposed project's incremental effects considered over time and together with those of other, nearby, past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355).

One future industrial project and three existing industrial facilities are immediately adjacent to the proposed SPP location. These are:

1. The CalPeak Peaker Plant, an existing natural-gas–fired power plant;

2. The Wellhead Power Generation facility, an existing natural-gas–fired power plant;

3. The proposed PEC (06-AFC-5), a future, natural-gas–fired power plant currently under Energy Commission review; and

4. The PG&E Panoche Substation, an existing facility for which an expansion is planned in connection with the construction of the PEC.

Cumulative impacts to cultural resources in the project vicinity could occur if any, several, or all of these facilities, including the proposed SPP, had or will have impacts on cultural resources that, considered together, would be significant.

No evaluations of the impacts to cultural resources of the CalPeak Peaker Plant and of the Wellhead Power Generation facility were identified in the CHRIS record searches for either the SPP project or the PEC project, so no data are available on the potential contribution of these projects to a cumulatively considerable impact on cultural resources. The impacts to cultural resources of the PEC project, of the expanded PG&E substation, and of the SPP were analyzed by staff and found to be not significant, with the implementation of conditions of certification providing for identification, evaluation, and avoidance or mitigation of impacts to significant cultural resources discovered during the construction of these projects.

Proponents of current and future projects can mitigate impacts to as yet undiscovered subsurface archaeological sites to less than significant levels by requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as significant (eligible for the CRHR or NRHP). Impacts to human remains can be mitigated by following the protocols established by state law in Public Resources Code § 5097.98. Since the impacts from the SPP project would be mitigated to a level less than significant by the project's compliance with **CUL-1** through **CUL-7**, and since similar protocols can be applied to other current and future projects in the area, staff does not expect any incremental effects of the SPP to be cumulatively considerable, when viewed in conjunction with other projects.

COMPLIANCE WITH APPLICABLE LORS

If the conditions of certification, below, are properly implemented, the proposed SPP would result in a less than significant impact on newly found cultural resources or on

any known resources that may be impacted in a previously unanticipated manner. The project would therefore be in compliance with CEQA and the other applicable state and local laws, ordinances, regulations, and standards listed in CULTURAL RESOURCES Table 1.

In its General Plan, Fresno County has policies promoting the preservation and re-use of historic sites and structures, the confidential identification of archaeological resources, Native American consultation, review of proposed projects for potential historic sites, and mitigation of adverse impacts to historic sites (Fresno County 2000).

Staff's conditions of certification require specific actions not just to promote but to effect historic preservation and mitigate impacts to all cultural resources to ensure CEQA compliance. Consequently, if the proposed SPP implements these conditions, its actions would be consistent with the cultural resources preservation policies of Fresno County.

RESPONSE TO PUBLIC COMMENTS

No public comments on the cultural resources analysis presented in the Preliminary Staff Assessment were received.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the Starwood Power Project would not have a significant impact on known significant archaeological resources, historic structures, or ethnographic resources. With the adoption and implementation of the proposed conditions of certification, **CUL-1** through **CUL-7**, the SPP would not have a significant impact on potentially significant archaeological resources that may be discovered during construction.

Staff recommends that the Energy Commission adopt the following proposed cultural resources conditions of certification, **CUL-1** through **CUL-7**. These conditions are intended to facilitate the identification and assessment of previously unknown archaeological resources encountered during construction and to mitigate any significant project impacts on any newly found resources assessed as significant and on any known resources that may be affected by the project in an unanticipated manner. To accomplish this, the conditions provide for:

- The hiring of a Cultural Resources Specialist, Cultural Resources Monitors, and Cultural Resources Technical Specialists;
- Cultural resources awareness training for construction workers;
- The archaeological and Native American (if needed) monitoring of ground-disturbing activities;
- The recovery of significant data from discovered archaeological deposits;
- The writing of a technical archaeological report on monitoring activities and findings; and

- The curation of recovered artifacts and associated notes, records, and reports.

When properly implemented and enforced, staff believes that these Conditions of Certification would mitigate any impacts to unknown significant archaeological resources newly discovered in the project impact areas to a less than significant level.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the project owner shall obtain the services of a Cultural Resources Specialist (CRS), and one or more alternates, if alternates are needed. The CRS shall manage all monitoring, mitigation, curation and reporting activities required in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resources Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility for listing in the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner (Discovery). No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction shall occur prior to CPM approval of the CRS, unless specifically approved by the CPM. Approval of a CRS may be denied or revoked for non-compliance on this or other projects.

CULTURAL RESOURCES SPECIALIST

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in the Code of Federal Regulations, 36 CFR Part 61. In addition, the CRS shall have the following qualifications:

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field; and

2. At least three years of archaeological or historic, as appropriate, resources mitigation and field experience in California.

3. At least one year of experience in a decision-making capacity on cultural resources projects in California and the appropriate training and experience to knowledgably make recommendations regarding the significance of cultural resources.

   The resumes of the CRS and alternate CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS/alternate CRS on referenced projects and demonstrate to the satisfaction of the

CPM that the CRS/alternate CRS has the appropriate training and experience to effectively implement the Conditions of Certification.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a BS or BA degree in anthropology, archaeology, historical archaeology or a related field and one year experience monitoring in California; or

2. an AS or AA degree in anthropology, archaeology, historical archaeology or a related field, and four years experience monitoring in California; or

3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology or a related field, and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS

The resume(s) of any additional technical specialists, e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification:

1. At least 45 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.

2. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval. At the same time, the project owner shall also provide to the approved new CRS the AFC and all cultural documents, field notes, photographs, and other cultural materials generated by the project.

3. At least 20 days prior to preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resources monitoring required by this Condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to the qualifications of the CRMs, at least five days prior to the CRMs beginning on-site duties.

4. At least 10 days prior to beginning tasks, the resume(s) of any additional technical specialists shall be provided to the CPM for review and approval.

5. At least 10 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall confirm in writing to the CPM that the approved CRS will be

available for onsite work and is prepared to implement the cultural resources Conditions.

CUL-2 Prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the AFC, data responses, and confidential cultural resources reports for the project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction activities shall occur prior to CPM approval of maps and drawings, unless specifically approved by the CPM.

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

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

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

Verification:

1. At least 40 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall provide the AFC, data responses, and confidential cultural resources documents to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

2. If there are changes to any project-related footprint, revised maps and drawings shall be provided at least 15 days prior to start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction for those changes.

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

4. On a weekly basis during preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, email, or fax.

5. Within five days of identifying changes, the project owner shall provide written notice of any changes to scheduling of construction phase.

CUL-3 Prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by or under the direction of the CRS, to the CPM for review and approval. The CPM shall provide the project owner with a model CRMMP to adapt for project use. The CRMMP shall be provided in the Archaeological Resource Management Report (ARMR) format, and, per ARMR guidelines, the author's name shall appear on the title page of the CRMMP. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Implementation of the CRMMP shall be the responsibility of the CRS and the project owner. Copies of the CRMMP shall reside with the CRS, alternate CRS, each monitor, and the project owner's on-site construction manager. No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, or construction shall occur prior to CPM approval of the CRMMP, unless specifically approved by the CPM.

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

1. A proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the project area, and a discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. A prescriptive treatment plan may be included in the CRMMP for limited resource types. A refined research design will be prepared for any resource where data recovery is required.

2. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The Conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the Conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A."

3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during ground disturbance, construction, and post-construction analysis phases of the project.

4. Identification of the person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team.

5. A description of the manner in which Native American observers or monitors will be included, the procedures to be used to select them, and their role and responsibilities.

6. A description of all impact-avoidance measures (such as flagging or fencing) to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during construction and/or operation, and identification of areas where these measures are to be implemented. The description shall address how these measures would be implemented prior to the start of construction and how long they would be needed to protect the resources from project-related effects.

7. A statement that all cultural resources encountered shall be recorded on a DPR form 523 and mapped and photographed. In addition, all archaeological materials retained as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, into a retrievable storage collection in a public repository or museum.

8. A statement that the project owner will pay all curation fees and a copy of an agreement with, or other written commitment from, a curation facility to accept artifacts from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

9. A statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resources materials that are encountered during construction and cannot be treated prescriptively.

10. A description of the contents and format of the Cultural Resources Report (CRR), which shall be prepared according to ARMR guidelines.

Verification:

1. At least 30 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall submit the subject CRMMP to the CPM for review and approval. Preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, or construction may not commence until the CRMMP is approved, unless specifically approved by the CPM.

2. At least 30 days prior to the start of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, a letter shall be provided to the CPM indicating that the project owner agrees to pay

curation fees for any materials collected as a result of the archaeological investigations (survey, testing, data recovery).

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

If the project owner requests a suspension of construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and submitted to the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification:

1. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.

2. Within 10 days after CPM approval, the project owner shall provide documentation to the CPM confirming that copies of the CRR have been provided to the SHPO, the CHRIS, and the curating institution, if archaeological materials were collected.

3. Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.

CUL-5 Prior to and for the duration of preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training shall include:

1. A discussion of applicable laws and penalties under the law;

2. Samples or visuals of artifacts that might be found in the project vicinity;

3. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt construction in the area of a Discovery to an extent sufficient to

ensure that the resource is protected from further impacts, as determined by the CRS;

4. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources Discovery and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;

5. An informational brochure that identifies reporting procedures in the event of a Discovery;

6. An acknowledgement form signed by each worker indicating that they have received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction, shall occur prior to implementation of the WEAP program, unless specifically approved by the CPM.

Verification:

1. At least 30 days prior to the beginning of pre-construction site mobilization, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval, and the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.

2. On a monthly basis, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of persons who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 The project owner shall ensure that the CRS, alternate CRS, or CRMs shall monitor preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, and construction full time at the project site and linear facilities, and ground disturbance full time at laydown areas or other ancillary areas, to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner (Discovery). Specifically, the CRS, alternate CRS, or CRMs shall monitor: the initial soil stripping and any grading of the plant site; the excavation of structural foundations, of trenches for the natural gas and water pipelines, and of the 25,000 square-foot evaporation pond; and the drilling of the 1,500-foot-deep well, if this alternate water source is necessary.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of all native-soil–removing activities on the construction site or along the linear facility routes for as long as the activities are ongoing. Full-

time archaeological monitoring shall require at least one monitor per excavation area where machines are actively removing native soils. If an excavation area is too large for one monitor to effectively observe the soil removal, one or more additional monitors shall be retained to observe the area.

In the event that the CRS determines that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered.

On forms provided by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS. Copies of the daily logs shall be provided to the CPM by the CRS as directed by the CPM. From these logs, the CRS shall compile a monthly monitoring summary report to be included in the MCR. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended. The CRS or alternate CRS shall report daily to the CPM on the status of cultural resources-related activities at the construction site, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resources monitoring and mitigation activities with Energy Commission technical staff (Staff).

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

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS and/or the project owner shall notify the CPM by telephone or e-mail within 24 hours. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the CPM.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts are discovered. Informational lists of concerned Native Americans and guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a

monitor shall be given to Native Americans with traditional ties to the area that shall be monitored.

Verification:

1. At least 30 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring and trenching; and construction, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log. While monitoring is on-going, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS.

2. Daily, the CRS shall provide a statement that "no cultural resources over 50 years of age were discovered" to the CPM as an e-mail, or in some other form acceptable to the CPM. If the CRS concludes that daily reporting is no longer necessary, a letter or e-mail providing a detailed justification for the decision to reduce or end daily reporting shall be provided to the CPM for review and approval at least 24 hours prior to reducing or ending daily reporting.

3. At least 24 hours prior to implementing a proposed change in monitoring level, documentation justifying the change shall be submitted to the CPM for review and approval.

CUL-7 The project owner shall grant authority to halt construction to the CRS, alternate CRS, and the CRMs in the event of a Discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event cultural resources over 50 years of age or considered exceptionally significant are found, or impacts to such resources can be anticipated, construction shall be halted or redirected in the immediate vicinity of the Discovery sufficient to ensure that the resource is protected from further impacts. The halting or redirection of construction shall remain in effect until the CRS has visited the Discovery, and all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the Discovery, or by Monday morning if the cultural resources Discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the Discovery (or changes in character or attributes), the action taken (i.e. work stoppage or redirection), a recommendation of eligibility, and recommendations for mitigation of any cultural resources Discoveries, whether or not a determination of significance has been made.

2. The CRS has completed field notes, measurements, and photography for a DPR 523 primary form. The "Description" entry of the 523 form shall include a recommendation on the significance of the find. The project owner shall submit completed forms to the CPM.

3. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the Discovery and approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

Verification:

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

2. Completed DPR form 523s shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever is more appropriate for the subject cultural resource, as determined by the CRS.

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HAZARDOUS MATERIALS MANAGEMENT

Testimony of Alvin J. Greenberg, Ph.D. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed Starwood Power-Midway, LLC Peaking Project (Starwood), with staff's proposed mitigation measures, indicates that hazardous materials use would not present a significant impact to the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations and standards. In response to Health and Safety Code, sections 25531 et seq., the applicant would be required to develop a Risk Management Plan. To ensure adequacy of the Risk Management Plan, staff's proposed conditions of certification would require that the Risk Management Plan be submitted for concurrent review by United States Environmental Protection Agency, Fresno County Environmental Health Division (EHD), and the California Energy Commission staff. In addition, staff's proposed conditions of certification require Fresno County's EHD's review, and staff's review and approval of the Risk Management Plan prior to delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, use of aqueous ammonia, and site security.

INTRODUCTION

The purpose of this Hazardous Materials Management analysis is to determine if the proposed project has the potential to cause significant impacts on the public as a result of the use, handling, storage, or transportation of hazardous materials at the proposed facility. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce impacts to the extent feasible.

This analysis does not address potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and provide employees with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials. The **Worker Safety and Fire Protection** section of this document describes the requirements applicable to the protection of workers from such risks.

Aqueous ammonia (19.5% ammonia in aqueous solution) is the only hazardous material proposed to be used or stored at the Starwood in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (URS 2006a, Table 5.15-1). Aqueous ammonia will be used for controlling oxides of nitrogen (NO_x) emissions through selective catalytic reduction. Other hazardous materials such as mineral and lubricating oils, and cleaning chemicals, will be present at the proposed facility, and small amounts of hazardous materials would be used during construction of the project. Although no natural gas is stored, the project will also involve the handling of large amounts of natural gas. Natural gas will be delivered through a new 6-inch pipeline, 200 feet of which would be installed offsite and 600 feet installed onsite along the west perimeter (URS 2006a, Section 3.7.1.1; URS memo of April 18, 2007

correcting length of gas pipeline). The Starwood project will also require the transportation of aqueous ammonia to the facility. This document addresses all potential impacts associated with the use and handling of hazardous materials.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

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

HAZARDOUS MATERIALS MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
SARA (42 United States Code (USC) §9601 et seq.)	The Superfund Amendments and Reauthorization Act (SARA) of 1986 contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III)
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Establishes a nationwide emergency planning and response program and imposes reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on Risk Management Plans (42 USC §112(r)	Requires the states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR Parts 172-800	U.S. Department of Transportation (U.S. DOT) requirement that suppliers of hazardous materials prepare and implement security plans.
49 CFR Part 1572, Subparts A and B	Requires suppliers of hazardous materials to ensure that all their hazardous materials drivers are in compliance with personnel background security checks.
The Clean Water Act (CWA) (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written Spill Prevention, Control, and Countermeasures (SPCC) plan to be prepared for onshore or offshore facilities that store oil that my leak into navigable waters.
49 CFR Part 190	Outlines gas pipeline safety program procedures.
49 CFR Part 191	Addresses transportation of Natural and Other Gas by Pipeline, including Annual Reports, Incident Reports, and Safety-Related Condition Reports.

Applicable Law	Description
49 CFR Part 192	Addresses transportation of Natural and Other Gas by Pipeline by establishing Minimum Federal Safety Standards. The safety requirements for pipeline construction vary according to the population density and land uses that characterize the surrounding land. This part also contains regulations governing pipeline construction that must be followed for Class 2 and Class 3 pipelines, and requirements for preparing a Pipeline Integrity Management Program.
State	
California Health and Safety Code Section 25500 et seq.	Requires facilities that use or store hazardous materials in excess of the threshold quantities to prepare a Hazardous Materials Business Plan (HMBP).
The California Health and Safety Code, section 25534 and Title 19, CCR Section 2770.5	Directs facility owners, storing or handling regulated substances in reportable quantities, to develop a Risk Management Plan (RMP) and submit it to appropriate local authorities, the United States Environmental Protection Agency (EPA), and the designated local administering agency for review and approval. The plan must include an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any preexisting evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. The new, recently developed California Accidental Release Prevention Program (CalARP) supersedes the California Risk Management and Prevention Plan (RMPP).
Title 8, CCR, Section 5189	Requires facility owners to develop and implement effective safety management plans to insure that large quantities of hazardous materials are handled safely.
Title 8, CCR, Section 458 and Sections 500 to 515	Set forth requirements for design, construction and operation of vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes, including the American Society for Material Engineering (ASME) Pressure Vessel Code, the American National Standards Institute (ANSI) K61.1 and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia but are also used to design storage facilities for aqueous ammonia.
California Health and Safety Code, section 41700	Requires that “No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”

Applicable Law	Description
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity to be discharged into sources of drinking water.
California Government Code Section 65850.2	Restricts approval of a project by local government until the facility has submitted an RMP.
Local (or locally enforced)	
Fresno County Environmental Health Division	The administering agency for the RMP and HMBP; requires new/modified businesses to complete these plans prior to final permit approval.

The Certified Unified Program Authority (CUPA) with responsibility to review RMPs and Hazardous Materials Business Plans (HMBPs) is the Fresno County Environmental Health Division. In regards to seismic safety issues, the site is located in Seismic Risk Zone 3, but the applicant has stated that design and construction of the Starwood project will meet the requirements of the Uniform Building Code for Seismic Zone 4, the highest risk zone category (URS 2006a, Section 3.3.2.2).

SETTING

Several factors associated with the area in which a project is to be located affect the potential for an accidental release of a hazardous material to cause public health impacts. These include:

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

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction and air temperature, affect the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the potential magnitude and extent of public exposure to such materials, as well as the associated health risks. When wind speeds are low and the atmosphere is stable, dispersion is severely reduced and can lead to increased localized public exposure.

Recorded wind speeds and ambient air temperatures are described in the Air Quality section (5.2.1) and Appendix I of the Application for Certification (AFC) (URS 2006a). Staff agrees with the applicant that use of F stability (stagnant air, very little mixing), wind speed of 1.5 meters per second, and the highest mean monthly maximum temperature recorded in the area since 1970 (101.2°F) are appropriate for conducting

the Offsite Consequence Analysis. Staff believes these represent a reasonably conservative scenario and thus reflects worst case atmospheric conditions.

TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor to be considered in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The site topography is gently sloped, with an average elevation of 395 to 400 feet above mean sea level. Terrain in the project vicinity that exceeds the proposed stack height begins about 1.1 miles away to the south and southwest of the site and continues in those directions as elevation gradually increases. Terrain slopes downward from the site in all other directions (URS 2006a, Sections 5.2.1, and Figure 5.2-1).

LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. Figure 5.16-1 of the AFC provides the location of sensitive receptors within three miles of the project site. This project treated all residences as sensitive receptors, and there are 12 residences and one park within a three mile radius. The nearest sensitive receptor is a 5-plex located about 100 feet from the northern project fenceline, but the applicant has stated at the PSA workshop that these residents will be relocated prior to the initial delivery of aqueous ammonia to the site. This will make the nearest sensitive receptor a residence that is located 600 meters (about 1968 feet or 0.37 miles) away from the project site (URS 2006a, Section 5.16.1).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD FOR DETERMINING SIGNIFICANCE

Staff reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals and natural gas were evaluated. Staff's analysis addresses potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of hazardous materials. In order to accomplish this goal, staff utilizes the most current acceptable public health exposure levels (both acute and chronic) set to protect the public from the effects of an accidental chemical release.

In order to assess the potential for released hazardous materials to travel off-site and affect the public, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that some hazardous materials must be used at power plants. Therefore, staff conducted its analysis by examining the choice and amount of chemicals to be used, the manner in which the applicant will use the chemicals, the manner it will be transported to the facility and transferred to facility storage tanks, and the way the applicant plans to store the materials on-site.

Staff reviewed the applicant's proposed engineering controls and administrative controls concerning hazardous materials usage. Engineering controls are those physical or mechanical systems, such as storage tanks or automatic shut-off valves, that can prevent a spill of hazardous material from occurring or which can limit the spill to a small amount or confine it to a small area. Administrative controls are those rules and procedures that workers at the facility must follow that will help to prevent accidents or keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off-site and causing harm to the public.

Staff reviewed and evaluated the applicant's proposed use of hazardous materials as described in the AFC (URS 2006a, Section 5.15). Staff's assessment followed the five steps listed below:

- Step 1: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in Table 5.15-1 of the AFC and determined the need and appropriateness of their use.
- Step 2: Those chemicals, proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off the site and impact the public, were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different size transfer-hose couplings and administrative controls such as worker training and safety management programs.
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.
- Step 5: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials even with the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the potential for adverse impacts to a level that is less than significant, staff will propose additional prevention and response controls until the potential for causing harm to the public is reduced to a level that is less than significant. It is only at this point that staff can recommend approval of the facility's use of hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps 1 and 2 that some materials, although present at the proposed facility, pose a minimal potential for off-site impacts as they will be stored in a solid form or in small quantities, have low mobility, or have low levels of toxicity. These hazardous materials, which were eliminated from further consideration, are discussed briefly below.

During the construction phase of the project, hazardous materials proposed for use include paint, paint thinner, cleaners, solvents, adhesives, gasoline, diesel fuel, motor oil, and lubricants. No acutely toxic hazardous materials will be used onsite during construction. Any impact of spills or other releases of these materials will be limited to the site due to the small quantities involved, the infrequent use and hence reduced chances of release, and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel are all of very low volatility and represent limited off-site hazard even in larger quantities.

During operations, hazardous chemicals such as hydraulic and lubricating oils and other various chemicals (see **Hazardous Materials Appendix B** for a list of all chemicals proposed to be used and stored at Starwood), would be used and stored in relatively small amounts and represent limited off-site hazard due to their small quantities, low volatility, and/or low toxicity.

Various cleaning chemicals and detergents such as hydrochloric acid, EDTA chelant and sodium nitrate will be used onsite, but their storage will be temporary. Sulfuric acid (in sealed batteries) will be stored on-site, but will not pose a risk of off-site impacts because of the small volumes stored and their relatively low vapor pressures that will keep spills confined to the site.

After removing from consideration those chemicals that pose no risk of off-site impact in Steps 1 and 2, staff continued with Steps 3, 4, and 5 to review the remaining hazardous materials: natural gas and aqueous ammonia.

Large Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or possible explosion risk as a result of its flammability. Natural gas is composed of mostly methane, but also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, and tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is 90% in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14%, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or possible explosion if a release were to occur under certain specific conditions. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1998), natural gas is less likely to cause explosions than many other fuel gases, such as propane or liquefied petroleum gas, but it can explode in some circumstances (as demonstrated by the natural gas detonation in Belgium in July of 2004).

While natural gas will be used in significant quantities, it will not be stored on-site. The risk of a fire and/or explosion on-site can be reduced to insignificant levels through adherence to applicable codes and development and implementation of effective safety management practices. The National Fire Protection Association (NFPA 85A) requires 1) the use of double block and bleed valves for gas shut-off; and 2) automated combustion controls. These measures will significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas turbines prior to start-up, thus precluding the presence of an explosive mixture. The safety management plan proposed by the applicant would

address the handling and use of natural gas and significantly reduce the potential for equipment failure due to improper maintenance or human error.

The proposed facility will require the installation of a new gas pipeline connecting to an existing PG&E line that serves the CalPeak Panoche facility. A 200-foot long (6 inch diameter) pipeline will be constructed off-site to connect the PG&E line to a new metering station at the northwest site boundary, and an additional 600 feet of pipeline will be constructed along the western project fenceline (on-site) to connect to the CTGs (URS 2006a, Section 3.7).

The natural gas pipeline will be designed in accordance with applicable codes and standards (URS 2006a Section 5.15.2.3). CPUC General Order 112-E, Section 125.1 requires that at least 30 days prior to the construction of a new pipeline, the owner must file a report with the commission that will include a route map for the pipeline. The natural gas pipeline must be constructed and operated in accordance with the Federal Department of Transportation (DOT) regulations, Title 49, Code of Federal Regulations (CFR), Parts 190, 191, and 192 (see Table 1 LORS). The off-site segment of the gas pipeline would be owned by PG&E and will be maintained in accordance with applicable Federal Energy Regulatory Commission (FERC) and U.S. DOT regulations (URS 2006a Section 3.9.4).

Staff concludes that existing LORS are sufficient to ensure minimal risks of pipeline failure. Additionally, the gas pipeline constructed for this project would be only 800 feet long (with only 200 feet located off-site), which greatly reduces the risks of impacts to the public from a rupture or failure.

Aqueous Ammonia

Based on staff's analysis, as described above, aqueous ammonia is the only hazardous material that may pose a risk of off-site impacts. Aqueous ammonia will be used in controlling NO_x emissions from the combustion of natural gas in the facility. The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with use of the more hazardous anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the anhydrous form which is stored as a liquefied gas at elevated pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air and result in high down-wind concentrations. Spills associated with the aqueous form are much easier to contain than those associated with anhydrous ammonia and emissions from such spills are limited by the slow mass transfer from the surface of the spilled material.

However, the accidental release of aqueous ammonia without proper mitigation can still result in significant down-wind concentrations of ammonia gas, even without interaction with other chemicals. This is a result of its moderate vapor pressure and the relatively large amounts of aqueous ammonia that will be used and stored on-site. Two aboveground storage tanks will be used to store the 19.5% aqueous ammonia, each with a maximum capacity of 12,000-gallon (URS 2006a, Section 5.15.2.2.1).

To assess the potential impacts associated with an accidental release of aqueous ammonia, staff uses the four "bench mark" exposure levels of ammonia gas occurring

off-site. These include: 1) the lowest concentration posing a risk of lethality of 2,000 ppm; 2) the Immediately Dangerous to Life and Health (IDLH) level of 300 parts-per-million (ppm); 3) the Emergency Response Planning Guideline (ERPG) level 2 of 150 ppm, which is also the RMP level 1 criterion used by EPA and California; and 4) the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure is 75 ppm averaged over 30 minutes. Thus, any plausible exposures due to a potential accidental release that produce exposures below 75 ppm will be considered insignificant. If staff's analysis determines that the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will assess the probability of occurrence of the release and/or the nature of the potentially exposed population in determining whether the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact. A detailed discussion of the exposure criteria considered by staff is provided in **Hazardous Materials Appendix A**.

Section 5.15.2.2.2 of the AFC (URS 2006a) describes the modeling parameters used for the accidental releases of aqueous ammonia in the applicant's Offsite Consequence Analysis (OCA). The OCA was prepared using the SCREEN3 atmospheric dispersion model for the following two scenarios: 1) a release associated with a failure of one storage tank (12,000 gallons), and 2) a release from the delivery truck during truck unloading (8,000 gallons). For the first release scenario, ammonia would flow through two 32-inch drains into an underground containment structure below the ammonia storage tanks. For the second release scenario, ammonia would flow from the sloped unlading pad through one 26-inch drain into the same underground vault. For both cases, evaporation of ammonia would only occur through the three drain openings mentioned above, and therefore the outcomes of both scenarios are practically the same (URS 2006a, Section 5.15.2.2.2).

The results of the applicant's modeling indicate that for either scenario, ammonia concentrations at CEC's level of significance (75 ppm) would extend about 47 meters from the ammonia storage tanks, and concentrations exceeding 200 ppm would extend up to 26 meters from the tanks. The ammonia concentration at the nearest occupational receptor (Wellhead Peaker Plant, 27 meters or 88 feet from the ammonia storage tank) was predicted to be 189 ppm. The concentration predicted to occur at the nearest resident, more than 600 meters (1968 feet) from the ammonia storage tank would be 0.9 ppm (URS 2006a Table 5.15-3), well below staff's level of significance (75 ppm) and below the level most people could smell the odor of ammonia (2 - 5 ppm). The applicant has stated that Wellhead Peaker Plant is unmanned under normal conditions, and therefore the chances of workers being present at that facility at the same time that an accidental release occurs at the proposed Starwood facility are extremely low.

Staff agrees with the modeling results of the applicant and believes that, with the incorporation of the engineering controls proposed by the applicant for the storage and transfer of aqueous ammonia, any potential accidental release of aqueous ammonia at the project site will not cause a significant impact and will not represent a significant risk to the public.

Mitigation

The potential for accidents resulting in the release of hazardous materials is greatly reduced by the implementation of a safety management program, which includes the use of both engineering and administrative controls. Staff believes that an accidental release of aqueous ammonia during transfer from the delivery tanker to the storage tank or the mistaken mixing of incompatible liquid hazardous materials are the most probable accident scenario and therefore proposes a condition (**HAZ-3**) requiring development of a safety management plan for the delivery of all liquid hazardous materials, including aqueous ammonia. The development of a Safety Management Plan addressing delivery of all liquid hazardous materials during construction, commissioning, and operations will further reduce the risk of any accidental release not addressed by the proposed spill prevention mitigation measures and the required RMP and prevent the mixing of incompatible materials that could result in the generation of toxic vapors. Elements of facility controls and the safety management plan, as required by condition of certification **HAZ-3**, are summarized below. Additionally, the sparsely populated area immediately around the project site contributes to the lack of impact on off-site receptors should a hazardous materials spill occur on-site. The nearest sensitive receptor is a 5-plex located about 100 feet from the northern project fenceline, but the applicant has stated at the PSA workshop that these residents will be relocated prior to the initial delivery of aqueous ammonia to the site. This relocation is critical mitigation and therefore staff proposes that this be required in condition **HAZ-9**.

Engineering Controls

Engineering controls help to prevent accidents and releases (spills) from moving off-site and impacting the community by incorporating engineering safety design criteria into the design of the facility. The engineering safety features proposed by the applicant and staff for use at this facility include:

- the aqueous ammonia storage tank be designed to comply with applicable standards and condition of certification **HAZ-4**;
- construction of secondary containment areas surrounding each of the hazardous materials storage areas designed to contain accidental releases that might happen during storage or delivery;
- construction of an underground secondary containment vault below the aqueous ammonia storage tanks that can hold the content of both tanks plus the volume of 24 hours of rain assuming the maximum rainfall recorded;
- construction of a containment area surrounding the truck unloading pad with a sloped floor draining into the underground vault below the storage tanks;
- instillation of ammonia system piping underground and use of double-walled pipes for any aboveground portions;
- process protective systems including ammonia vapor detection equipment, tank level monitors, and automatic shut off valves; and
- implementation of a Safety Management Plan for delivery of aqueous ammonia and other liquid hazardous materials that includes procedures, protective equipment

requirements, training, a checklist, and lockout control by a power plant employee not involved in the delivery or transfer operation.

Administrative Controls

Administrative controls also help prevent accidents and releases (spills) from moving off-site and impacting the community by establishing worker training programs, process safety management programs and by complying with all applicable health and safety LORS.

A worker health and safety program will be prepared by the applicant and will include (but is not limited to) the following elements (see the **Worker Safety and Fire Protection** section in this FSA for specific regulatory requirements):

- worker training regarding chemical hazards, health and safety issues, and hazard communication;
- procedures to ensure the proper use of personal protective equipment;
- safety operating procedures for operation and maintenance of systems utilizing hazardous materials;
- fire safety and prevention; and
- emergency response actions including facility evacuation, hazardous material spill cleanup, and fire prevention.

At the facility, the project owner will be required to designate an individual who has the responsibility and authority to ensure a safe and healthful workplace. The project health and safety official will oversee the health and safety program and will have the authority to halt any action or modify any work practice in order to protect the workers, facility, and the surrounding community in the event that the health and safety program is violated.

The applicant will be limited to the use and storage of hazardous materials listed in Appendix B (attached) as per proposed condition of certification **HAZ-1**. The applicant will also prepare an RMP for aqueous ammonia as required by CalARP regulations and condition of certification **HAZ-2** that would include a program for prevention of accidental releases and responding to an accidental release of aqueous ammonia. A Hazardous Materials Business Plan (HMBP) will also be prepared by the applicant that would incorporate state requirements for the handling of hazardous materials (URS 2006a, Section 5.15.5.2).

On-site Spill Response

In order to address the issue of spill response, the facility will prepare and implement an Emergency Response Plan which includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, etc. Emergency procedures will be established that include evacuation, spill cleanup, hazard prevention, and emergency response. Staff's proposed condition of certification **HAZ-3** would require that an Emergency Response plan be prepared and implemented.

The CalPeak Panoche facility's hazardous materials response team will be the responder for hazardous materials incidents. Estimated response time may range from an immediate response to one hour. Staff reviewed the hazmat emergency equipment list for this team and determined that the CalPeak Panoche hazmat team is adequately equipped to respond to hazmat incidents at the proposed Starwood facility (URS 2007b, response to DR #67).

Staff has also considered the minority population (as identified in **Socioeconomics Figure 1**) in its impact analysis. Staff has concluded that with the mitigation measures proposed by the applicant and by staff, there are no potential significant adverse impacts and therefore, there are no environmental justice issues.

Transportation of Hazardous Materials

Hazardous materials, including aqueous ammonia, compressed gases, waste oil, and cleaning chemicals, will be transported to the facility via truck or tanker truck. (See URS 2007b, Response to DR #17, for a detailed list of hazardous materials that would be transported to/from the Starwood facility). While many types of hazardous materials will be transported to the site, staff believes that transport of aqueous ammonia poses the predominant risk associated with hazardous materials transport.

The applicant stated that the hazardous materials transportation route will be selected to use the shortest route possible, which would be Interstate-5 to West Panoche Road to the Starwood site (URS 2007b response to DR #17). Staff reviewed this route and considered the potential for impact on public and sensitive receptors. This route passes one residence located on West Panoche Road and thus staff agrees that this is a suitable route, as it minimizes off-freeway travel distance (about 2 miles in total) as per California regulations (Vehicle Code sections 31303-31309). Delivery of hazardous materials will comply with DOT, DMV, and CHP regulations (URS 2006a, Table 5.11-15). To ensure that this route will be used, staff proposes condition of certification **HAZ-6**.

Ammonia can be released during a transportation accident and the extent of impact in the event of such a release would depend on the location of the accident and on the rate of dispersion of ammonia vapor from the surface of the aqueous ammonia pool. The likelihood of an accidental release during transport is dependent on three factors:

- the skill of the tanker truck driver,
- the type of vehicle used for transport, and
- accident rates along similar roads.

To address this concern, staff evaluated the risk of an accidental transportation release in the project area. Staff's analysis focused on the project area after the delivery vehicle leaves the main highway (Interstate 5). Consistent with CEQA, staff believes that it is appropriate to rely on the extensive regulatory program that applies to shipment of hazardous materials on California highways to ensure safe handling in general transportation (see the Federal Hazardous Materials Transportation Law 49 USC §5101 et seq., the US Department of Transportation Regulations 49 CFR Subpart H, §172-700, and California DMV Regulations on Hazardous Cargo). These regulations also

address the issue of driver competence. See AFC section 5.11.5 for additional information on regulations governing the transportation of hazardous materials.

To address the issue of tanker truck safety, aqueous ammonia will be delivered to the proposed facility in U.S. DOT certified vehicles with design capacity of 6,000 gallons. These vehicles will be designed to U.S. DOT Code MC-306 or MC-307. These are high integrity vehicles designed for hauling of caustic materials such as aqueous ammonia. Staff has, therefore, proposed Condition of Certification **HAZ-5** to ensure that regardless of which vendor supplies the aqueous ammonia, delivery will be made in a tanker, which meets or exceeds the specifications described by these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker trucks) accident rates in the United States and California. Staff relied on six references and three federal government databases to assess the risks of a hazardous materials transportation accident.

Staff used the data from the Davies and Lees (1992) article which references the 1990 Harwood et al. study, to determine that the frequency of release for transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per million miles traveled on well designed roads and highways. The maximum usage of aqueous ammonia each year of operation of the proposed Starwood will require only three tanker truck deliveries of aqueous ammonia per year, each delivering about 6,000 gallons. Each delivery will travel approximately 2 miles from Interstate 5 to the facility along West Panoche Road. This would result in about 6 miles of delivery tanker truck travel in the project area per year (with a full load). Staff believes that the risk over this distance is insignificant. Data from the U.S. DOT show that the actual risk of a fatality over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) is approximately 0.1 in one million.

Staff therefore believes the risk to the public of exposure to significant concentrations of aqueous ammonia during transportation to the facility are insignificant because of the remote possibility of accidental release of a sufficient quantity to present a danger to the public combined with the already diluted concentration of the aqueous ammonia being transported. The transportation of similar volumes of hazardous materials on the nation’s highways is not unique nor an infrequent occurrence. Staff’s analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the U.S. DOT) demonstrates that the risk of accident and exposure is less than significant.

Based on the environmental mobility, toxicity, quantities present at the site and frequency of delivery, it is staff’s opinion that aqueous ammonia poses the predominate risk associated with hazardous materials transportation and use at the proposed facility. Staff concludes that the risk associated with transportation of other hazardous materials to the proposed facility does not significantly increase the risk of impact beyond that associated with ammonia transportation.

Seismic Issues

The possibility exists that an earthquake would cause the failure of a hazardous materials storage tank. The quake could also cause the failure of the secondary

containment system (berms, dikes, underground vault) as well as electrically controlled valves and pumps. The failure of all these preventive control measures might then result in a vapor cloud of hazardous materials moving off-site and impacting the residents and workers in the surrounding community. The effects of the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan, in January 1995, heighten the concern regarding earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to several large storage tanks and smaller tanks associated with the water treatment system of a cogeneration facility. Those tanks with the greatest damage, including seam leakage, were older tanks, while the newer tanks sustained displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards that should be followed in adequately designing and building storage tanks and containment areas to withstand a large earthquake. Staff also reviewed the impacts of the February 2001 Nisqually earthquake near Olympia, Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks were impacted by this quake. Referring to the sections on **Geologic Hazards and Resources** and **Facility Description and Location** in the AFC, staff notes that the proposed facility will be designed and constructed to the applicable standards of the 1998 California Building Code (Volume 2, Chapter 16) and the 1997 Uniform Building Code. The site is within Seismic Zone 3, but the applicant has stated that design and construction of the Starwood project will meet the requirements of the Uniform Building Code for Seismic Zone 4, the highest risk zone category (URS 2006a, Section 3.3.2.2). Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake with newer tanks designed to standards similar to those in California, staff determined that tank failures at the project site during seismic events are not probable and do not represent a significant risk to the public.

Site Security

This facility proposes to use hazardous materials that have been identified by the US EPA as materials where special site security measures should be developed and implemented to ensure that unauthorized access is prevented. The EPA published a Chemical Accident Prevention Alert regarding Site Security (EPA 2000a), the U.S. Department of Justice published a special report on Chemical Facility Vulnerability Assessment Methodology (US DOJ 2002), the North American Electric Reliability Council published Security Guidelines for the Electricity Sector in 2002 (NERC 2002), and the U.S. Department of Energy published a draft Vulnerability Assessment methodology for Electric Power Infrastructure in 2002 (DOE 2002). The energy generation sector is one of the 14 areas of Critical Infrastructure listed by the U.S. Department of Homeland Security. On April 9, 2007, the U.S Department of Homeland Security published in the Federal Register (6 CFR Part 27) an Interim Final Rule requiring that facilities that use or store certain hazardous materials conduct Vulnerability Assessments and implement certain specified security measures. While the rule applies to aqueous ammonia solutions of 20% or greater and this proposed facility plans to utilize 19.5% aqueous ammonia, staff feels that all power plants under the jurisdiction of the Energy Commission should implement a minimum level of security consistent with the guidelines listed here.

The applicant has stated that a security measures will be implemented and maintained on a 24-hour basis by either surveillance devices or personnel (URS 2006a, section 3.5.6). In order to ensure that this facility or a shipment of hazardous material is not the target of unauthorized access, staff's proposed Conditions of Certification HAZ-7 and HAZ-8 address both a Construction Security Plan and an Operations Security Plan. These plans would require the implementation of Site Security measures consistent with the above-referenced documents and Energy Commission guidelines.

In order to determine the level of security, the Energy Commission staff used an internal Vulnerability Assessment (VA) decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the NERC 2002 guidelines, the U.S. Department of Energy VAM-CF model, and the U.S. Department of Homeland Security regulations published in the Federal Register (Interim Final Rule 6 CFR Part 27). Staff determined that this power plant would fall into the category of Low Vulnerability and thus staff proposes that certain security measures be implemented but does not propose that the project owner conduct its own vulnerability assessment.

The goal of these conditions of certification is to provide for the minimum level of security for power plants to protect California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for this power plant is dependent upon the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of consequences of that event. The results of the off-site consequence analysis prepared as part of the RMP will be used, in part, to determine the severity of consequences of a catastrophic event. In order to determine the level of security, the Energy Commission staff will provide guidance in the form of a vulnerability assessment (VA) decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the NERC 2002 guidelines, the U.S. Department of Energy VAM-CF model, and the U.S. Department of Homeland Security regulations published in the Federal Register (Interim Final Rule 6 CFR Part 27).

These measures will include perimeter fencing and detectors, possibly guards, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contact in the event of security breach. Site access for vendors shall be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleet and employ only drivers properly licensed and trained. The project owner will be required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements for Hazardous Materials vendors to prepare and implement security plans as per 49 CFR 172.800 and to ensure that all hazardous materials drivers are in compliance with personnel background security checks as per 49 CFR Part 1572, Subparts A and B. The Compliance Project Manager (CPM) may authorize modifications to these measures, or may require additional measures in response to additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electric Reliability Council, after consultation with appropriate law enforcement agencies and the applicant.
Cumulative impacts and mitigation Staff has considered the proposed project's incremental effect together with other closely related past, present, and reasonably

foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. (Pub Resources Code, § 21083.2; Cal Code of Regs, tit. 14, §§ 15064(h), 15065(c), 15130, and 15355).

One proposed industrial project and three existing industrial facilities are nearby the proposed SPP. These are:

1. The CalPeak Peaker Plant, an existing natural-gas-fired power plant;

2. The Wellhead Power Generation facility, an existing natural-gas-fired power plant;

3. The proposed PEC (06-AFC-5), a proposed, natural-gas-fired power plant currently under Energy Commission review; and

4. The PG&E Panoche Substation, an existing facility for which an expansion is planned in connection with the construction of the PEC."

Staff further reviewed other facilities that although not in the immediate area, are located in the general vicinity. These facilities included:

- A Federal Bureau of Prison (BOP) medium security Federal Correctional Institution (FCI) is under construction near Mendota, Fresno County, 12 miles from the PEC and Starwood power plant sites.
- San Joaquin Valley Energy Center, a 1,087 MW combined cycle plant, was approved in 2004 by the Energy Commission. Construction has not begun and is currently on hold.
- Bullard Energy Center, a 200 MW natural gas peaker, in the City of Fresno (licensing process is currently on hold).

Staff reviewed the potential for the operation of the Starwood facility combined with existing and planned facilities to result in cumulative impacts on the population within the area. The PG&E Panoche substation is located about 80 feet west of the proposed Starwood (actual structures are 250 feet away); the Wellhead Peaker Plant is adjacent to the proposed Starwood site (actual structures are 120 feet away); and the CalPeak Panoche power plant is also adjacent to the proposed Starwood site (actual structures are 270 feet away). The proposed Panoche Energy Center, if approved, would be located about 500 feet southwest of the proposed Starwood (URS 2007b, Response to DR #46 and URS 2006a, Figure 3.2-1).

Staff determined that the chemical with the most potential to cause a cumulative impact is aqueous ammonia. Previous staff assessments that included air dispersion modeling of cumulative impacts have found that cumulative impacts from simultaneous releases of hazardous materials are only significant if the releases are very close to each other, a distance of less than ¼ mile (<1320 feet). Therefore, staff was able to remove from consideration the Federal prison, the San Joaquin Energy Center, and the Bullard Energy Center. With the exception of the PG&E substation, all remaining facilities mentioned above either currently use and store ammonia on site or would do so if approved and are within 500 feet of each other and thus have the potential to cause a cumulative impact. However, staff believes that the SPP, as proposed by the applicant

and with the additional mitigation measures proposed by staff, poses a minimal risk of accidental release that could result in offsite impacts. It is unlikely that an accidental release that has very low probability of occurrence (about one in one million per year) would independently occur at the Starwood site and another facility – even two other facilities - at the same time. Furthermore, there would be even less possibility for simultaneous off-site plumes from other facilities to merge and cause a significant off-site cumulative impact where individually no significant off-site impact exists because of the spill containment controls used at the CalPeak Panoche Power Plant and those planned for the Starwood Peaking Project. Therefore, staff concludes that the proposed Starwood facility would not contribute to a significant cumulative impact.

Staff has also considered the minority population (as identified in **Socioeconomics Figure 1**) in its impact analysis and has concluded that there are no potential significant adverse impacts \ and therefore, there are no cumulative environmental justice issues.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the Starwood as proposed by the applicant and conditioned by staff, would be in compliance with all applicable LORS concerning long-term and short-term project impacts in the area of Hazardous Materials Management.

CONCLUSIONS

Staff's evaluation of the proposed project indicates that with the implementation of mitigation measures proposed by staff and the applicant and with fulfillment of staff's conditions of certification, hazardous materials use will pose no significant impacts on the public. Staff's analysis also shows that there will be no significant cumulative impact. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable LORS. In response to Health and Safety Code, section 25531 et seq., the applicant will be required to develop an RMP. To insure adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by U.S. EPA and Energy Commission staff. In addition, staff's proposed conditions of certification require review and comment from the Fresno County Environmental Health Division and staff's review and approval of the RMP prior to delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia as well as site security.

Staff recommends the Energy Commission impose the proposed conditions of certification, presented herein, to ensure that the project is designed, constructed and operated to comply with applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release. If all mitigation proposed by the applicant and by staff are required, the use, storage, and transportation of hazardous materials will not present a significant risk to the public.

Staff proposes eight conditions of certification mentioned throughout the text (above) and listed below. **HAZ-1** ensures that no hazardous material would be used at the

facility except those listed in the AFC, unless there is prior review by the Fresno County Environmental Health Division and the Energy Commission CPM. **HAZ-2** requires that an RMP be prepared and submitted prior to the delivery of aqueous ammonia.
Staff believes that an accidental release of aqueous ammonia during transfer from the delivery tanker to the storage tank is the most probable accident scenario, and therefore proposes a condition (**HAZ-3**) requiring development of a safety management plan for the delivery of aqueous ammonia. The development of a Safety Management Plan addressing delivery of ammonia will further reduce the risk of any accidental release not addressed by the proposed spill prevention mitigation measures and the required RMP. **HAZ-4** requires that the aqueous ammonia storage tank be designed to comply with applicable LORS. The transportation of hazardous materials is addressed in **HAZ-5** and **6**. Site security during both the construction and operations phases is addressed in **HAZ-7** and **HAZ-8**. Finally, in order to ensure the safety of the off-site public, **HAZ-9** requires that the persons residing in the 5-plex located about 100 feet from the northern project fenceline be relocated by the applicant prior to the initial delivery of aqueous ammonia to the site

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous materials not listed in Appendix B, below, or in greater quantities than those identified by chemical name in Appendix B, below, unless approved in advance by the Compliance Project Manager (CPM).

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

HAZ-2 The project owner shall concurrently provide a Business Plan and a Risk Management Plan (RMP) to the Certified Unified Program Authority (CUPA) – Fresno County Environmental Health Division and the CPM for review at the time the RMP is first submitted to the U.S. Environmental Protection Agency (EPA). After receiving comments from the CUPA, the EPA, and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final Business Plan and RMP shall then be provided to the CUPA and EPA for information and to the CPM for approval.

Verification: At least 60 days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Business Plan to the CPM for approval. At least sixty (60) days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the CUPA for information and to the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan (SMP) for delivery of aqueous ammonia and other liquid hazardous materials and an Emergency Response Plan (ERP) that addresses actions to take in the event of a spill of hazardous materials. These plans shall be submitted to the CPM for review and approval. The SMP shall include procedures, protective equipment requirements, training and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials including provisions to maintain

lockout control by a power plant employee not involved in the delivery or transfer operation. The ERP shall include emergency response procedures, spill containment and prevention systems, personnel training, spill notification, and cleanup procedures. These plans shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least sixty (60) days prior to the first delivery of any liquid hazardous material to the facility, the project owner shall provide a SMP and an ERP as described above to the CPM for review and approval.

HAZ-4 The aqueous ammonia storage facility shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, the storage tank shall be protected by a secondary containment basin capable of holding 125% of the storage volume or the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm. The final design drawings and specifications for the ammonia storage tank and secondary containment basins shall be submitted to the CPM for review and approval.

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

HAZ-5 The project owner shall direct, in writing, all vendors delivering aqueous ammonia to the site to use only tanker truck transport vehicles that meet or exceed the specifications of U.S. DOT Code MC-307.

Verification: At least sixty (60) days prior to the first receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

HAZ-6 The project owner shall direct, in writing, all vendors delivering any hazardous material to the site to use only the route approved by the CPM (from Interstate 5, to West Panoche Road, to the project site). The project owner shall submit any desired change to the approved delivery route to the CPM for review and approval.

Verification: At least sixty (60) days prior to receipt of any hazardous materials on site, the project owner shall submit copies of the required transportation route limitation direction to the CPM for review and approval.

HAZ-7 At least 30 days prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the CPM for review and approval. The Construction Security Plan shall include the following:

1. Perimeter security consisting of fencing enclosing the construction area;

2. Security guards;

3. Site access control consisting of a check-in procedure or tag system for construction personnel and visitors;

4. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on-site or off-site;

5. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and

6. Evacuation procedures.

Verification: At least thirty (30) days prior to commencing construction, the project owner shall notify the CPM that a site-specific Construction Security Plan is available for review and approval.

HAZ-8 The project owner shall prepare a site-specific Security Plan for the operational phase and shall be made available to the CPM for review and approval. The project owner shall implement site security measures addressing physical site security and hazardous materials storage. The level of security to be implemented shall be no less than that described as below (as per NERC 2002).

The Operation Security Plan shall include the following:

1. Permanent full perimeter fence or wall, at least 8 feet high;

2. Main entrance security gate, either hand operable or motorized;

3. Evacuation procedures;

4. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;

5. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on-site or off-site;

6. a) A statement (refer to sample, attachment “A”) signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to ascertain the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal law regarding security and privacy;

   b) A statement(s) (refer to sample, attachment “B”) signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by the CPM after consultation with the project owner) that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractor personnel that visit the project site.

7. Site access controls for employees, contractors, vendors, and visitors;

8. A statement(s) (refer to sample, attachment “C”) signed by the owners or authorized representative of hazardous materials transport vendors certifying that they have prepared and implemented security plans in conformity with 49 CFR 172.880, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;

9. Closed Circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) capable of viewing, at a minimum, the main entrance gate and the ammonia storage tank; and

10. Additional measures to ensure adequate perimeter security consisting of either:

    A. Security guard present 24 hours per day, 7 days per week.

    or

    B. Surveillance and warning devices able to be viewed in the control room and from a remote location that include:

        1. The CCTV monitoring system required in number 9 above shall include cameras that are able to pan, tilt, and zoom (PTZ), have low-light capability, are recordable, and are able to view 100% of the perimeter fence, the ammonia storage tank, the outside entrance to the control room, and the front gate, **and**

        2. Perimeter breach detectors **or** on-site motion detectors.

    The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to the security plans. The CPM may authorize modifications to these measures, or may require additional measures, such as protective barriers for critical power pant components (e.g., transformers, gas lines, compressors, etc.) depending on circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council, after consultation with appropriate law enforcement agencies and the applicant.

Verification: At least 30 days prior to the initial receipt of hazardous materials on-site, the project owner shall notify the CPM that a site-specific Vulnerability Assessment and Operations Site Security Plan are available for review and approval. In the Annual Compliance Report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed, and updated certification statements are appended to the Operations Security Plan. In the Annual Compliance Report, the project owner shall include a statement that the Operations Security Plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

HAZ-5 The project owner shall relocate all persons residing in the 5-plex located about 100 feet from the project's north fenceline prior to the initial delivery of aqueous ammonia to the site.

Verification: At least ten (10) days prior to the first receipt of aqueous ammonia on site, the project owner shall submit a letter to the CPM indicating that the residents have been removed from the buildings.

SAMPLE CERTIFICATION (Attachment "A")

Affidavit Of Compliance for Project Owners

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company Name)

for employment at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment "B")

Affidavit of Compliance for Contractors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company Name)

for contract work at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment "C")

Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that the below named company has prepared and implemented security plans in conformity with 49 CFR 172.880 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

_____

(Company Name)

for hazardous materials delivery to

_____

(Project name and location)

as required by the California Energy Commission Decision for the above- named project.

_____

(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

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Hazardous Materials Appendix A

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

Staff uses a health-based airborne concentration of 75 PPM as a threshold for initiating the evaluation of risk of exposure associated with potential accidental releases of ammonia. While this level is not consistent with the 150-ppm level used by EPA and Cal/EPA in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's analysis of the proposed project. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines (ERPGs) states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. CEQA requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through feasible changes or alternatives to the proposed project.

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

Hazardous Materials Appendix A Table-1
Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH[2]	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 min.	Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible injury or impairment of the ability to escape.
IDLH/10[1]	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 min.	Protects nearly all segments of general population from irreversible effects
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 min. 4 times per 8 hr day	No toxicity, including avoidance of irritation
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 min.	Significant irritation but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one time exposure
STPEL[4]	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 min. 30 min. 10 min.	Significant irritation but protects nearly all segments of general population from irreversible acute or late effects. One time accidental exposure
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. Work shifts
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	150 ppm	60 min.	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin)

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

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

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

REFERENCES FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

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

EPA. 1987. U.S. Environmental Protection Agency, Technical Guidance for Hazards Analysis, EPA, Washington, D.C.

NRC. 1985. National Research Council, Criteria and Methods for Preparing Emergency Exposure Guidance Levels (EEGL), short-term Public Emergency Guidance Level (SPEGL), and Continuous Exposure Guidance Level (CEGL) Documents, NRC, Washington, D.C.

NRC. 1972. Guideline for short-term Exposure of The Public To Air Pollutants. IV. Guide for Ammonia, NRC, Washington, D.C.

NIOSH. 1994. National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Washington D.C., Publication numbers 94-116.

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

ABBREVIATIONS FOR HAZARDOUS MATERIALS APPENDIX A, TABLE1

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

Hazardous Materials Appendix B

Hazardous Materials Appendix B Table 1: Hazardous Materials Proposed for Use at the Starwood project[a]

Material	CAS No.	Application/ Location	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[b]
Aqueous Ammonia 19.5 % solution	7664-41-7	NO_X Emissions Control	Acute, chronic, fire, pressure	24,000 gallons	100 lbs
Carbon Dioxide Gas	124-38-9	CEMS	Acute, chronic, pressure	25,000scf	NA
Citric Acid	77-92-9	Chemical cleaning (stored off-site)	Acute, chronic	Temporary	NA
EDTA Chelant	62-33-99	Chemical cleaning (stored off-site)	Acute	Temporary	100 lbs
Heat Transfer Oil Diala Oil A	None	Electrical Transformers	Acute, chronic, fire	25,000 gallons	NA
Hydraulic Fluid – Mobile DTE 13M	None	Mechanical Equipment	Acute, chronic, fire	7,500 gallons	NA
Hydrochloric Acid	7647-01-0	Chemical cleaning (stored off-site)	Acute, chronic	Temporary	5,000 lbs
Lubricating Oil – Mobile DTE Oil Light	None	Mechanical Equipment	Acute, chronic, fire	7,500 gallons	NA
Natural Gas	None	GTC and Duct Burner Fuel (temporarily on-site)	Acute, fire, pressure	1,600 lbs	NA
Sodium Nitrate	7632-00-0	HRSG Chemical cleaning (stored off-site)	Acute	Temporary	NA
Sulfuric Acid 29.5%	7664-93-9	Station and Gas Turbine Batteries	Acute, chronic, reactive	1,500 gallons	1,000 lb

a. Source: URS 2006a, Table 5.15-1.

b. Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act.

LAND USE

Testimony of Amanda Stennick

SUMMARY OF CONCLUSIONS

Based on staff's review of Fresno County's August 8, 2007 General Plan Conformity Determination letter (docketed August 20, 2007) for the Starwood Power Project (SPP), staff defers to Fresno County's position that the proposed project is consistent with Fresno County's General Plan Agriculture and Land Use Element and the AE-20 zoning designation.

Staff used the California Agricultural Land Evaluation and Site Assessment (LESA) model to assess the loss of 6.16 acres of agricultural land and concluded the SPP's impact to agriculture to be significant. To mitigate the loss of farmland, staff's proposed condition of certification **LAND-1** requires the applicant to pay a fee to an agricultural land trust that will contribute to the purchase of a conservation easement in Fresno County or adjacent counties in the Central Valley.

INTRODUCTION

The land use analysis of the SPP Application for Certification (06-AFC-10) focuses on the project's consistency with land use plans, ordinances, and policies, and the project's compatibility with existing and planned land uses. In this case, the land use analysis also focuses on the project's consistency with the California Land Conservation Act, commonly referred to as the Williamson Act. In general, a power plant and its related facilities have the potential to create land use impacts if they create unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts. These individual resource areas are discussed in separate sections of this document. A power plant would also create a significant impact if it converts prime or unique farmland or farmland of statewide importance to non-agricultural uses.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Land Use Table 1 contains all applicable land use laws, ordinances, regulations, and standards for the proposed project.

LAND USE Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	The proposed project is not located on federally administered lands and is not subject to federal land use regulations.
State	Subdivision Map Act (Pub. Resources Code § 66410-66499.58),§ 66412.1 California Land Conservation Act (Gov. Code § 51200-51297.4) Section 51282 addresses Williamson Act Contract cancellation procedures. In order for a contract to be cancelled, the local elected officials (e.g. a City Council or a County Board of Supervisors) need to make a series of findings and approve the cancellation.
Local	Fresno County would require an unclassified conditional use permit for the proposed project in the A-E 20 Zone, but for the exclusive siting authority of the Energy Commission.

SETTING

The applicant proposes to build the SPP on a 6.16-acre portion of a 128-acre parcel in the northwestern section of the Westside Valley Area in Fresno County. The closest community to the project is Mendota, located 16 miles to the east and northeast. The nearest roadway intersections to the site are West Panoche Road and South Fairfax Avenue. Interstate-5 is about two miles southwest of the site.

PROJECT SITE AND VICINITY

In April 2007, the Fresno County Board of Supervisors approved the request for cancellation of the 6.16-acre project site from the Williamson Act contract within Fresno County Agricultural Preserve No. 367. Fresno County has issued its Certificate of Tentative Cancellation on the 6.16-acre site and expects to issue the Certificate of Partial Cancellation of Agricultural Land Conservation Contract No. 367 when and if the Energy Commission licenses the SPP. Until such time, the 6.16-acre project site is still considered a portion of the 128-acre contracted parcel.

The proposed project would be located in an area of large agricultural parcels that are also under Williamson Act contracts. The Assessors Parcel Number (APN) for the 128-acre parcel is 027-060-78S. The project site is designated Agriculture by the Fresno County General Plan Agriculture and Land Use Element; the zoning designation is AE-20 (Exclusive Agriculture with a 20-acre minimum parcel size). The project site is not farmed and is currently used as a storage yard and contains a five-plex housing unit that is used to house farm workers. The construction laydown area is directly north of the project site.

The zoning and general plan land use designations within one mile of the subject parcel are AE-20 and Agriculture, respectively. Although not Prime Farmland as shown on the California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP), the USDA Natural Resources Conservation Service Web Soil Survey shows the site as Prime Farmland, if irrigated. The project site is mapped Urban and Built-Up

Land by the FMMP. As stated on Department of Conservation's (DOC) website, the term "urban and built-up land must contain man-made structures or buildings under construction and the infrastructure required for development (e.g., paved roads, sewers, water, electricity, drainage, or flood control facilities) that are specifically designed to serve that land." As shown in the AFC and as evidenced from staff site visits, the 6.16-acre site contains no infrastructure that would specifically serve the site.

Both the FMMP and the USDA Natural Resources Conservation Service Web Soil Survey show land in the vicinity of the site as Prime Farmland. **Land Use Figure 1** shows the general plan designations and **Land Use Figure 2** shows the zoning for the site and within one mile of the site. Other than agriculture, farm residences, and related buildings, land uses in the immediate vicinity of the proposed project include the PG&E Panoche Substation, the CalPeak Peaker Plant, and the Wellhead Power Generation facility.

Offsite improvements required by the SPP would include a 300-foot electrical transmission line that would tie into the existing CalPeak generator tie line, a 1,200-foot underground water pipeline that would connect the project to the existing CalPeak well, and an 800-foot gas transmission line that would tap into the existing PG&E gas trunkline.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document are based on the CEQA Guidelines and performance standards or thresholds identified by the Energy Commission staff, based on applicable LORS and utilized by other governmental regulatory agencies. An impact may be considered significant if the project results in:

- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;
- disruption or division of the physical arrangement of the established community;
- conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency and the USDA Natural Resources Conservation Service Web Soil Survey, to non-agricultural uses;
- conflict with existing zoning for agricultural use, or a Williamson Act Contract;
- involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland to nonagricultural use;
- unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts, or when it precludes or unduly restricts existing or planned future uses.

COMPLIANCE WITH LORS

Subdivision Map Act (Pub. Resources Code § 66410-66499.58)

The Subdivision Map Act provides procedures and requirements regulating land divisions and the determination of parcel legality. Regulation and control of the design and improvement of subdivisions by the Subdivision Map Act have been vested in the legislative bodies of local government. Section 66412.1 of the Subdivision Map Act exempts a project from state subdivision requirements provided that the project demonstrates compliance with local ordinances regulating design and improvements. The project's compliance with local development standards is discussed under the heading **Fresno County Zoning Ordinance**.

California Land Conservation Act (Gov. Code § 51200-51297.4)

The California Land Conservation Act, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space uses. The landowner commits the parcel to an annually renewing ten-year period wherein no conversion out of agricultural use is permitted. In return, the land is taxed at a rate based on the actual use of the land for agricultural purposes, as opposed to its unrestricted market value. Participation in the Williamson Act program is dependent on county adoption and implementation of the program. Property owner participation in the program is voluntary.

The proposed 6.16-acre project site is considered a portion of a 128-acre parcel within Fresno County Agricultural Preserve No. 367 that is under a Williamson Act Contract. The applicant filed a request with Fresno County for cancellation of the 6.16 acres from the Williamson Act Contract and on April 24, 2007 the Fresno County Board of Supervisors approved the request. As stated above, Fresno County has issued its Certificate of Tentative Cancellation on the 6.16-acre site and expects to issue the Certificate of Partial Cancellation of Agricultural Land Conservation Contract No. 367 when and if the Energy Commission licenses the SPP.

Fresno County staff in its Agricultural Land Conservation Committee Staff Report Agenda Item No. 3, April, 4, 2007 recommended approval of the cancellation to the Board of Supervisors (see **Land Use Appendix 1** for the full text). In accordance with Government Code section 51282, the Fresno County Board of Supervisors made the following mandated findings to approve the cancellation from Agricultural Preserve No. 367.

1. That the cancellation is for land on which a notice of contract nonrenewal has been filed.

2. That cancellation is not likely to result in the removal of adjacent lands from agricultural use.

3. That cancellation is for an alternative use which is consistent with applicable provisions of the city or county general plan.

4. That cancellation will not result in discontiguous patterns of development.

5. That there is no proximate (i.e. nearby) noncontracted land which is both available and suitable for the proposed use.

The Board's approval action and the findings are necessary to conclude that the cancellation of the Williamson Act contract has lawfully occurred, thereby permitting the power generation facility to be considered for this site. In addition to the Board's approval, cancellation requires the issuance of a Final Certificate of Cancellation of the Williamson Act contract. According to Fresno County staff's Certificate of Tentative Cancellation, the final Certificate of Partial Cancellation will be recorded when the following conditions of approval for the cancellation have been met.

1. Payment in full of the cancellation fee.

2. Unless the cancellation fee is paid or a Certificate of Cancellation of Contract is issued within one year from the date of the recording of this certificate, the cancellation fee shall be recomputed as of the date of notice by the landowner to the Board of Supervisors required by Government Code Section 51283.4.

3. The landowner shall obtain all permits necessary to commence this project.

As shown by condition no. 3, the Certificate of Cancellation of Contract will not be recorded until all permits, including the Energy Commission's license are issued. Please refer to **Land Use Appendix 2** for a copy of the Board of Supervisors' Resolution #07-202 and the Certificate of Tentative Cancellation. Interested parties would have 180 days from April 24, 2007 (the date the Board took action) to challenge the cancellation.

Fresno County General Plan

The Fresno County General Plan, adopted in 2000, contains an evaluation of existing conditions and provides long-term goals and policies to guide growth and development in the county for the next 15 to 25 years. The general plan is implemented by the county through its zoning, subdivision ordinances, specific plans, growth management policies, planned development districts, development agreements, development review, code enforcement, land use database, capital improvement programs, environmental review procedures, building and housing codes, and redevelopment plans. The general plan land use designation for the site is Agriculture.

Fresno County General Plan **Goal LU-A** states that the county shall promote the long-term conservation of productive and potentially productive agricultural lands and to accommodate agricultural-support services and agriculturally-related activities that support the viability of agriculture and further the county's economic development goals.

The applicable land use policies from Fresno County's General Plan Agriculture and Land Use Element are given below. Staff's discussion is given in *italics* after each policy.

Policy LU-A.1. The county shall maintain agriculturally-designated areas for agriculture use and shall direct urban growth away from valuable agricultural lands to cities, unincorporated communities, and other areas planned for such development where public facilities and infrastructure are available.

The proposed project would be sited on a parcel that is under a Williamson Act contract in a region dominated by large agricultural parcels currently under Williamson Act contracts. The proposed use is not an agricultural use nor is it considered an ancillary agricultural use because to function it does not need to locate adjacent to an agricultural use. On that basis, the project could be considered a use that would be more compatible in an area where industrially zoned land is available.

Policy LU-A.3. The county may allow by discretionary permit in areas designated Agriculture, special agricultural uses and agriculturally related activities including value-added processing facilities, and certain non-agricultural uses listed in Table LU-3 (see **Land Use Appendix 3** for the full text). Approval of these and similar uses in areas designated Agriculture shall be subject to the following criteria:

- The use shall provide a needed service to the surrounding agricultural area which cannot be provided more efficiently within urban areas or which requires location in a non-urban area because of unusual site requirements or operational characteristics;
- The use should not be sited on productive agricultural lands if less productive land is available in the vicinity;
- The operational or physical characteristics of the use shall not have a detrimental impact on water resources or the use or management of surrounding properties within at least 1/4-mile radius; and
- A probable workforce should be located nearby or be readily available.

As stated in the AFC, the objectives of the SPP are to provide reliable service to PG&E's customer loads in the area, which would include agricultural as well as urban users. The SPP has specific site requirements (proximity to a substation and transmission lines) that would be provided by the adjacent PG&E substation and the existing CalPeak Panoche generator and well. However, the SPP's operational characteristics (industrial nature of the project) do not require that the project locate in a non-urban area. Similar energy facilities have been sited in urban areas where the zoning and adjacent land uses are compatible with uses such as power plants.

The SPP would be located in an area dominated by large agricultural parcels. The project site is mapped Urban and Built-Up Land by the California Department of Conservation's Farmland Mapping and Monitoring Program. The USDA Natural Resources Conservation Service Web Soil Survey shows the site and land in the vicinity of the site as Prime Farmland. Because of the area's prime soils, less productive agricultural land in the vicinity of the proposed site is not available. The land uses in the vicinity of the current proposed location that make the site feasible are the PG&E substation and the CalPeak Peaker Plant because they would provide the necessary infrastructure that another site in the vicinity would not provide.

*The **Water and Soil Resources** section has concluded that the SPP would not significantly impact water resources on the site or impact the use or management of surrounding properties. The **Socioeconomic Resources** section of this document has concluded that a sizeable workforce is available in Fresno County. Please refer to the sections on **Water and Soil Resources** and **Socioeconomic Resources** for a*

complete discussion of potential impacts and mitigation for water resources and construction workforce.

Policy LU-A.13. The county shall protect agricultural operations from conflicts with nonagricultural uses by requiring buffers between proposed non-agricultural uses and adjacent agricultural operations.

*As cited in the **Traffic and Transportation** section of this document, no aerial spraying is done in this area that might necessitate a buffer between the proposed SPP and adjacent agricultural operations. Therefore, staff does not expect the SPP to preclude or negatively impact the continued agricultural use of the remainder of the parcel or that of the surrounding area.*

Energy Commission Staff's General Plan Consistency Determination for the SPP

As part of the licensing process, the Energy Commission must determine whether a proposed facility complies with all applicable state, regional, and local LORS (Public Resources Code section 25523(d)(1)). The Energy Commission must either find that a project conforms to all applicable LORS or make specific findings that a project's approval is justified even where the project is not in conformity with all applicable LORS (Public Resources Code section 25525).

When determining LORS compliance, staff is permitted to rely on a local agency's assessment of whether a proposed project is consistent with that agency's zoning and general plan. On past projects staff has requested that the local agency provide a discussion of the findings and conditions that agency would make when determining whether a proposed project would comply with the agency's LORS, were they the permitting authority. Any conditions recommended by an agency are considered by Energy Commission staff for inclusion in the conditions of certification staff recommends for the project.

As part of staff's analysis of local LORS compliance and specifically to determine the County's view on the project's consistency with its general plan, staff reviewed Fresno County's Agricultural Land Conservation Committee Staff Report on the proposed Williamson Act cancellation. As stated in the section **California Land Conservation Act (Gov. Code § 51200-51297.4)**, one of the findings the Board of Supervisor's must make is whether the "cancellation is for an alternative use which is consistent with applicable provisions of the county general plan." In their staff report, Fresno County staff provided the following information.

> "The subject property is designated Agriculture in the Fresno County General Plan. The proposed alternate use of the property is development of a thermal power plant…Nevertheless, the County's General Plan allows for development of certain non-agricultural uses in areas designated for Agriculture.
>
> According to information provided by the applicant, the location of a power generation facility within an urban environment has the potential to impact sensitive receptors such as schools and hospitals in addition to greater land use conflicts with residences. Further, the applicant indicated that the site selection investigation that was performed looked for land that was in sufficient proximity to

> the infrastructure listed above [PG&E substation, natural gas lines, and transmission lines]. The applicant reported that no less productive agricultural lands were identified as a result of the site selection investigation. Based on the information provided by the applicant, staff believes that the proposed alternate use is consistent with the General Plan. Based on this information, this finding can be made."

In the PSA, Energy Commission staff could not conclude from Fresno County staff's report that it provided compelling evidence to recommend to the Board of Supervisors that the alternate use, in this case the SPP, is consistent with Fresno County's General Plan Agriculture and Land Use Element.

In the Fresno County General Plan Agriculture and Land Use Element, the Agriculture land use designation provides for the production of crops and livestock and for location of necessary agriculture commercial centers, agriculture processing facilities, and certain nonagricultural activities. Table LU-3 in the Fresno County General Plan Agriculture and Land Use Element lists uses allowed by right and by special permit in areas designated Agriculture. The special permit uses are agriculturally related and value added agricultural uses such as wineries, commercial packing, and processing of crops, or they are non-agricultural uses such as sewage treatment plants, cemeteries, radio and television broadcasting stations, and golf courses. The most closely related special permit uses comparable to a power generating facility in Table LU-3 would be "electrical substation" and "mineral extraction and oil and gas development."

On April 17, 2007 Energy Commission staff sent a letter to Fresno County requesting that the County provide a discussion of how a use such as a power plant would be consistent with the provisions and intent of the Agriculture land use designation and with the uses allowed by right or by special permit listed in Table LU-3 in the General Plan Agriculture and Land Use Element. Fresno County's response letter to the Energy Commission (docketed May 7, 2007) states that Fresno County staff did discuss with Energy Commission staff, the basis for Fresno County's conclusion that the proposed project is consistent with the County's General Plan. The letter also states that the Fresno County Board of Supervisors concurred with its staff and determined that the proposed use is consistent with the General Plan when they approved the petition for partial cancellation of the 6.16-acre site from the Williamson Act.

While Energy Commission staff did not disagree with Fresno County's letter, in the PSA, staff believed that Fresno County did not provide Energy Commission staff a discussion of how the proposed project is substantially similar in character and intensity to such uses listed Table LU-3 in the Fresno County General Plan Agriculture and Land Use Element that would warrant a determination of consistency. In addition, Fresno County in its staff report for cancellation and in its response to Energy Commission staff's letter did not address the four criteria listed in its general plan Policy LU-A.3, which is the mechanism that enables the county to allow through a discretionary permit, the non-agricultural uses listed in Table LU-3 in areas designated Agriculture.

Responding to staff's recommendation in the PSA that the applicant work with Fresno County to resolve the issue of conformity, the applicant provided staff with a copy of Fresno County's General Plan Conformity Determination (Determination) for the SPP

(See **Land Use Appendix 4** for full text). In its Determination, Fresno County provides the following information:

> "Policy LU-A.3 states that the County shall allow special agricultural uses, agriculturally related activities, and certain non-agricultural uses listed in areas designated Agriculture. Table LU-3 lists typical uses allowed in areas designated Agriculture. Approval of those and similar uses is subject to a determination that certain criteria can be met. This list is not intended to be inclusive of all uses that can be considered for development. The proposed power generating facility is similar to other allowed uses which provide a needed service to the surrounding community or the larger area. Table LU-3 includes uses which provide a public benefit to the surrounding community or larger area, such as sewage treatment plants, solid waste disposal, wireless communication facilities and electrical substations."

The Determination also provides a discussion of how the SPP sufficiently meets the four bulleted criteria in Policy LU-A.3 of the Fresno County Agriculture and Land Use Element and concludes by stating:

> "It has been determined that the proposed power generating facility is similar to other non-agricultural uses listed in Table LU-3 of the Fresno County General Plan. Further, the Starwood Power-Midway facility meets the criteria for allowing such a use as described in Policy LU-3.A of the General Plan. The development of the proposed use on the subject property is consistent with the Fresno County General Plan…This determination was supported by the Board of Supervisor's on April 24, 2007, when the request for partial cancellation of Agricultural Land Conservation Contract No.267 was approved."

Staff believes that Fresno County's General Plan Conformity Determination for the SPP addresses staff's concerns regarding the SPP's conformity with the Fresno County General Plan. Therefore, Energy Commission staff defers to Fresno County's position that the proposed project is consistent with its General Plan Agriculture and Land Use Element.

Fresno County Zoning Ordinance

Site Plan Review (SPR) Section 874 of Fresno County's Ordinance Code

To comply with the exemption provision of the Subdivision Map Act Fresno County and Energy Commission staffs required the applicant to submit a site plan to Fresno County and complete the County's SPR process (Section 874 of Fresno County's Ordinance Code). Section 874 states that, "The purpose of the site plan is to enable the Director to make a finding that the proposed development is in conformity with the intent and provisions of this Division and to guide the Development Services Division in the issuance of permits."

The applicant submitted its site plan to Fresno County in January, 2007. Fresno County submitted its SPR analysis to the Energy Commission (docketed April 9, 2007). In its SPR process, Fresno County determined that as conditioned, the proposed SPP would be in conformity with the development standards for the AE-20 zone. The County is

aware that their SPR is advisory and their actions in this matter represent a review of the project that the County would normally undergo but for the Energy Commission's exclusive jurisdiction and permit authority. In addition to zoning development standards, the SPR addresses and conditions the project in the areas of visual resources, drainage and flood control, health, waste, hazardous waste, facility design, socioeconomic resources, worker safety and fire protection, air quality, and traffic and transportation.

Staff reviewed Fresno County's SPR and determined that as conditioned, the SPP would meet the development standards of the AE-20 zone. However, Fresno County provided no information in its SPR that addressed whether the project is in conformity with the intent and provisions of the AE-20 zoning division. **Land Use Table 2** shows the development standards and staff's consistency determination for the SPP. Fresno County's proposed conditions of approval have been analyzed by Energy Commission staff and incorporated as staff's proposed condition of certification **LAND-2**.

LAND USE Table 2
Development Standards and Consistency Determination for SPP

Development Standards for the AE-20 Zone. Zoning Ordinance Sections 816.5	Consistency Determination
Lot Size: Each lot size shall have a minimum acreage as indicated by the district acreage designation. The minimum lot size in the AE-20 zone is 20 acres.	Consistent as proposed. The proposed site would total 6.16 acres. Because the parcel would be created through a lease, it would not be subject to the 20-acre parcel size (Tani 2007).
Building Height: Non-dwelling structures and other accessory farm buildings are excepted from building height restrictions.	Consistent as proposed. Two 50-foot exhaust stacks are proposed for the SPP. However, Fresno County does not limit the height of non-dwelling structures in the AE-20 zone.
Setbacks: Each lot shall have a front yard of not less than 35 feet extending across the full width of the lot; each lot shall have a side yard on each side of not less than 20 feet.	Consistent as conditioned. The preliminary site plan shows the SPP is not within the 35-foot front yard setback. For the project to conform to this standard, the site plan would have to show that the footprint of the SPP is outside 20-foot side yard setbacks. Staff's proposed condition of certification **LAND-2** would require the project owner to conform to these setback requirements.
Parking: The number of parking spaces required is 1 space for every 2 permanent employees, 1 space for each salesperson, and 1 space for each company vehicle.	Consistent as proposed. For the project to conform to this standard a minimum of 2 parking spaces would have to be provided. The applicant's site plan shows adequate parking spaces.
Off-Site Improvements: The project owner shall ensure that any access gate shall be setback a minimum of 20 feet (or the length of the longest vehicle to initially enter the site from the edge of the ultimate road right-of-way).	Consistent as conditioned. For the project to conform to this standard the site plan would need to show that any access gate shall be setback a minimum of 20 feet (or the length of the longest vehicle to initially enter the site from the edge of the ultimate road right-of-way. Staff's proposed condition of certification **LAND-2** would require the project owner to conform to this off-site improvement.

AE-20 Zoning District Section 816 of the Fresno County Ordinance Code

The SPP site is zoned AE-20. The AE-20 District "is intended to be an exclusive district for agriculture and those uses which are necessary and an integral part of the agricultural operation. This district is intended to protect the general welfare of the agricultural community from encroachments of non-related agricultural uses which by their nature would be injurious to the physical and economic well-being of the agricultural district." Section 816 lists the uses permitted, the uses permitted subject to director review and approval, the uses permitted subject to a conditional use permit, uses expressly prohibited, and the property development standards. Staff's review of the uses for this zone shows that power plants are not expressly listed as a permitted or conditional use. Therefore, similar to the discussion of the project's consistency with the Fresno County General Plan land use designation, staff cannot conclude that the proposed project would be consistent with the AE-20 zoning because power plants are not expressly listed in any of the use categories of this zone and because Fresno County's SPR analysis did not address whether the project would be consistent with the intent and purpose of the AE-20 zone designation.

According to Fresno County staff, each zone district in Fresno County has a list of uses allowed by right and uses allowed through a discretionary permit such as a Director Review and Approval, or a Conditional Use Permit, which may be classified or unclassified (Tani 2006). The AFC states that Fresno County would ordinarily require an unclassified conditional use permit for a use such as the SPP. Based on Fresno County's SPR analysis of the proposed project, Energy Commission staff could not conclude that the SPR satisfies Fresno County's unclassified use permit process. The SPR merely ensures the project's compliance with the development standards in the AE-20 zone. For these reasons, staff in the PSA did not conclude that the SPP would be consistent with the AE-20 zone designation.

As stated above, the applicant provided staff with a copy of Fresno County's Determination for the SPP. Regarding the issue of the unclassified use permit, Fresno County provides the following information:

"For proposed power generating facilities with a net generating capacity of less than 50 MW, the proposed project requires approval from Fresno County. In those instances, an Unclassified Conditional Use permit is required to be submitted for review and for a determination before the Fresno County Planning Commission and/or Board of Supervisors. In this case, because the proposed project would have a net generating capacity of 120 MW, an Unclassified Conditional Use Permit was determined to not be required."

Fresno County's Determination seems to state that because the SPP would be a 120 megawatt (MW) facility, the County would not have jurisdiction and therefore could not require an Unclassified Conditional Use Permit. While it is true that the Energy Commission has exclusive authority to license all new or modified power plant facilities 50 MW or greater, to determine LORS compliance, staff has attempted several times to have Fresno County provide any project-specific conditions they would normally include in an Unclassified Conditional Use Permit, were they the permitting agency.

Based on staff's review of Fresno County's General Plan Determination for the SPP and because as conditioned, the SPP would meet the development standards of the AE-20 zone, staff assumes that the proposed project is consistent with Fresno County's AE-20 zoning designation.

DISRUPT OR DIVIDE AN ESTABLISHED COMMUNITY

While the proposed project is located in an area dominated by agriculture, there are three existing energy uses within one-half mile of the proposed SPP: the Wellhead Peaker Plant; the CalPeak Peaker Plant; and the PG&E Substation. The two peaker plants (both under 50 MW) were approved by Fresno County within the last few years. Another proposed energy facility, the Panoche Energy Center (06-AFC-5) would be located south of the existing electrical generating uses and PG&E Substation, on the same 128-acre parcel as the SPP. Given the existing cluster of energy/industrial uses, development of the proposed site as an energy/industrial use would continue the trend toward industrial development in the immediate area. Because of the established pattern of energy/industrial uses, the proposed project would not result in a physical division or disruption of the established agricultural community. No new physical barriers would be created by the project and no existing roadways or pathways would be blocked that would be considered detrimental to agricultural use.

CONVERSION OF AGRICULTURAL RESOURCES

The 6.16-acre project site consists of prime soils and would be considered by the FMMP and USDA as Prime Farmland, if irrigated. About five years ago, Starwood Power Midway, LLC graded the site and removed it from agricultural production. Starwood Power Midway, LLC's intent at that time was to develop a natural gas-fired power plant on the site. However, the site has since served as a storage yard for peaking unit equipment. As stated above, Fresno County has issued its Certificate of Tentative Cancellation on the 6.16-acre site and expects to issue the final Certificate of Partial Cancellation of Agricultural Land Conservation Contract No. 367 when and if the Energy Commission licenses the SPP. Until such time, the 6.16-acre project site is still considered a portion of the 128-acre parcel that is mapped by the FMMP as Prime Farmland and under a Williamson Act contract. For these reasons, staff felt more comfortable using an objective, quantitative assessment tool when addressing the conversion of agricultural resources to nonagricultural uses. As such, staff used the LESA model to determine whether the project's conversion of the 6.16 acres would be significant.

State CEQA Guidelines Appendix G provides direction to lead agencies when determining whether impacts to agricultural resources are significant environmental effects. Appendix G states that lead agencies may refer to the LESA model prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. The LESA model provides an approach for rating the relative quality of land resources based upon specific measurable features. The California LESA model is composed of six different factors: two Land Evaluation factors based upon measures of soil resource quality; and four Site Assessment factors that provide measures of a given project's size, water resource availability, surrounding agricultural lands, and surrounding protected resource lands.

Staff determined the final LESA score to be 80 points (see **Land Use Appendix 5**). Under the California LESA scoring threshold a score between 80 and 100 points is significant. Because the conversion is considered significant, staff proposes a similar condition of certification that was used on other Energy Commission siting projects (Tesla, Salton Sea, East Altamont) where agricultural land was converted to nonagricultural uses. Condition of certification **LAND-1** requires the project owner to mitigate for the loss of 6.16 acres of prime farmland at a one-to-one ratio. Staff believes that with the adoption of this condition, the impact to agricultural resources will be reduced to less than significant.

When staff identifies a significant impact, staff's analysis needs to discuss how that impact would affect the environmental justice population (**Socioeconomics Figure 1**) within the project's six-mile radius. The direct and indirect impacts of project construction would be that 6.16 acres of prime agricultural land would be converted to a nonagricultural use. When agricultural land is converted, the effect can be experienced by the residents of the area as a loss of open space, a loss of farmland, and the encroachment of urban uses into a nonurban setting. While staff acknowledges that the 6.16 acres is not currently farmed, the decision by the landowner not to farm does not affect the quality of the soils or their designation as prime farmland, pursuant to CEQA and/or the LESA model. Staff believes that with the adoption of condition of certification **LAND-1** there would be no impact to the environmental justice population or any population because there would be no net loss of productive agricultural land.

LAND USE COMPATIBILITY

Energy Commission staff has found no unmitigated impacts in the areas of **Air Quality, Public Health**, **Traffic and Transportation**, and **Visual Resources**. According to the **Noise and Vibration** section of this document, all occupants living in the five-plex housing will be relocated before construction would begin.

Worker Safety And Fire Protection identified an impact regarding the diesel fuel tank farm owned by Baker Farming located about 6.5 feet north of the project site. Staff is requiring SPP to mitigate the potential hazard of spilled diesel fuel from flowing onto the SPP site by proposing condition of certification **WORKER SAFETY-6**. Please refer to the section **Worker Safety and Fire Protection** for a thorough analysis of this technical area.

With the adoption of **WORKER SAFETY-6**, staff believes the SPP would be compatible with surrounding land uses. As discussed earlier, no aerial spraying is done in this area that might necessitate a buffer between the proposed SPP and adjacent agricultural operations. Therefore, staff does not expect the SPP to preclude or negatively impact the continued agricultural use of the remainder of the parcel or that of the surrounding area.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects

of past projects, the effects of other current projects, and the effects of probable future projects. (Cal. Code Regs., tit. 14, section 15130.)

The SPP is planned to serve the region's existing and anticipated electrical needs. Staff does not expect the SPP to make a significant contribution to regional impacts related to new development and growth.

Both the SPP and the PEC (06-AFC-5) would be situated in an area dominated by large agricultural parcels under Williamson Act Contracts. As with the SPP, staff used the LESA model to determine whether the PEC would have a significant land use impact. Staff's analysis showed that the PEC also would have a significant impact on agricultural resources. To mitigate this impact in the PEC PSA, staff proposed a condition of certification similar to **LAND-1** in this PSA. As conditioned, the SPP and the PEC would not contribute to a cumulative loss of agricultural resources from conversion to nonagricultural uses.

In addition to the two proposed energy projects, existing land uses in the immediate vicinity (other than agriculture, farm residences, and related buildings), include the PG&E Panoche Substation, the CalPeak Peaker Plant, and the Wellhead Power Generation facility. The CalPeak Peaker Plant and the Wellhead Power Generation facility were permitted by Fresno County within the last few years. Because the proposed project is situated near other nonagricultural industrial/energy uses, it would not result in a physical division or disruption of the established agricultural community, no new physical barriers would be created by the project, and no existing roadways or pathways would be blocked that would be detrimental to agricultural uses.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The DOC submitted a letter (dated January 19, 2007) to Fresno County (docketed on February 23, 2007) commenting on the partial cancellation of Land Conservation (Williamson Act) Contract No. 367; APN 027-060-78S. The DOC concluded that assuming the information the applicant provided on the cancellation application is accurate and correct, it concurs that the Fresno County Board of Supervisors has a basis to find cancellation of the 6.16-acre portion of the contract consistent with the purposes of the Williamson Act. Furthermore, it concluded that development of the proposed power generation facility will not negatively affect adjacent agricultural lands or cause their removal from agricultural use, that the proposed alternative use appears consistent with the agricultural land use policies in the Fresno County General Plan, and due to the location of the existing PG&E substation will not produce discontiguous patterns of urban development. Overall, the DOC letter concurs that there is not proximate or noncontracted land that is suitable or available for the proposed SPP.

In its PSA, staff disagreed with the DOC's conclusions that the project appeared consistent with Fresno County's General Plan land use policies. Also, the DOC's letter did not address the direct loss of agricultural resources. Staff's analysis concluded that the SPP's conversion of 6.16 acres to a nonagricultural use would result in a significant impact requiring mitigation. Therefore, staff proposes condition of certification **LAND-1**, which would require the project owner to mitigate for the loss of prime farmland at a

one-to-one ratio. Staff believes that with the adoption of this condition, the impact to farmland will be reduced to less than significant.

The DOC submitted its PSA comments letter (dated September 7, 2007; docketed September 7, 2007) to Energy Commission staff. The comments address the impacts to agricultural land from the partial cancellation of the Williamson Act contract and the need to mitigate for the loss of 6.16 acres of prime agricultural land.

Staff generally agrees with the DOC letter. In its letter, the DOC recommended that staff increase the 1:1 ratio for the loss of agricultural lands. Staff discussed the recommendation with a DOC staff person who agreed with Energy Commission staff that the 1:1 ratio recommended in staff's PSA was adequate for this type of project.

Fresno County submitted to the Energy Commission their Agricultural Land Conservation Committee Staff Report Agenda Item No. 3, April, 4, 2007 on the proposed Williamson Act cancellation for the 6.16 acres of prime farmland (see **Land Use Appendix 2** for the full text). In its staff report, Fresno County makes a recommendation of approval to the Board of Supervisors for the cancellation of the 6.16 acres.

In its PSA, staff did not concur with Fresno County's conclusions that "…the cancellation is for an alternative use that is consistent with the provisions of the County General Plan." Based on staff's review of Fresno County's Determination for the SPP, staff defers to Fresno County's position that the proposed project is for an alternative use that is consistent with the provisions of the County General Plan.

Fresno County's May 2, 2007 letter (docketed May 7, 2007) to Energy Commission staff is discussed under the section **Fresno County General Plan**.

CONCLUSIONS

Based on staff's review of Fresno County's Determination for the SPP, staff defers to Fresno County's position that the proposed project is consistent with Fresno County's General Plan Agriculture and Land Use Element and the AE-20 zoning designation. Therefore, Energy Commission staff concludes that the SPP complies with all applicable LORS. In addition to the above statement, the following conclusions summarize staff's analysis.

- **Williamson Act** – Fresno County's 180-day appeal period for the cancellation began on April 24, 2007, the day the Board of Supervisors took action on the cancellation. In the most recent siting case (Tesla) the Commission certified the project while the appeal period was still in effect. Both Alameda County and Fresno County conditioned their final approval of the respective cancellations upon Commission certification of the projects.
- **Subdivision Map Act –** staff is satisfied that the applicant's submittal of its site plan to Fresno County for the county's SPR complies with the exemption provision of the Subdivision Map Act.

The project would convert 6.16 acres of prime soil to a non-agricultural use. Staff's proposed condition of certification **LAND-1** would reduce this impact to less than significant. Staff is satisfied that as conditioned, the proposed SPP would not have a significant adverse affect on the environmental justice population living within the project's six-mile radius.

Should the Energy Commission certify the project, staff recommends that the Energy Commission adopt the following conditions of certification.

PROPOSED CONDITION OF CERTIFICATION

LAND-1 The project owner shall mitigate for the permanent loss of 6.16 acres of prime farmland at a one-to-one ratio.

Verification: The project owner shall provide a mitigation fee payment to an agricultural land trust such as the San Joaquin River Parkway and Conservation Trust or any other land trust that has been previously approved by the Compliance Project Manager (CPM) within 120 days of the start of construction. The fee payment will be determined by an independent appraisal conducted on available prime farmland and paid for by the project owner. The project owner shall provide documentation to the CPM that the fee has been paid and that the 6.16 acres of prime farmland and/or easements shall be purchased within three years of start of operation as compensation for the 6.16 acres of prime farmland to be converted by the SPP. The documentation also shall guarantee that the land/easements purchased by the trust will be located in Fresno County and will be farmed in perpetuity. If no available land or easements can be purchased in Fresno County, then the purchase of lands/easements in other Central Valley Counties is acceptable. The project owner shall provide to the CPM updates in the Annual Compliance Report on the status of farmland/easement purchase(s).

LAND-2 The project owner shall design and construct the project to the applicable development standards in Sections 816.5 and 874 of the Fresno County Ordinance Code.

1. Any access gate shall be setback a minimum of 20 feet (or the length of the longest vehicle to initially enter the site from the edge of the ultimate road right-of-way.

2. The number of parking spaces required as part of this project shall be one space for every permanent employee, one space for each sales person, and one space for each company vehicle for a total of 2 spaces.

3. Each lot shall have a front yard of not less than 35 feet extending across the full width of the lot; each lot shall have a side yard on each side of not less than 20 feet.

Verification: At least sixty (60) days prior to the start of construction the project owner shall submit to the Compliance Project Manager (CPM) written documentation including evidence of review by Fresno County that the project conforms to the standards in Sections 816.5 and 843 of the Fresno County Ordinance Code.

LAND-3 The project owner shall provide a copy of Fresno County's Final Certificate of Cancellation of Contract from Agriculture Preserve No. 367.

Verification: At least 60 days prior to construction, the project owner shall submit to the CPM a copy of Fresno County's Final Certificate of Cancellation of Contract from Agriculture Preserve No. 367.

REFERENCES

CEC 2006h California Energy Commission/ C. McFarlin (tn 38662) Data Adequacy Package. 12/15/2006 Rec'd 12/15/2006

CEC 2007q California Energy Commission/ C. McFarlin (tn 39243) Docketed Email-Starwood site lease/ ownership. 02/09/2007 Rec'd 02/09/2007

CEC 2007r California Energy Commission/ C. McFarlin (tn 39268) Data Requests #1-67. 02/14/2007 Rec'd 02/14/2007

CofF 2006a County of Fresno/ C. McFarlin (tn 38769) Starwood Midway-Power-Comments. 12/14/2006 Rec'd 12/22/2006

URS 2006a URS Corporation/ R. Watkins (tn 38405) Application for Certification with Cover Letter for Starwood Power-Midway, LLC Peaking Project. 11/17/2006 Rec'd 1/17/2006

URS 2006e URS Corporation/ URS (tn 38527) Confidential 5-plex lease letter. 11/17/2006 Rec'd 11/17/2006

URS 2007b URS Corporation/ A. Leiba (tn 39567) Starwood responses to data requests (#1-67). 03/09/2007 Rec'd 03/12/2007

URS 2006k URS Corporation/ M. Fitzgerald (tn 38796) Data adequacy responses. 12/28/2006 Rec'd 12/29/2006

PEC (Panoche Energy Center Project) 2006a – Application for Certification. Submitted to the California Energy Commission on August 2, 2006.

California Dept of Conservation (CDOC) 2006a – Comments and Recommendations. Submitted to the California Energy Commission on September 28, 2006.

PEC (Panoche Energy Center Project) 2006f – Petition for Partial Cancellation of Williamson Act Contract No. 367-APN-027-060-78s. Submitted to the California Energy Commission on December 1, 2006.

PEC (Panoche Energy Center Project) 2007a – Data Responses. Submitted to the California Energy Commission on January 9, 2007.

California Dept of Conservation (CDOC) 2007a – Tentative Approval of Land Conservation Contract Cancellation. Submitted to the California Energy Commission on February 23, 2007.

FRES (Fresno County) 2007a – Site Plan Review. Submitted to the California Energy Commission on April 9, 2007.

FRES (Fresno County) 2007b – Agricultural Land Conservation Committee Staff Report. Submitted to the California Energy Commission on May 1, 2007.

Tani, Robin. Senior Planner, Fresno County Planning Department. Personal communication with staff in December 2006.

Tani, Robin. Senior Planner, Fresno County Planning Department. Meeting with Amanda Stennick and David Jenkins in January 2007.

LAND USE APPENDIX 1

Starwood

County of Fresno

Department of Public Works and Planning
Alan Weaver, Director

Agricultural Land Conservation Committee Staff Report
Agenda Item No. 4
April 4, 2007

SUBJECT: **Review and make recommendation to forward to the Board of Supervisors regarding PARTIAL CANCELLATION of AGRICULTURAL LAND CONSERVATION CONTRACT NO. 367 (RLCC NO. 843)**

STAFF CONTACT: **Jared Nimer, Planner**
(559) 262-4846

Margie McHenry, Senior Planner
(559) 262-4870

DOCKET
06-AFC-10
DATE APR 0 4 2007
RECD. JUN 1 1 2007

RECOMMENDATION:

Staff believes that the required findings can be made and recommends that application for Partial Cancellation of Agricultural Land Conservation Contract No. 367 be forwarded to the Board of Supervisors with a recommendation for approval, subject to the following conditions:

1. Payment in full of the cancellation fee.
2. Unless the cancellation fee is paid or a Certificate of Cancellation of Contract is issued within one year from the date of the recording of this certificate, the cancellation fee shall be recomputed as of the date of notice by the landowner to the Board of Supervisors required by Government Code Section 51283.4.
3. The landowner shall obtain all permits necessary to commence the project.

BACKGROUND:

The Agricultural Land Conservation Committee reviews requests for Cancellation of Agricultural Land Conservation Contracts for consistency with the purposes of the Williamson Act, pursuant to Section 51282 of the Government Code. Action to approve or deny an application for contract Cancellation becomes a recommendation to the Board of Supervisors.

PAO Investments, LLC (Applicant) filed an application for Partial Cancellation of Agricultural Land Conservation Contract (ALCC) No. 367. The proposal seeks to remove 6.16 acres of prime agricultural land from Contract restrictions for development of a 120-megawatt thermal power plant. This application has been assigned RLCC No. 843.

The subject property is located on the south side of Panoche Road, between Interstate 5 and Fairfax Avenue, approximately 12.6 miles southwest of the City of Mendota. (See Location Map *Exhibit 'A'*, Zoning Map *Exhibit 'B'*, and Land Use Map *Exhibit 'C'*).

DISCUSSION:

In order to approve a cancellation request, the Board of Supervisors must determine that the action is consistent with the Land Conservation Act of 1965. The law requires that five findings be made. Staff analysis of the required findings is as follows:

1. *That the cancellation is for land on which Notice of Nonrenewal has been served pursuant to Section 51245 of the Government Code.*

   An executed Notice of Partial Nonrenewal for ALCC No. 367 was accepted by the County Recorder on November 6, 2006, and was assigned Document No. 2006-0236374. Nonrenewal was initiated on the entire 128 acres that comprise APN 027-060-78s.

2. *That the cancellation is not likely to result in the removal of adjacent lands from agricultural use.*

   The subject property and adjacent parcels are currently devoted to agricultural uses, with the exception of the existing PG&E substation located on a separate parcel adjacent to the southwest of the area proposed for Williamson Act cancellation. The applicant has stated that the proposed location of the thermal power plant is ideal due to the existing infrastructure installed at the existing Pacific Gas & Electric substation and by the existing high-volume natural gas lines and 115 kilovolt transmission lines located on the subject parcel. Two power generation facilities already exist next to the PG&E substation. The existing infrastructure allows for efficient interconnection, which minimizes impacts, specifically environmental impacts.

   Staff agrees that the proposed use of the property for a thermal power plant would not cause any disruption to adjacent parcels and would not result in restrictions on the use of adjacent parcels. While it is possible that adjacent land may be removed from agricultural use, for development of additional power plants, this would be due to the clustering of the necessary infrastructure for efficient interconnection with existing facilities and resources rather than the development of the proposed thermal power plant.

3. *That the cancellation is for an alternative use that is consistent with the provisions of the County General Plan.*

   The subject property is designated Agriculture in the Fresno County General Plan. The proposed alternate use of the property is development of a thermal power plant. Permitting for this use is issued through the State of California, so no land use applications would be processed by the County of Fresno during development of the thermal power plant. Nevertheless, the County's General Plan allows for development of certain non-agricultural uses in areas designated for Agriculture.

   According to information provided by the applicant, the location of a power generation facility within an urban environment has the potential to impact sensitive receptors such as schools and hospitals in addition to greater land use conflicts with residences. Further, the applicant indicated that the site selection investigation that was performed looked for land that was in sufficient proximity to the infrastructure listed above. The

applicant reported that no less productive agricultural lands were identified as a result of the site selection investigation. Based on the information provided by the applicant, staff believes that the proposed alternate use is consistent with the General Plan. Based on this information, this finding can be made.

4. *That the cancellation will not result in discontiguous patterns of urban development.*

The proposed use of the property for a thermal power plant would not be considered urban development. Based on this, staff believes this finding can be made.

5. *That there is no proximate non-contracted land which is both available and suitable for the use to which it is proposed that the contracted land be put, or that development of the contracted land would provide more contiguous patterns of urban development than development of proximate non-contracted land.*

The applicant conducted an analysis of proximate non-contracted land, to determine if any non-contracted land was both available and suitable for the proposed alternate use. The applicant stated that in order to be suitable for development, of the proposed power plant would require that the land be in close proximity to the existing PG&E substation and to high-volume natural gas lines. Parcels within three miles of the subject property were examined by the applicant, but were all either subject to Williamson Act Contract or were too distant from the existing PG&E substation and/or high-volume natural gas lines to be considered feasible alternatives to the subject property.

ENVIRONMENTAL DETERMINATION:

It has been determined that the project proposal is considered statutorily exempt from CEQA, under Section 15271, Early Activities Related to Thermal Power Plants. A copy of the County's CEQA Determination memo is included as Exhibit 'D'.

OTHER REVIEWING AGENCIES:

As of January 1, 2001, Government Code Section 51284.1(a) requires notification to be provided by the County to the Director of the State Department of Conservation (the Director) once a cancellation application has been accepted as complete. Under Government Code Section 51284.1(c), the Director's comments are required to be considered by the Board of Supervisors before acting on the proposed cancellation. Pursuant to the Director's January 19, 2007, letter providing comments on the applicant's information related to the required findings, the Department of Conservation stated that the Board of Supervisors has a basis to find cancellation of the 12.82-acre portion of the Contract consistent with the purposes of the Williamson Act The Director's comments are attached as Exhibit E.

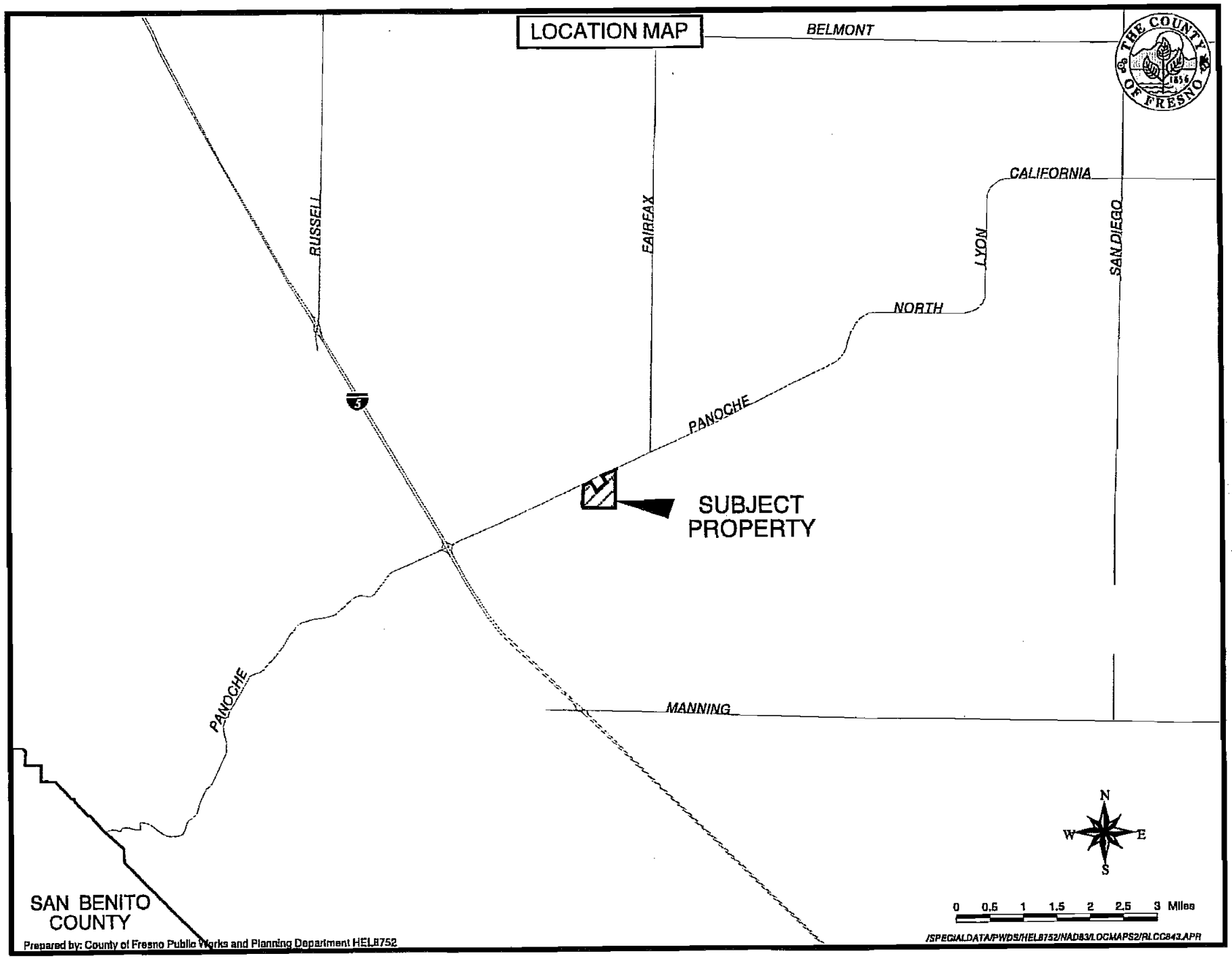

LOCATION MAP
BELMONT
THE COUNTY OF FRESNO
1856
CALIFORNIA
RUSSELL
EAIREAX
LYON
SAN DIEGO
NORTH
PANOCHE
SUBJECT PROPERTY
PANOCHE
MANNING
N
W
E
S
0 0.5 1 1.5 2 2.5 3 Miles
SAN BENITO COUNTY
Prepared by: County of Fresno Public Works and Planning Department HEL8752
/SPECIALDATA/PWDS/HEL8752/NAD83/LOCMAPS2/RLCC843.APR

EXHIBIT 'A'

RLCC 843
STR: 06 - 15/13

EXISTING ZONING MAP

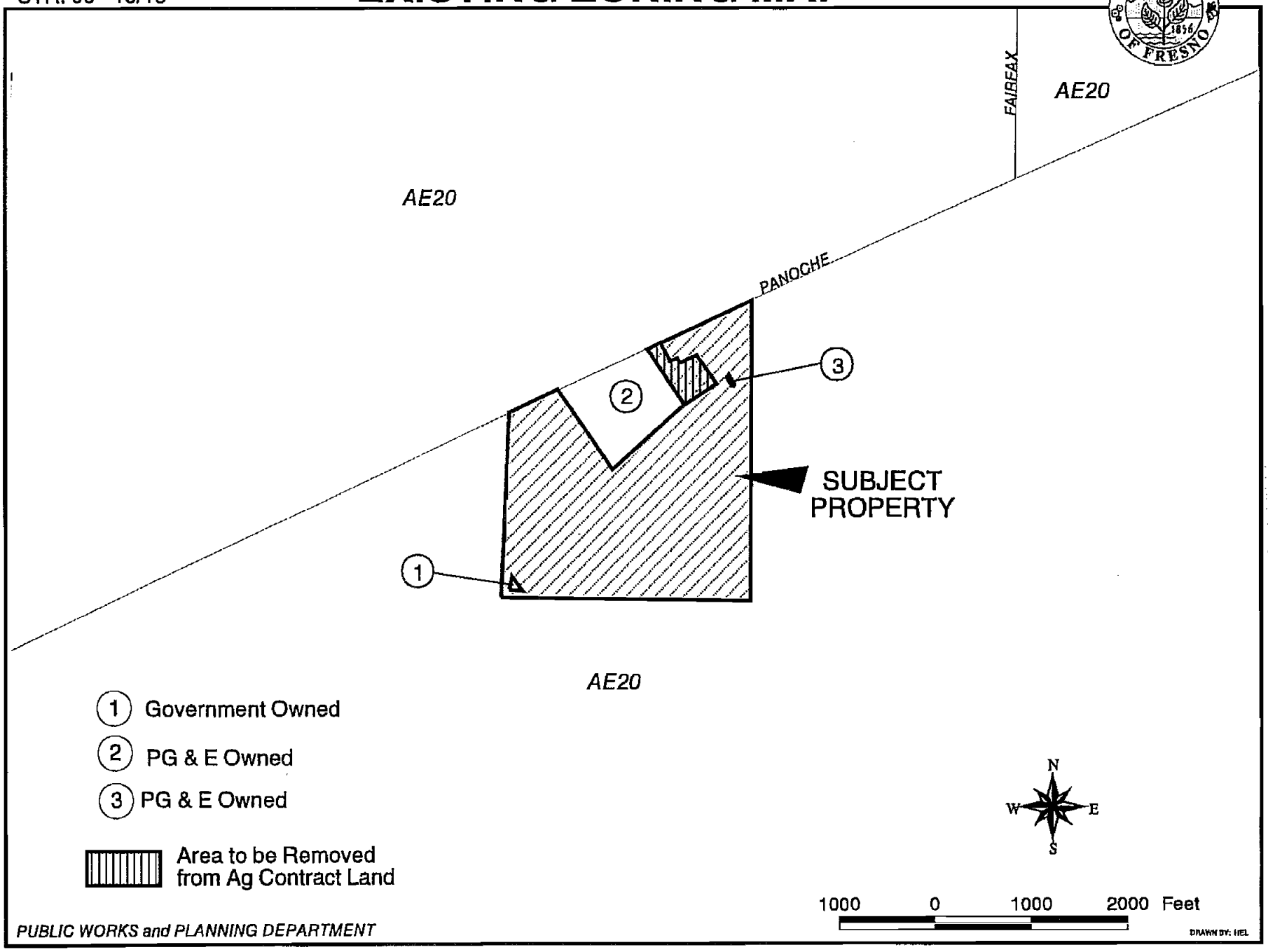
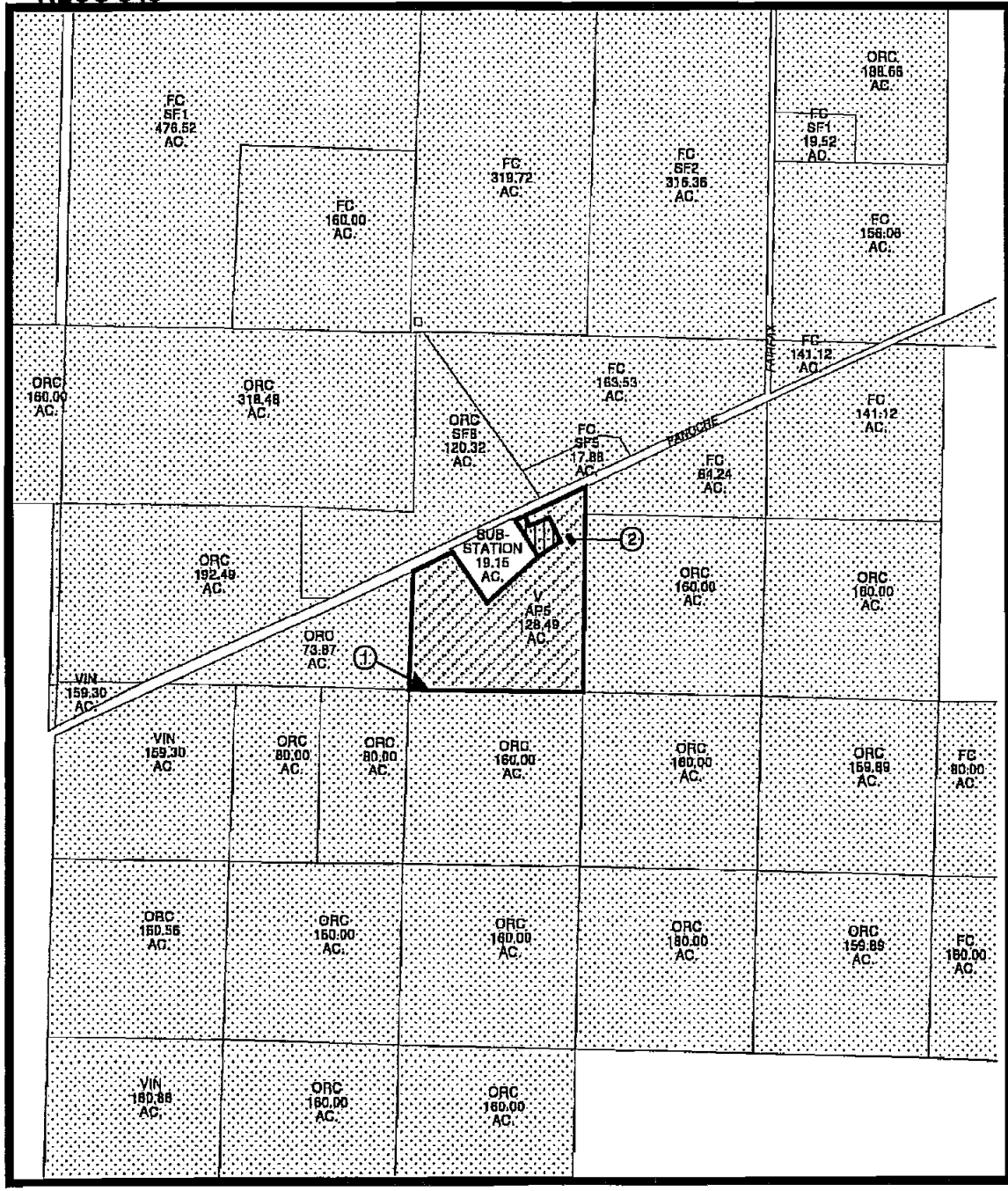


EXHIBIT 'B'

RLCC 843

EXISTING LAND USE MAP



Legend
AP1 - APARTMENT
FC - FIELD CROP
ORC - ORCHARD
SF#- SINGLE FAMILY RESIDENCE
V - VACANT
VIN - VINEYARD

Subject Property

Ag Contract Land

Area to be Removed from Ag Contract Land

(1) Government Owned

(2) PG&E Owned

N W E S

0.2 0 0.2 0.4 0.6 0.8 Miles

Prepared by: County of Fresno The Department of Public Works and Planning HEL8752

EXHIBIT 'C'

EXHIBIT 'D'

Inter Office Memo

DATE: March 14, 2007

TO: PAO Investments, LLC

FROM: Briza Sholars, Development Services

SUBJECT: CEQA Determination
Environmental Review No. 5786 (45499 Panoche Road)

Project Description:

The project proposes a partial cancellation of Williamson Act Contract No. 367 on 6.16 acres of a 128 acre parcel of land in the AE-20 (Exclusive Agriculture, 20-acre minimum lot size) Zone District. The project is located on the south side of Panoche Road between South Brannon Avenue and South Fairfax Avenue in an unincorporated area of Fresno County.

Determination

The proposed project is considered Statutory exempt from the California Environmental Quality Act (CEQA), under Section 15271, Early Activities Related to Thermal Power Plants. The following supports this determination:

1. The intent of Section 15271 of the CEQA Guidelines is to exempt or delay early activities related to thermal electric power plants which will be the subject of an EIR or Negative Declaration or other document or documents prepared pursuant to a regulatory program certified pursuant to Public Resources Code Section 21080.5, which will be prepared by:

   (a) The State Energy Resources Conservation and Development Commission,

   (b) The Public Utilities Commission, or

   (c) The city or county in which the power plant and related facility would be located.

2. Cancellation of Williamson Act Contract No. 367 is required for development of the proposed thermal power plant and is therefore, determined to an early activity required for the project.

3. The cancellation of Williamson Act Contract No. 367 as an early activity will be further analyzed as part of an EIR, Negative Declaration, or other

document prepared for the proposed thermal power plant site or facility, as required under Section 15271.

4. The division of land is proposed in accordance with the County's General Plan and Zoning Ordinance. The project will not result in any adverse impacts to the environment.

The proposed project meets the criteria for Section I5271 and is exempt from the provisions of CEQA.

If you have any questions, please call me at 262-4454.

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DEPARTMENT OF CONSERVATION

DIVISION OF LAND RESOURCE PROTECTION

801 K STREET • MS 18-01 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 324-0850 • FAX 916 / 327-3430 • TDD 916 / 324-2555 • WEBSITE conservation.ca.gov

March 8, 2007

VIA FACSIMILE (559) 262-4166

Mr. Jared Nimer, Planner II
Fresno County Department of Public Works and Planning
Development Services Division
2220 Tulare Street, Sixth Floor
Fresno, CA 93721

Subject: Partial Cancellation of Land Conservation (Williamson Act) Contract ALCC No. 367 (RLCC 843); APN 027-060-78s portion - PAO Investments

Dear Mr. Nimer:

Thank you for submitting notice to the Department of Conservation (Department) as required by Government Code section 51284.1 for the above referenced matter.

The petition proposes to cancel a 6.16-acre portion of the parcel's 128.49 prime agricultural acres subject to Contract No. 367 for development of a 120-megawatt thermal power plant. The Department previously commented on a cancellation petition submitted for a 12.82-acre portion of APN 027-606-78s on January 19, 2007. The parcel's remaining acreage is currently undergoing the nonrenewal process for contract termination.

The site is located south and adjacent to West Panoche Road, approximately ¾ of a mile west of the intersection of Fairfax Avenue and West Panoche Road in Fresno County.

Cancellation Findings

Government Code Section 51282 states that tentative approval for cancellation may be granted only if the local government makes one of the following findings: 1) cancellation is **consistent** with purposes of the Williamson Act or 2) cancellation is in the **public interest.** The Department has reviewed the petition and information provided and offers the following comments.

Cancellation is consistent with the purposes of the Williamson Act

For the cancellation to be consistent with purposes of the Williamson Act, the Fresno County Board of Supervisors must make all of the following five findings: 1) a notice of nonrenewal has been served, 2) removal of adjacent land from agricultural use is unlikely, 3) the alternative use is consistent with the County's General Plan, 4) discontiguous patterns of urban development will not result, and 5) that there is no proximate noncontracted land which is available and suitable for the use proposed on the contracted land or that development of the contracted land would provide more contiguous patterns of urban development than development of proximate noncontracted land.

Provided the information received is accurate and correct, the Department concurs the Board has a basis to find cancellation of the 6.16-acre portion of the contract consistent with the purposes of the Williamson Act.

The landowner served a notice of nonrenewal. The 128.49-acre portion of Contract No. 367 (APN 027-060-78s) is scheduled to expire on December 31, 2016. Development of the proposed power generation facility will not negatively affect adjacent agricultural lands or cause their removal from agricultural use.

The proposed alternative use appears consistent with the agricultural land use policies contained in the Fresno County General Plan. The proposed alternative use will not produce discontiguous patterns of urban development and due to the location of the existing PG&E substation, the Department would concur that there is not proximate noncontracted land that is suitable or available for the alternative use proposed.

Cancellation is in the Public Interest

For the cancellation to be in the public interest, the Council must make findings with respect to all of the following: (1) other public concerns substantially outweigh the objectives of the Williamson Act and (2) that there is no proximate noncontracted land which is available and suitable for the use proposed on the contracted land or that development of the contracted land would provide more contiguous patterns of urban development than development of proximate noncontracted land. Our comments have already addressed the second finding required under public interest finding above.

In order to find that "other public concerns substantially outweigh the objectives of the Williamson Act," the Supreme Court has directed that the Board must consider the interest of the public as a whole in the value of the land for open space and agricultural use. Though the interests of the local and regional communities involved are also important, no decision regarding the public interest can be based exclusively on their parochialism. Moreover, the paramount 'interest' involved is the preservation of land in agricultural production. In providing for cancellation, the Legislature has recognized the relevance of other interests, such as housing, needed services, environmental protection through developed uses, economic growth and employment. However, it

must be shown that open space objectives, explicitly and unequivocally protected by the act, are substantially outweighed by other public concerns before the cancellation can be deemed "in the public interest" (Sierra Club v City of Hayward (1981), 28 Cal. 3d. 840, 857).

As a general rule, land can be withdrawn from Williamson Act contract through the nine-year nonrenewal process. The Supreme Court has opined that cancellation is reserved for extraordinary situations (Sierra Club v. City of Hayward (1981), 28 Cal.3d 840).

Lastly, legislation effective January 1, 2005, requires the county assessor to send notice to the Department and landowner of the current fair market value of the land and of the opportunity to request a formal review from the assessor prior to any action giving tentative approval to the cancellation of any contract. (SB 1820, Machado, Chapter 794, Statutes of 2004 (Section 51283(a)). To date, the Department has not received the required notice of the parcel's cancellation valuation.

Provided that the information presented is complete and accurate, it appears that the Board has an adequate basis to support the findings required to cancel the proposed parcel of contracted land.

Thank you for the opportunity to provide comments on the proposed cancellation. Please provide our office with a copy of the Notice of the Public Hearing on this matter ten (10) working days before the hearing and a copy of the published notice of the Board's decision within 30 days of the tentative cancellation pursuant to section 51284. If you have any questions concerning our comments, please contact Adele Lagomarsino, Program Analyst at (916) 445-9411.

Sincerely,

Dennis J. O'Bryant
Program Manager

LAND USE APPENDIX 2

4

FRESNO County Recorder
Robert C. Werner
DOC- 2007-0090292
Monday, MAY 07, 2007 11:37:59
Ttl Pd $0.00 Nbr-0002498885
APR/R1/1-4

AFTER RECORDING,
RETURN TO STOP #214

BEFORE THE BOARD OF SUPERVISORS

OF THE COUNTY OF FRESNO

STATE OF CALIFORNIA

CERTIFICATE OF TENTATIVE CANCELLATION

(less than the total of the land subject to contract)

NOTICE IS HEREBY GIVEN:

By resolution dated April 24, 2007, the Board of Supervisors of the County of Fresno granted tentative approval of the petition by PAO Investments, LLC for cancellation of a portion of Agricultural Land Conservation Contract (ALCC) No. 367, which applies to the real property situated in the County of Fresno, State of California, and is more particularly described on the legal description attached as Exhibit "A" and made a part hereof describing the 6.16-acre parcel subject to cancellation.

The above-referenced property is less than the total of the real property subject to ALCC No. 367.

A Certificate of Cancellation of the Contract shall be issued and recorded at such time as the following contingencies and conditions are satisfied:

1. Payment in full of the cancellation fee, which is in the amount of $3,062.50.
2. Unless the cancellation fee is paid or a Certificate of Cancellation of Contract is issued within one year from the date of the recording of this certificate, the cancellation fee shall be recomputed as of the date of

notice by the landowner to the Board of Supervisors required by Government Code Section 51283.4.

3. The landowner shall obtain all permits necessary to commence the project.

IN WITNESS WHEREOF, I have unto set my hand and seal this 24th day of April, 2007.

Bob Waterston, Chairman
Board of Supervisors

ATTEST:

Bernice E. Seidel, Clerk
Board of Supervisors

By Deputy

G:\4360Devs&Pln\ADMIN\BOARD\Board Items\2007\04-24-07\RLCC 843_PAO_CTC.doc

EXHIBIT "A-1"

Property Description

Being a portion of the Southwest Quarter of Section 5, Township 15 South, Range 13 East; Mount Diablo Base and Meridian, in the County of Fresno, State of California, lying south of the southerly right-of-way line of Panoche Road and east of that certain parcel of land described in the deed from B.E. Montgomery and wife to Pacific Gas and Electric Company dated November 17, 1948 and recorded in Book 2689 at Page 410, Official Records Fresno County, being more particularly described as follows:

Commencing at the Southwest Corner of said Section 5; thence North 00°21'06" East along the west line of said Section 5 a distance of 1760.25 feet to a point on the said southerly right-of-way line of Panoche Road (80 feet wide); thence North 64°43'53" East along said southerly right-of-way line a distance of 69.62 feet to the beginning of a curve concave to the northwest having a radius of 56,540.00 feet; thence northeasterly 509.96 feet along said curve and southerly right-of-way line through a central angle of 00°31'07" to the beginning of a tangent line; thence North 64°13'59" East along said southerly right-of-way line a distance of 1077.76 feet to the northeasterly corner of said land as described per deed to Pacific Gas and Electric Company; said point also being the TRUE POINT OF BEGINNING; thence the following courses:

1) North 64°13'59" East continuing along said southerly right-of-way line a distance of 65.30 feet;
2) South 26°27'26" East leaving said southerly right-of-way line a distance of 150.79 feet;
3) North 64°17'53" East a distance of 199.83 feet;
4) South 26°09'22" East a distance of 57.00 feet;
5) North 64°13'59" East a distance of 341.73 feet;
6) South 25°46'01" East a distance of 358.02 feet;
7) South 50°21'56" West a distance of 187.78 feet;
8) South 46°38'42" West a distance of 304.95 feet to the southeasterly corner of said land as described per deed to Pacific Gas and Electric Company;
9) North 36°43'05" West along the easterly line of said land as described per deed to Pacific Gas and Electric Company a distance of 716.22 feet to the Northeasterly corner of said deed to Pacific Gas and Electric Company and TRUE POINT OF BEGINNING

Said Parcel contains 5.62 acres more or less.

Basis of Bearings:
The centerline of Panoche Road between found Fresno County Brass Cap Monuments at stations 173 + 63.18 and 192 + 89.15 feet located in the Southwest Quarter of Section 5, T.15S., R.13E., taken as North 64°13'59" East per Book 34 of Record of Surveys at Pages 99-101, Fresno County Records.

Date: April 26, 2006

By: _____
Cris H. Robles, P.L.S.

EXHIBIT "A-2"

Property Description

Being a portion of the Southwest Quarter of Section 5, Township 15 South, Range 13 East; Mount Diablo Base and Meridian, in the County of Fresno, State of California, lying south of the southerly right-of-way line of Panoche Road and east of that certain parcel of land described in the deed from B.E. Montgomery and wife to Pacific Gas and Electric Company dated November 17, 1948 and recorded in Book 2689 at Page 410, Official Records Fresno County, being more particularly described as follows:

Commencing at the Southwest Corner of said Section 5; thence North 00°21'06" East along the west line of said Section 5 a distance of 1760.25 feet to a point on the said southerly right-of-way line of Panoche Road (80 feet wide); thence North 64°43'53" East along said southerly right-of-way line a distance of 69.62 feet to the beginning of a curve concave to the northwest having a radius of 56,540.00 feet; thence northeasterly 509.96 feet along said curve and southerly right-of-way line through a central angle of 00°31'07" to the beginning of a tangent line; thence North 64°13'59" East along said southerly right-of-way line a distance of 1077.76 feet to the northeasterly corner of said land as described per deed to Pacific Gas and Electric Company; thence North 64°13'59" East continuing along said southerly right-of-way line a distance of 324.08 feet to the TRUE POINT OF BEGINNING; thence the following courses:

1) North 64°13'59" East continuing along said southerly right-of-way line a distance of 182.00 feet;
2) South 25°46'01" East leaving said southerly right-of-way line a distance of 129.00 feet;
3) South 64°13'59" West parallel with the said southerly rigbt-of-way line a distance of 182.00 feet;
4) North 25°46'01" West a distance of 129.00 feet to a point on the said southerly right-of-way line and TRUE POINT OF BEGINNING.

Said Parcel contains 0.539 acres more or less.

Basis of Bearings:
The centerline of Panoche Road between found Fresno County Brass Cap Monuments at stations 173 + 63.18 and 192 + 89.15 feet located in the Southwest Quarter of Section 5, T.15S., R.13E., taken as North 64°13'59" East per Book 34 of Record of Surveys at Pages 99-101, Fresno County Records.

Date: December 22, 2006

By: _____
Cris H. Robles, P.L.S.

4

5

FRESNO County Recorder
Robert C. Werner
DOC- 2007-0090291
Monday, MAY 07, 2007 11:37:59
Ttl Pd $0.00 Nbr-0002498884
APR/R1/1-5

AFTER RECORDING,

RETURN TO STOP #214

BEFORE THE BOARD OF SUPERVISORS

OF THE COUNTY OF FRESNO

STATE OF CALIFORNIA

IN THE MATTER OF AGRICULTURAL LAND CONSERVATION CONTRACT	RESOLUTION APPROVING PARTIAL CANCELLATION OF AGRICULTURAL LAND CONSERVATION CONTRACT NO. 367 (RLCC No. 843)

WHEREAS, Agricultural Land Conservation Contract (ALCC) No. 367 was entered into between the County of Fresno and Russell Giffen and Ruth P. Giffen, and succeeded to by PAO Investments, LLC, hereafter referred to as "Owners", and recorded February 27, 1969, as Instrument No. 13855, Book 5665, Pages 182 to 185, of the Official Records of Fresno County, California, and

WHEREAS, in accordance with Section 51283(b) of the Government Code, the County Assessor certified the cancellation valuation to this Board for determination of the cancellation fee; and

WHEREAS, this Board has determined the cancellation fee to be in the amount of $3,062.50; and

WHEREAS, the Agricultural Land Conservation Committee has recommended approval of the proposed cancellation because of the ability to make all of the required findings in accordance with Section 51282(b) of the Government Code:

1. That the cancellation is for land on which notice of non-renewal has been served pursuant to Section 51245.

2. That the cancellation is not likely to result in the removal of adjacent lands from agricultural use.

3. That the cancellation is for an alternative use that is consistent with the provisions of the County General Plan.

4. That the cancellation will not result in discontiguous patterns of urban development.

5. That there is no proximate non-contracted land which is both available and suitable for the use to which it is proposed the contracted land be put or that development of contracted land would provide more contiguous patterns of urban development than development of proximate non-contracted land; and

WHEREAS, in accordance with Section 51284.1(c) of the Government Code the Board has considered the comments of the Department of Conservation ("DOC"); and

WHEREAS, the Board has determined the cancellation to be consistent with the purposes of the Williamson Act, subject to the following conditions:

1. Payment in full of the cancellation fee, which is in the amount of $3,062.50.

2. Unless the cancellation fee is paid or a Certificate of Cancellation of Contract is issued within one year from the date of the recording of this certificate, the cancellation fee shall be recomputed as of the date of notice by the landowner to the Board of Supervisors as required by Government Code Section 51283.4.

3. The landowner shall obtain all permits necessary to commence the project.

NOW, THEREFORE BE IT RESOLVED that the Board of Supervisors hereby finds this cancellation of said contract as to 6.16 acres to be consistent with the purposes of the Williamson Act; and

BE IT FURTHER RESOLVED that the partial cancellation of this contract be and it hereby is approved for the 6.16-acre portion of ALCC No. 367 described on the attached legal description (Exhibit "A"), subject to the following conditions:

1. Payment in full of the cancellation fee, which is in the amount of $3,062.50.

2. Unless the cancellation fee is paid or a Certificate of Cancellation of Contract is issued within one year from the date of the recording of this certificate, the unitary cancellation fee shall be recomputed as of the date of notice by the landowner to the Board of Supervisors as required by Government Code Section 51283.4.

3. The landowner shall obtain all permits necessary to commence the project; and

BE IT FURTHER RESOLVED that the Chairman is authorized to execute a Certificate of Tentative Cancellation, and upon satisfaction of conditions of approval stated above to execute a Certificate of Partial Cancellation of ALCC No. 367.

THE FOREGOING was passed and adopted by the following vote of the Board of Supervisors of the County of Fresno this 24th day of April 2007, to-wit:

AYES: Supervisors Larson, Case, Anderson, Perea, Waterston

NOES: None

ABSENT: None

CHAIRMAN, Board of Supervisors

ATTEST:

BERNICE E. SEIDEL, Clerk
Board of Supervisors

By _____ Deputy

Agenda #18

Resolution #07-202

G:\4360Devs&Pln\ADMIN\BOARD\Board Items\2007\04-24-07\RLCC 843_PAO_Res.doc

EXHIBIT "A-1"

Property Description

Being a portion of the Southwest Quarter of Section 5, Township 15 South, Range 13 East; Mount Diablo Base and Meridian, in the County of Fresno, State of California, lying south of the southerly right-of-way line of Panoche Road and east of that certain parcel of land described in the deed from B.E. Montgomery and wife to Pacific Gas and Electric Company dated November 17, 1948 and recorded in Book 2689 at Page 410, Official Records Fresno County, being more particularly described as follows:

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3) North 64°17'53" East a distance of 199.83 feet;
4) South 26°09'22" East a distance of 57.00 feet;
5) North 64°13'59" East a distance of 341.73 feet;
6) South 25°46'01" East a distance of 358.02 feet;
7) South 50°21'56" West a distance of 187.78 feet;
8) South 46°38'42" West a distance of 304.95 feet to the southeasterly corner of said land as described per deed to Pacific Gas and Electric Company;
9) North 36°43'05" West along the easterly line of said land as described per deed to Pacific Gas and Electric Company a distance of 716.22 feet to the Northeasterly corner of said deed to Pacific Gas and Electric Company and TRUE POINT OF BEGINNING

Said Parcel contains 5.62 acres more or less.

Basis of Bearings:
The centerline of Panoche Road between found Fresno County Brass Cap Monuments at stations 173 + 63.18 and 192 + 89.15 feet located in the Southwest Quarter of Section 5, T.15S., R.13E., taken as North 64°13'59" East per Book 34 of Record of Surveys at Pages 99-101, Fresno County Records.

Date: April 26, 2006

By: _____
Cris H. Robles, P.L.S.

EXHIBIT "A-2"

Property Description

Being a portion of the Southwest Quarter of Section 5, Township 15 South, Range 13 East; Mount Diablo Base and Meridian, in the County of Fresno, State of California, lying south of the southerly right-of-way line of Panoche Road and east of that certain parcel of land described in the deed from B.E. Montgomery and wife to Pacific Gas and Electric Company dated November 17, 1948 and recorded in Book 2689 at Page 410, Official Records Fresno County, being more particularly described as follows:

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2) South 25°46'01" East leaving said southerly right-of-way line a distance of 129.00 feet;
3) South 64°13'59" West parallel with the said southerly right-of-way line a distance of 182.00 feet;
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Said Parcel contains 0.539 acres more or less.

Basis of Bearings:
The centerline of Panoche Road between found Fresno County Brass Cap Monuments at stations 173 + 63.18 and 192 + 89.15 feet located in the Southwest Quarter of Section 5, T.15S., R.13E., taken as North 64°13'59" East per Book 34 of Record of Surveys at Pages 99-101, Fresno County Records.

Date: December 22, 2006

By: _____
Cris H. Robles, P.L.S.

LAND USE APPENDIX 3

Definitions for the Agriculture and Land Use Element

Agricultural Land:

Productive (Prime) Agricultural Land: Soils which are suitable for the production of most climatically adapted irrigated crops. Such land includes the following soils:

1. All land which qualifies for rating as Class I or II soils in the Natural Resources Conservation Service land use capability classifications;
2. Land which qualifies for rating with a Storie index rating of 80 through 100; and
3. Land which supports livestock used for the production of food and fiber and which has an annual carrying capacity equivalent to at least one (1) animal unit per acre as defined by the USDA.

Potentially Productive Agricultural Land: Soils which within the realm of economic possibility can be altered using certain reclamation or modification practices to make them more productive for essential food crops such as grain and vegetables. Included are certain Class III and IV soils and soils with a Storie index of 60-80.

Agricultural Commercial Centers: Small commercial centers located primarily in areas designated Agriculture or Rangeland that provide services to the surrounding area.

Agriculturally-Related Uses: Uses that are generally related to agriculture (e.g., commercial processing facilities that serve the agricultural community).

Agricultural Uses: The growing of food and fiber and the raising of livestock and poultry.

Compatible (Zoning): Zone districts that specifically implement the policies of the General Plan.

Conditionally Compatible (Zoning): Zone districts that may be compatible with the land use designations, policies, and standards of the General Plan, depending on certain circumstances which may apply.

Incompatible (Zoning): Zone districts that are inconsistent with the General Plan policies for a particular land use designation.

Overlay Land Use Designation: A land use designation on the General Plan Land Use Diagram that modifies in some specific manner the land uses or development standards of the underlying primary land use designation.

Parcel (Lot): A lot, or continuous group of lots, in single ownership or under single control, usually considered a unit for purposes of development.

Planned Urban Boundary: A line encompassing all land designated by a city for urban uses within the city's service area boundary, including land designated "Reserve" in a County-adopted community plan for the city. The boundary may be coterminous with or smaller than the Sphere of Influence.

Primary Land Use Designation: A land use designation on the General Plan Land Use Diagram that defines allowable uses and development standards for agricultural, residential, commercial, and industrial development, and other basic categories of land use.

Resource Lands: Lands generally designated and devoted to agriculture, grazing, resource extraction, and other open space uses.

Rural (Non-Agricultural) Development: Development that is generally characterized by very low density residential development (2 to 5 acre parcels) that is not necessarily limited to agricultural or other resource uses.

Second Unit: A self-contained living unit, either attached to or detached from, and in addition to, the primary residential unit on a single lot. Sometimes called "granny unit."

Sphere of Influence (SOI): The probable physical boundaries and service area of a local agency, as determined by the Local Agency Formation Commission.

Storie Index: A numerical system (0-100) rating the degree to which a particular soil can grow plants and produce crops, based on four (4) factors, including soil profile, surface texture, slope, and soil limitations.

Definitions for the Agriculture and Land Use Element

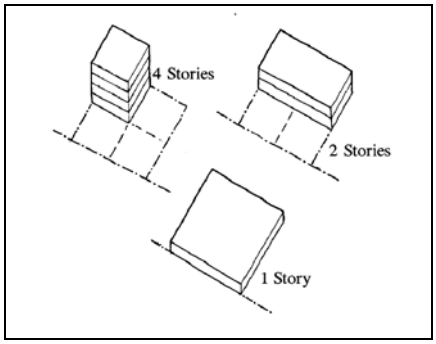
Urban Development: Development generally characterized by moderate and higher density residential development (i.e., three or more dwelling units per acre), commercial development, and industrial development, and supported by public services such as central water and sewer systems.

Value-Added Agricultural Uses (Processing Facilities): Uses or facilities that increase the value of agricultural produce over the cost of raw produce, such as canning, drying, freezing, or packaging agricultural produce for the ultimate sale to consumers.

Non-Residential Uses

Standards of building intensity for non-residential uses such as commercial and industrial development are stated as maximum *floor-area ratios* (FARs). A floor-area ratio is the ratio of the gross building square footage on a lot to the net square footage of the lot (or parcel).

For example, on a lot with 10,000 net square feet of land area, an FAR of 1.00 will allow 10,000 square feet of gross building floor area to be built, regardless of the number of stories in the building (e.g., 5,000 square feet per floor on two floors or 10,000 square feet on one floor). On the same 10,000-square-foot lot, a FAR of 0.50 would allow 5,000 square feet of floor area, and an FAR of 0.25 would allow 2,500 square feet. The diagram to the right shows graphically how various building configurations representing an FAR of 1.00 could cover a lot.



LAND USE DESIGNATIONS

The General Plan includes 30 resource, residential, commercial, industrial, and other land use designations that depict the types of land uses that will be allowed throughout the unincorporated county**.** These designations are broken down into two (2) categories: primary and overlay. The 27 primary land use designations consist of standard land use designations that appear on the land use diagram. There are also three overlay designations: Reserve, San Joaquin River Corridor, and Westside Freeway Corridor.

Each primary land use designation is defined in terms of allowable uses and intensity standards. Overlay land use designations modify the policies, standards, or procedures established for the underlying primary land use designation. Allowable uses for each land use designation are set out in the descriptions that follow; intensity standards for the various land use designations are set out in Table LU-1.

The land use designations are implemented largely through zoning. Table LU-2 shows which zoning districts are deemed compatible, conditionally compatible, or incompatible with the various General Plan land use designations.

TABLE LU-1

FRESNO COUNTY GENERAL PLAN
LAND USE DESIGNATIONS AND DEVELOPMENT INTENSITY STANDARDS[1]

Land Use Designation	Residential Intensity (in gross acres)[2]	Non-residential Intensity Floor Area Ratio (FAR)[3]
Agriculture	1 DU/20 acres	0.10[4]
Irrigated Agriculture	1 DU/20 acres	0.10[4]
Westside Rangeland	1 DU/40 acres	0.10[4]
Eastside Rangeland	1 DU/40 acres	0.10[4]
Open Space	1 DU/40 acres	0.10[4]
Public Lands and Open Space	1 DU/40 acres	0.10[4]
Low Density Residential	0.9-2.8 DU/acre	0.35
Medium Density Residential	2.8-5.8 DU/acre	0.40
Medium High Density Residential	5.8-14.5 DU/acre	0.50
Mountain Residential	1 DU/5 acre to 14.5 DU/acre	0.50
Rural Residential	1 DU/5 acre to 1 DU/2 acres	0.30
Foothill Rural Residential	1 DU/5 acre to 1 DU/2 acres	0.30
Planned Urban Village	4.0-8.0 DU / acre (net)	0.50
Planned Rural Community	1.0-2.0 DU/acre	0.50
Rural Settlement Area	1 DU/2 acres to 1 DU/acre	0.50
Office Commercial	5.8-14.5 DU/acre	0.50
Neighborhood Commercial	n/a	0.50
Community Commercial	n/a	0.50
Central Business Commercial	5.8-14.5 DU/acre	1.00
Regional Commercial	n/a	1.00
Highway Commercial	n/a	1.00
Service Commercial	5.8-14.5 DU/acre	1.00
Special Commercial	n/a	1.00
Mountain Commercial	n/a	1.00
Limited Industry	n/a	1.50
General Industry	n/a	1.50
Public Facilities	n/a	0.50
Mountain Urban	1 DU/5 acres to 14.5 DU/acre	1.00
Reserve Overlay	1 DU/20 acres	0.10[4]
San Joaquin River Corridor Overlay	1 DU/20 acres	0.10[4]
Westside Freeway Corridor Overlay	n/a	1.00

[1]These are the applicable standards of residential and non-residential building intensity unless otherwise specified in policy text.
[2]Maximum allowable residential intensity or allowable range of residential intensity. Gross acreage includes roadways and other rights-of-way. Net acreage is about 80 percent of gross acreage.
[3]Maximum allowable intensity for non-residential uses allowed as a matter of right in the compatible zone district where parcel size meets or exceeds minimum area requirements of applicable districts.
[4]Does not apply to facilities necessary for resource production.

TABLE LU-2
FRESNO COUNTY GENERAL PLAN LAND USE/ZONING CONSISTENCY[1]

Land Use Designations	Zone Districts																																					
	R-C	TPZ	O	R-E	AE	AL	AC[2]	R-R	RCC[2]	RS	R-A	R-1-A	R-1-AH	R-1-E	R-1-EH	R-1-B	R-1-C	R-1	R-2/R-2-A	R-3/R-3-A	T-P	C-P	R-P	C-1	C-2	C-3	C-4	C-6	C-R	C-M	M-1	M-2	M-3	P	P-V
RESOURCE																																						
Agriculture		○	○		●	○	○																											○	
Irrigated Agriculture	○	○	○		●	○	○																											○	
Westside Rangeland	○	○	○		●		○																											○	
Eastside Rangeland	○	○	○	○	●		○														□							□		□	□	□			○	
Open Space	●	○	○	○		○																												○	
Public Lands and Open	●	○	○	○	○		○		○			□	□	□	□	□	□	□	□		□							□	□	□					○	
RESIDENTIAL																																						
Rural Residential		○	○			○		●	○																									○	
Foothill Rural Residential		○	○	□	○	○		●	○												□									□	□	□	□		
Mountain Residential		○	○	○	○	○		○				○	○	○	○	○	○	○	○		○		○												
Mountain Commercial		○	○			○													○			○	○	○	○		○	○	○	○				○	
Low Density Residential		○	○			○		□			○	●	○	●	○	●	○	○			○		○												
Medium Density		○	○			○										○	●	●	○		○		○												
Medium High Density Res.		○	○			○											○	●	●	○	○		○												
MULTIPLE CATEGORIES																																						
Mountain Urban		○	○	○		○		●				○	○	○	○	○	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
Rural Settlement Area		○	○							●											○										○	○	○		
Planned Rural Community																○								○											
Planned UrbanVillage																																			●	
COMMERCIAL																																						
Neighborhood Commercial		○	○			○																		●										○	
Office Commercial		○	○			○													○	○		○	●											○	
Community Commercial		○	○			○						○	○	○	○	○	○	○	○	○		○	○	○	●									○	
Central Business		○	○			○						○	○	○	○	○	○	○	○	○		○	○				●							○	
Regional Commercial		○	○			○						○	○	○	○	○	○	○	○	○		○	○		○	●								○	
Highway Commercial		○	○			○																						○						○	
Service Commercial		○	○			○																						●						○	
Special Commercial		○	○	○		○																						○	○					○	

TABLE LU-2
FRESNO COUNTY GENERAL PLAN LAND USE/ZONING CONSISTENCY[1]

Land Use Designations	Zone Districts																																				
	R-C	TPZ	O	R-E	AE	AL	AC[2]	R-R	RCC[2]	RS	R-A	R-1-A	R-1-AH	R-1-E	R-1-EH	R-1-B	R-1-C	R-1	R-2/R-2-A	R-3/R-3-A	T-P	C-P	R-P	C-1	C-2	C-3	C-4	C-6	C-R	C-M	M-1	M-2	M-3	P	P-V
INDUSTRIAL																																					
Limited Industrial		○	○			○																								●	●	○	○	○		
General Industrial		○	○			○																								○	●	●	●	○		
PUBLIC																																					
Public Facilities		○	○			●																															
OVERLAY																																					
Reserve Overlay		○				●																															
Westside Freeway					●																																
San Joaquin River Corridor		○	○	○	●	○	○																														

● = compatible use

○ = conditionally compatible use

□ = limited to Sierra-South and/or Sierra-North Regional Plans

[1] Subject to more detailed zoning compatibility matrices in regional, community, and specific plans, the urban development policies, and the following:

a. Zone districts which exist at the time of broadscale rezoning and which are not included as "Compatible" on the matrix may be found to be "Conditionally Compatible" under the following circumstances:
   1. The subject property is developed with a permitted and functional use.
   2. The existing use and other uses which might be permitted by the zone district will not inhibit or obstruct the development of the surrounding area to its planned future use.

b. The provisions of "a" above shall also apply to legally established uses in areas designated for Agriculture which did not have the appropriate zoning for the use at the time of broadscale rezoning. In such cases, conditional zoning should be applied to limit development to the existing uses and limit impacts on surrounding properties.

c. Zoning districts in addition to AL (Limited Agriculture) District may be permitted within the "Reserve" land use designation under the following circumstances:
   1. The proposed zone district is considered "Compatible" or "Conditionally Compatible" with the underlying urban use reflected on the County Community Plan.
   2. The provisions stated in Policies LU-G.15, LU-G.20, and LU-G.22 are met.

d. The Mountain Overlay District may be applied to any district which is "Compatible" or "Conditionally Compatible" in the Mountain Urban and Rural Residential designated areas.

[2] Only for parcels zoned prior to 9/20/90.

Primary Land Use Designations

Resource

Agriculture: This designation provides for the production of crops and livestock, and for location of necessary agriculture commercial centers, agricultural processing facilities, and certain nonagricultural activities. (See Table LU-3 for list of typical uses.)

Irrigated Agriculture: This designation provides for the production of crops, necessary agricultural processing facilities, and certain nonagricultural activities. (See Table LU-3 for list of typical uses.) Irrigated agriculture requires a system that delivers at least one (1)-acre foot of water per acre per year.

Westside Rangeland: This designation provides for grazing and other agricultural operations, mining, oil and gas development, wildlife habitat, various recreational activities, and other appropriate open space uses. (See Table LU-4 for list of typical uses.)

Eastside Rangeland: This designation provides for grazing and other agricultural operations, wildlife habitat, various non-intensive recreational activities, and other appropriate open space uses.

Open Space: This designation, which is applied to land or water areas that are essentially unimproved and planned to remain open in character, provides for the preservation of natural resources, the managed production of resources, parks and recreation, and the protection of the community from natural and manmade hazards.

Public Lands and Open Space: This designation, which is applied to land or water areas that are essentially unimproved and planned to remain open in character, provides for the preservation of natural resources, the managed production of resources, parks and recreation, and the protection of the community from natural and manmade hazards.

Residential

Rural Residential: This designation provides for single family dwellings, accessory buildings, and small agricultural operations (e.g., greenhouses, fruit trees, nut trees, and vines) in rural settings. Expansion of this designation is restricted by General Plan policy.

Foothill Rural Residential: This designation provides for single family dwellings, accessory buildings, and small agricultural operations (e.g., greenhouses, fruit trees, nut trees, and vines) in rural settings in the Sierra Foothills. Expansion of this designation is restricted by General Plan policy.

Low Density Residential: This designation provides for residential development that combines the space and privacy of a suburban setting with the amenities and services of urban areas. The predominant residential type is the single family dwelling unit.

Medium Density Residential: This designation provides for single family dwellings, multi-family dwellings, and accessory structures.

Medium High Density Residential: This designation provides for single family dwellings, multi-family dwellings, accessory structures, churches, schools, and libraries.

Mountain Residential*:* This designation provides for recreation-oriented residential development including single family dwellings, multi-family dwellings, mobilehomes, and accessory structures.

Commercial

Neighborhood Commercial: This designation provides for commercial activities ranging from a single commercial use to a neighborhood shopping center serving a local area. A neighborhood shopping center should provide convenience goods, personal services, and general merchandise for the living needs of neighborhood residents and may offer specialty items.

Office Commercial: This designation provides for the concentration of administrative, business, medical, professional, general offices, and multi-family development in designated locations where development is compatible with surrounding land uses.

Community Commercial: This designation provides for development of unified retail centers that supplement Central Business Commercial. Typical uses include retail shops, services, restaurants, professional and administrative offices, department stores, furniture stores, supermarkets, and similar and compatible uses.

Central Business Commercial: This designation provides for development of commercial centers where the full range of retail services and professional and governmental offices are concentrated in a location that is central to most community residents. Typical uses include specialty shops, retail, entertainment uses, apparel stores, restaurants, hotels/motels, and financial, medical, and professional offices.

Regional Commercial: This designation provides for a large cluster of commercial establishments that serve a defined regional trade area of more than 50,000 people. Typical uses include large-scale shopping centers, wholesale stores, factory outlets, and other commercial uses including retail stores, food and drug stores, apparel stores, specialty shops, motor vehicle sales and service, hotels/motels, theaters, entertainment uses, and other uses that serve a regional market.

Highway Commercial: This designation provides for one-stop concentrated commercial service nodes for the traveling public. Typical uses include hotels, motels, service stations, and restaurants.

Service Commercial: This designation provides for general commercial uses which, due to space requirements or the distinctive nature of the operation, are not usually located in commercial centers. Typical uses include repair, rental, sales, storage, and overnight lodging.

Mountain Commercial: This designation provides for mixed retail, service, heavy commercial, and residential uses in mountain or foothill communities where existing land use patterns preclude the clustering of similar types of uses into unified commercial centers. It is applied primarily to specific sections of major thoroughfares where the combination of uses function as a small central business district.

Special Commercial: This designation provides for commercial activities which do not fall within any other commercial land designation and whose frequency of occurrence does not warrant the establishment of additional specific use designations. Typical uses include drive-in theaters, airport-related and recreation-related commercial uses, and other such uses.

Industrial

Limited Industrial: This designation provides for restricted non-intensive manufacturing and storage activities that do not have detrimental impacts on surrounding properties.

General Industrial: This designation provides for the full range of manufacturing, processing, fabrication, and storage activities. Land designated General Industrial may be developed to a less intense industrial use when in a transitional area adjacent to land designated for non-industrial urban uses.

Multiple Categories

Mountain Urban: This designation provides for concentrations of residential development, various intensities of commercial activities, industrial uses where appropriate, and continued foothill rural residential uses.

Planned Rural Community: This designation provides for a variety of housing types in a semi-rural environment with public services and locally-oriented commercial uses such as grocery stores, restaurants, offices, and small retail shops. Expansion of this designation is prohibited by General Plan policy.

Planned Urban Village: The designation provides for the development of a mixed use Master Planned Community. This designation is only appropriate on large properties which are contiguous to existing city sphere of influence lines where annexation in the future is possible.

Rural Settlement: This designation provides for a non-urban community in the rural areas designated for residential and supportive commercial uses serving the rural settlement and surrounding farm population.

Public

Public Facilities: This designation provides for location of services and facilities that are necessary to the welfare of the community. Typical uses include liquid and solid waste disposal, ponding basins, parks, schools, civic centers, hospitals, libraries, penal institutions, and cemeteries.

Overlay Land Use Designations

Reserve Overlay: This overlay is intended to reserve certain lands for future more intensive development by permitting only limited agricultural uses on an interim basis. Typical uses include livestock raising; tree, vine, and field crops; single family dwellings; and accessory buildings. Where such lands are located within a city sphere of influence, development will usually not occur until annexation to the city. Where such lands are peripheral to an unincorporated community, development shall be subject to the provision of public facilities and phasing.

San Joaquin River Corridor Overlay: This overlay provides for agricultural activities with incidental homesites, sand and gravel extraction, various recreational activities, wildlife habitat areas, and uses which serve the San Joaquin River Parkway. This overlay designation does not restrict uses set forth in the Friant Community Plan.

Westside Freeway Corridor Overlay*:* This overlay provides for uses at designated interchanges that cater to needs of long distance freeway users and agriculture-related enterprises, and prohibits uses which normally cater to the service and convenience needs of urban and rural population centers. Typical permitted uses include hotels, motels, service stations, restaurants and cafes, truck service and repair facilities, rest areas, camper and trailer parks, emergency medical facilities, grocery stores, employee housing facilities, public use airports, agriculture-related uses, and value-added agricultural uses. Areas outside designated interchanges are limited to agricultural uses.

LAND USE GOALS, POLICIES, AND IMPLEMENTATION PROGRAMS

This second major part of the Agriculture and Land Use Element sets out goals, policies, and implementation programs under four main headings: Resource Lands, Rural Development, Urban Development, and General Provisions and Administration.

The Resource Lands heading addresses land that will remain primarily open in character. Topics under this heading include: Agriculture, Westside Rangelands, River Influence Areas, and the Westside Freeway Corridor. The goals, policies, and implementation programs for these topics reflect a basic commitment to preserve the existing open rural character of the county and its natural and managed resources. While necessarily protective and restrictive, the policies also recognize the need to maintain economic productivity and allow for urban growth. The intent of the policies is not to preclude intensive development but to direct it to minimize loss of valuable open space.

The goals, policies, and implementation programs under the second major heading, Rural Development, guide development in areas designated Rural Residential, Rural Settlement Area, and Planned Rural Community. The policies provide for the continued development of areas within these designations in a manner that minimizes environmental impacts and public infrastructure investments, but generally limits expansion of these designations.

The goals, policies, and implementation programs under the third heading, Urban Development, direct intensive development to cities, unincorporated communities, and other areas planned for such development where public facilities and infrastructure are available. Topics under this heading include: Incorporated Cities, Unincorporated Communities, Urban Residential, Urban Commercial, and Urban Industrial. These policies reflect a basic commitment to conserving natural and managed resources while directing growth and enhancing economic development.

Goals, policies, and implementation programs under the fourth main heading, Administration, include special development and administrative provisions that are applicable to many land use types and various areas of the county.

RESOURCE LANDS

A. AGRICULTURE

Since the early 1950s, Fresno County has been the leading agricultural county in the United States in the value of farm products. Since most of the county's highly productive agricultural soils could be easily developed by urban, rural residential, and other non-agricultural uses, careful land use decision-making is essential to minimizing the conversion of productive agricultural land. This land use conversion diminishes Fresno County's agricultural production capacity and economic viability and detrimentally impacts surrounding agricultural operations to the extent that further losses in production may occur.

As the introduction to the Economic Development Element states, the first step in expanding the county's job base is to strengthen the county's historical economic base of agriculture. It is essential for the county's agricultural economy to reduce the conversion of productive agricultural land. Policies in this section seek to sustain agriculture by protecting agricultural activities from incompatible land uses, promoting agricultural land preservation programs, developing programs to preserve or maintain soil conditions or improve soil productivity, facilitating agricultural production by supplying adequate land for support services, and controlling expansion of non-agricultural development onto productive agricultural lands. Related policies are included in Section ED-A, Job Creation; Section LU-B, Westside Rangelands; and Section PF-C, Water Supply and Delivery**.**

Goal LU-A To promote the long-term conservation of productive and potentially- productive agricultural lands and to accommodate agricultural-support services and agriculturally-related activities that support the viability of agriculture and further the County's economic development goals.

Policies

Policy LU-A.1 The County shall maintain agriculturally-designated areas for agriculture use and shall direct urban growth away from valuable agricultural lands to cities, unincorporated communities, and other areas planned for such development where public facilities and infrastructure are available.

Policy LU-A.2 The County shall allow by right in areas designated Agriculture activities related to the production of food and fiber and support uses incidental and secondary to the on-site agricultural operation. Uses listed in Table LU-3 are illustrative of the range of uses allowed in areas designated Agriculture.

Policy LU-A.3 The County may allow by discretionary permit in areas designated Agriculture, special agricultural uses and agriculturally-related activities, including value-added processing facilities, and certain non-agricultural uses listed in Table LU-3. Approval of these and similar uses in areas designated Agriculture shall be subject to the following criteria:

a. The use shall provide a needed service to the surrounding agricultural area which cannot be provided more efficiently within urban areas or which requires location in a non-urban area because of unusual site requirements or operational characteristics;
b. The use should not be sited on productive agricultural lands if less productive land is available in the vicinity;
c. The operational or physical characteristics of the use shall not have a detrimental impact on water resources or the use or management of surrounding properties within at least one-quarter (1/4) mile radius;
d. A probable workforce should be located nearby or be readily available;
e. For proposed agricultural commercial center uses the following additional criteria shall apply:
    1. Commercial uses should be clustered in centers instead of single uses.

2. To minimize proliferation of commercial centers and overlapping of trade areas, commercial centers should be located a minimum of four (4) miles from any existing or approved agricultural or rural residential commercial center or designated commercial area of any city or unincorporated community.
3. New commercial uses should be located within or adjacent to existing centers.
4. Sites should be located on a major road serving the surrounding area.
5. Commercial centers should not encompass more than one-quarter (1/4) mile of road frontage, or one-eighth (1/8) mile if both sides of the road are involved, and should not provide potential for developments exceeding ten (10) separate business activities, exclusive of caretakers' residences;

f. For proposed value-added agricultural processing facilities, the evaluation under criteria "a" above, shall consider the service requirements of the use and the capability and capacity of cities and unincorporated communities to provide the required services; and
g. For proposed churches and schools, the evaluation under criteria LU-A.3a above shall include consideration of the size of the facility. Such facilities should be no larger than needed to serve the surrounding agricultural community.
h. When approving a discretionary permit for an existing commercial use, the criteria listed above shall apply except for LU-A.3b, e2, e4, and e5.

Policy LU-A.4 The County shall require that the recovery of mineral resources and the exploration and extraction of oil and natural gas in areas designated Agriculture comply with the Mineral Resources Section of the Open Space and Conservation Element. (See Section OS-G)

Policy LU-A.5 The County shall allow the Agricultural Commercial (AC) center zone district to remain in areas designated Agriculture if the land was so zoned prior to September 20, 1990. Commercial uses legally established prior to that date shall be deemed conforming, but expansion or the addition of new commercial uses shall require a discretionary permit as provided in Policy LU-A.3.

Policy LU-A.6 The County shall maintain twenty (20) acres as the minimum permitted parcel size in areas designated Agriculture, except as provided in Policies LU-A.9, LU-A.10, and LU-A.11. The County may require parcel sizes larger than twenty (20) acres based on zoning, local agricultural conditions, and to help ensure the viability of agricultural operations.

Policy LU-A.7 The County shall generally deny requests to create parcels less than the minimum size specified in Policy LU-A.6 based on concerns that these parcels are less viable economic farming units, and that the resultant increase in residential density increases the potential for conflict with normal agricultural practices on adjacent parcels. Evidence that the affected parcel may be an uneconomic farming unit due to its current size, soil conditions, or other factors shall not alone be considered a sufficient basis to grant an exception. The decision-making body shall consider the negative incremental and cumulative effects such land divisions have on the agricultural community.

TABLE LU-3

TYPICAL USES ALLOWED IN AREAS DESIGNATED AGRICULTURE (Policies LU-A.2 and LU-A.3)

BY RIGHT	SPECIAL PERMIT USES		
Agricultural Uses	**Special Agricultural Uses**	**Agriculturally-Related & Value-Added Agricultural Uses**	**Agricultural Commercial Center Uses & Other Non-Agricultural Uses**
Crop & livestock production, except as specified under special permit uses Packing, processing & sale of crops produced on premises, or where such activity is carried on in conjunction with or as part of a bonafide agricultural operation under the same ownership, except as specified under special permit uses Sale of livestock produced or raised on the premises Residences Home occupations Certain oil & gas development activities pursuant to the policies in Section OS-C, Mineral Resources, of the Open Space and Conservation Element	Cattle feed lots Dairies Goat lots Swine yards Poultry operations Fish farms	Wineries & distilleries Cotton ginning Cottonseed delinting Tree nut hulling & shelling Trucking operations servicing the agricultural community Inspection & weighing services associated with transportation of agricultural products Commercial land leveling & developing establishments Farm labor camps Commercial grain elevators Dehydration operations Commercial soil preparation service establishments Commercial packing & processing of crops Commercial meat processing plants	<u>Commercial Centers:</u> • Veterinary Services & hospitals • Medical & health services • Irrigation systems administration offices • Water-well drilling services • Farm equipment & machinery sales, rental, storage & maintenance • Welding & blacksmith shops • Agricultural employment services • Feed & farm supply sales • Fertilizer sales • Building materials sales • Hardware stores • Grocery stores • Gasoline service stations • Liquefied petroleum gas distribution & storage • Livestock auction market <u>Other:</u> • Organic & inorganic fertilizer manufacturing & mixing • Boarding & training kennels • Home occupations • Sewage treatment plants • Solid waste disposal • Race tracks • Pistol & rifle range • Churches • Schools • Cemeteries • Commercial stables & riding academies • Golf courses • Radio & television broadcasting stations • Wireless communication facilities • Electrical substations • Liquefied petroleum gas distribution & storage • Airports • Detention facilities • Interstate freeway commercial development • Mineral extraction and oil and gas development pursuant to the policies in Section OS-C, Mineral Resources, of the Open Space and Conservation Element.

LAND USE APPENDIX 4

THE COUNTY OF FRESNO 1856

Fax Cover Sheet

Department of Public Works and Planning
Development Services Division

DATE: 08.15.07

TO:

FROM: Margie McHenry

Organization:

Development Services Division

Attention: Marcus Magness

Name:

Telephone No:

Telephone No: 262-4022

Fax No: 448-9499

FAX NO.: (559) 262-4166

TOTAL NO. OF PAGES BEING FAXED INCLUDING THIS COVER SHEET: 20

Message:

Per your request....
Pls call if you need anything further.

DOCKET
06-AFC-10
DATE AUG 15 2007
RECD. AUG 21 2007

2220 Tulare Street, Sixth Floor / Fresno, California 93721 / Phone (559) 262-4055 / 262-4029 / 262-4302 / 262-4022 / FAX 262-4893

County of Fresno

DEPARTMENT OF PUBLIC WORKS AND PLANNING
ALAN WEAVER, DIRECTOR

August 8, 2007

PAO Investments, LLC
45499 W. Panoche Rd.
Firebaugh, CA 93622

Dear Sir or Madam:

SUBJECT: General Plan Conformity Application – Starwood Power-Midway, LLC

Determine General Plan Conformity of Starwood Power-Midway, LLC's proposal to develop an electrical power generating facility on a 5.6-acre site in the AE-20 (Exclusive Agriculture, 20-acre minimum parcel size) District.

LOCATION: The proposed power generating facility is located on the south side of Panoche Road between Interstate 5 and Fairfax Avenue approximately 12.6 miles southwest of the City of Mendota (SUP. DIST.: 1) (APN: 027-060-78s).

APPLICANT: PAO Investments

EXHIBITS:

1. Location Map
2. Existing Zoning Map
3. Existing Land Use Map
4. Fresno County Adopted General Plan
5. Aerial Photograph of Proposed Power Generating Facility and Surrounding Area
6. Site Plan of Proposed Power Generating Facility

PROJECT DESCRIPTION:

On July 18, 2007, PAO Investments LLC submitted an application for determination of General Plan Conformity on a 5.6-acre parcel for the purposes of establishing a power generating facility. The proposed power generating facility is located on the south side of Panoche Road between Interstate 5 and Fairfax Avenue approximately 12.6 miles southwest of the City of Mendota. The proposed facility would consist of two FT8-3 SwiftPac Combustion Turbine Generator units installed in a simple-cycle power plant arrangement, with a total net generating

DEVELOPMENT SERVICES DIVISION
2220 Tulare Street, Sixth Floor / Fresno, California 93721 / Phone (559) 262-4056 / 262-4029 / 262-4302 / 262-4022 / FAX 262-4893
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capacity of approximately 120 MW. Off-site improvements associated with the project include an approximate 300-foot electric transmission line to tie into the PG&E Substation, a 1,200-foot underground water pipeline connecting the project to the existing CalPeak Panoche plant well adjacent to the project site, 50 feet of new gas transmission line and a gas metering set which will tap into the existing PG&E gas trunkline.

BACKGROUND:

On April 24, 2007, the Fresno County Board of Supervisors approved a request for partial cancellation of the Williamson Act Contract, to remove the subject 5.6-acre area from Agricultural Land Conservation Contract No. 367 restrictions. Approval of the partial cancellation request required the Board to make five specified findings. One of the required findings was a determination that the proposed alternate use is consistent with the General Plan. The Board determined that the five findings could be made and, therefore, approved the partial cancellation.

EXISTING LAND USE:

The existing parcel is zoned AE-20 (Exclusive Agriculture, 20-acre minimum parcel size). The site is designated Agriculture in the Fresno County General Plan and is subject to Agricultural Land Conservation Contract No. 367.

The subject site is currently used as a storage-yard by CalPeak Power. A PG&E electrical substation exists adjacent to the southwest of the project area. Other adjacent land consists of pomegranate orchards.

PROCEDURAL CONSIDERATIONS / PURPOSE OF REPORT:

The California Energy Commission's (CEC) Preliminary Staff Assessment (PSA) regarding the proposed power generating facility indicated that the CEC was unable to determine that the proposed project is consistent with the Fresno County General Plan.

GENERAL PLAN POLICY CONSIDERATIONS

The proposed project and surrounding land is designated for Agriculture in the Fresno County General Plan. As previously-mentioned, the subject site is zoned for agricultural land uses (AE-20). The existing AE-20 zoning (Exhibit 2) is reflective of the County General Plan land use designation for this area.

The Fresno County General Plan contains specific policies related to agricultural land and the protection of those lands as the County's most valuable natural resource and its historical basis of its economy. General Plan Policy LU-A.1 directs urban growth away from valuable agricultural lands to cities and unincorporated communities.

Policy LU-A.3 states that the County shall allow special agricultural uses, agriculturally-related activities and certain non-agricultural uses in areas designated Agriculture. Table LU-3 lists typical uses allowed in areas designated Agriculture. Approval of those and similar uses is subject to a determination that certain criteria can be met. This list is not intended to be inclusive of all uses that can be considered for development. The proposed power generating

facility is similar to other allowed uses which provide a needed service to the surrounding community or the larger area. Table LU-3 includes uses which provide a public benefit to the surrounding community or larger area, such as sewage treatment plants, solid waste disposal, wireless communication facilities and electrical substations. For proposed power generating facilities with a net generating capacity of less than 50 MW, the proposed project requires approval from Fresno County. In those instances, an Unclassified Conditional Use Permit is required to be submitted for review and for a determination before the Fresno County Planning Commission and/or Board of Supervisors. In this case, because the proposed project would have a net generating capacity of 120 MW, an Unclassified Conditional Use Permit was determined to not be required. However, the Fresno County Board of Supervisors has, in the past, approved Unclassified Conditional Use Permits for proposed power generating facilities on land designated for Agriculture and zoned AE-20.

Regarding the criteria to be considered in approval of such uses, as specified in Policy LU-A.3, staff believes the criteria are met sufficiently to determine that the proposed project is consistent with the Fresno County General Plan.

Criterion "a" is met in that the facility is proposed at this non-urban location because of the existing infrastructure installed at the adjacent Pacific Gas and Electric substation and the existing high-volume natural gas lines and 115 kilovolt transmission lines located on the subject parcel. The existing infrastructure allows for efficient interconnection, which reduces impacts on adjacent land. Criterion "b" can be met because a site selection investigation was performed by the applicant, looking for land that was in sufficient proximity to the infrastructure listed above. No less productive agricultural lands were identified within sufficient proximity to serve as a reasonable alternative. The proposed power generating facility is estimated to have a maximum annual groundwater demand of 135.6 acre-feet. Based on the environmental documentation submitted to the California Energy Commission, the proposed facility will not have a significant effect on groundwater resources, and would meet Criterion "c". The proposed facility is located approximately 12.6 miles from the city of Mendota and approximately 13.7 miles from the city of Firebaugh. While a location closer to sources for the two required employees would be preferable, other site requirements preclude such a location.

CONCLUSION:

Table LU-A.3 lists typical uses allowed on land designated for Agriculture in Fresno County. The identified uses are not intended to be an exhaustive listing of all allowed uses, but instead are typical uses allowed. Other similar uses can also be permitted on land designated for Agriculture. It has been determined that the proposed power generating facility is similar to other non-agricultural uses listed in Table LU-3 of the Fresno County General Plan. Further, the Starwood Power-Midway facility meets the criteria for allowing such a use as described in Policy LU-A.3 of the General Plan. The development of the proposed use on the subject property is consistent with the Fresno County General Plan.

This determination was supported by the Board of Supervisors on April 24, 2007, when the request for partial cancellation of Agricultural Land Conservation Contract No. 367 was approved.

No additional land use entitlement review by Fresno County is required for the development of the proposed power generating facility.

If you have questions regarding this General Plan Conformity review, please call me at (559) 262-4022.

Sincerely,

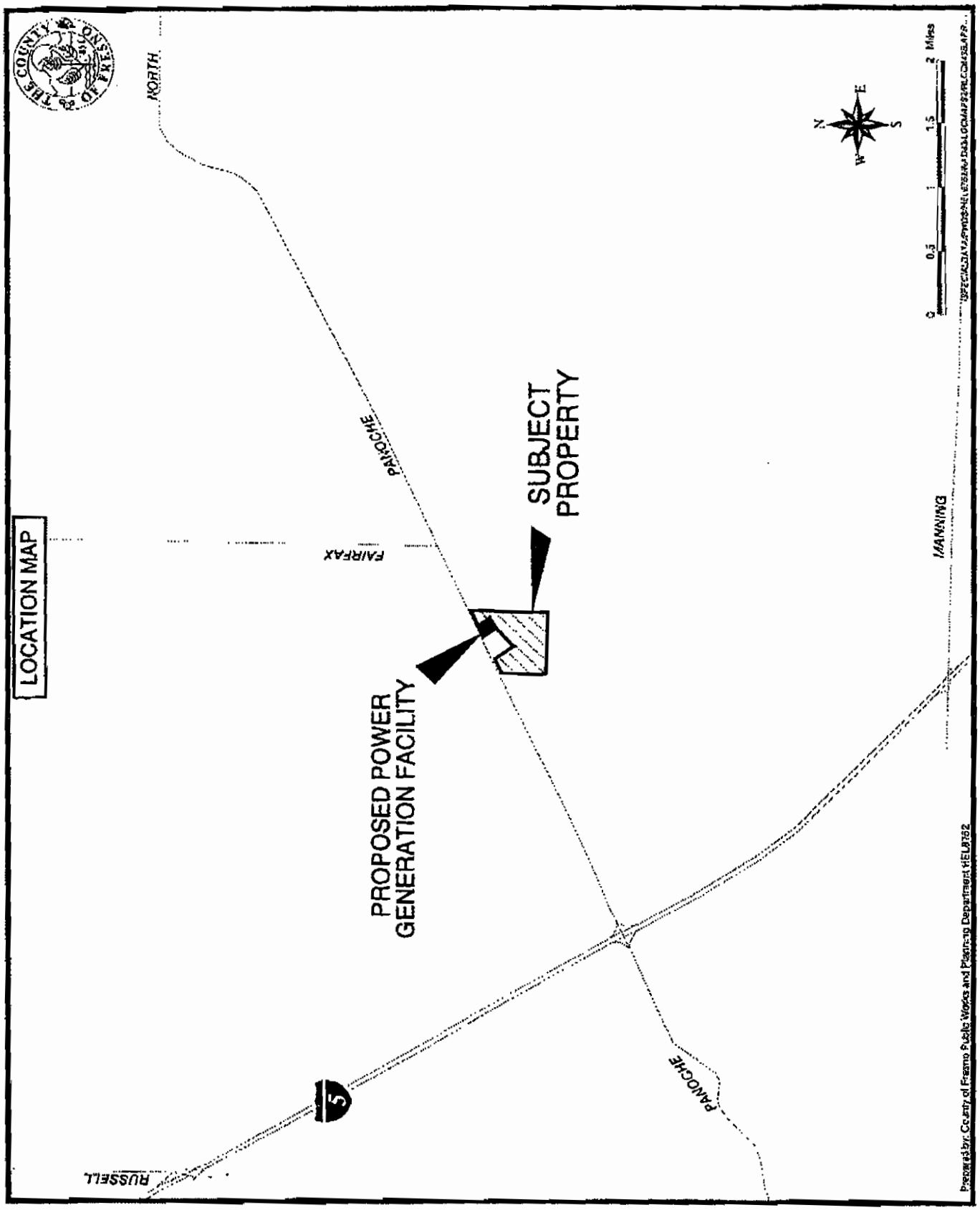
Jared Nimer, Planner
Development Services

JN:hr
G:\4360Devs&Pln\PROJSEC\PROJDOCS\GPC\Starwood Power - Midway\GPC letter.doc

Enclosures

c: Bernard Jimenez, Division Manager
Will Kettler, Principal Planner
Margie McHenry, Senior Planner
Zachary Redmond, Deputy County Counsel
Marcus Magness

EXHIBIT 1


LOCATION MAP
NORTH
PANOCHE
FAIRFAX
SUBJECT PROPERTY
PROPOSED POWER GENERATION FACILITY
MANNING
PANOCHE
RUSSELL
5
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E
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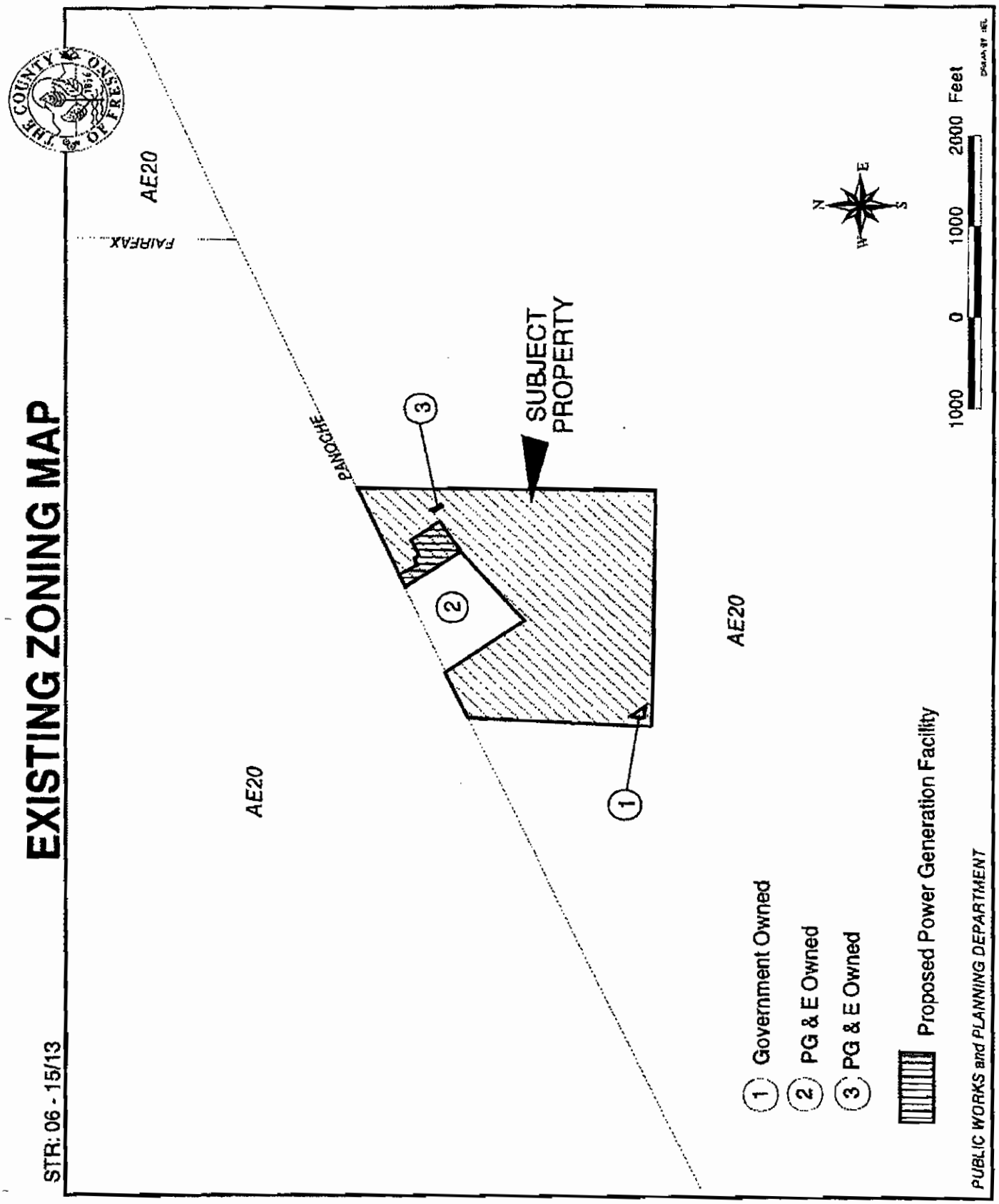
1
1.5
2 Miles
Prepared by: County of Fresno Public Works and Planning Department (ELA)/32

EXHIBIT 2


EXISTING ZONING MAP
STR: 06 - 15/13
THE COUNTY OF FRESNO
AE20
FAIRFAX
PANOCHE
SUBJECT PROPERTY
AE20
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E
S
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1 Government Owned
2 PG & E Owned
3 PG & E Owned
Proposed Power Generation Facility
PUBLIC WORKS and PLANNING DEPARTMENT

EXHIBIT 3

EXISTING LAND USE MAP

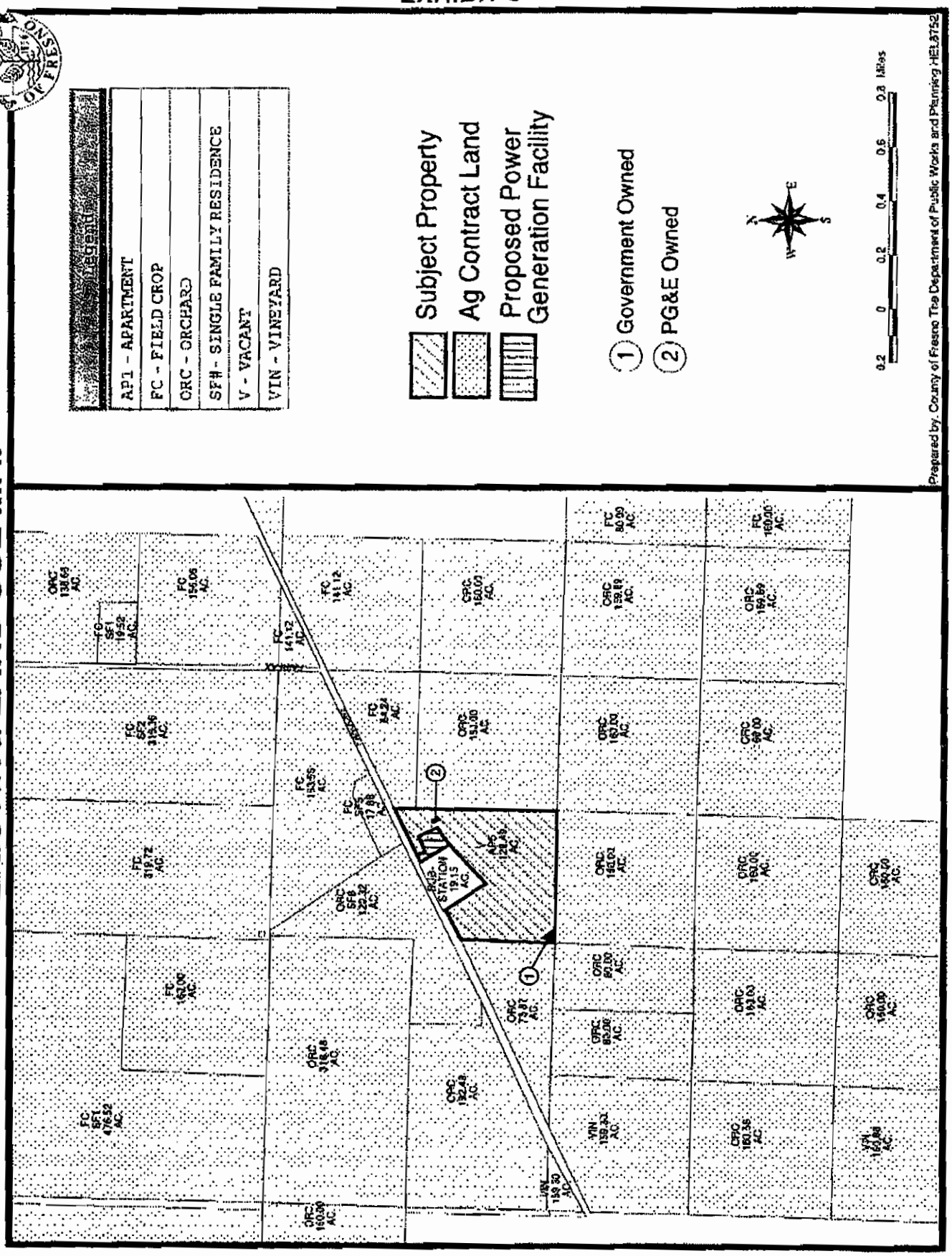


EXHIBIT 4

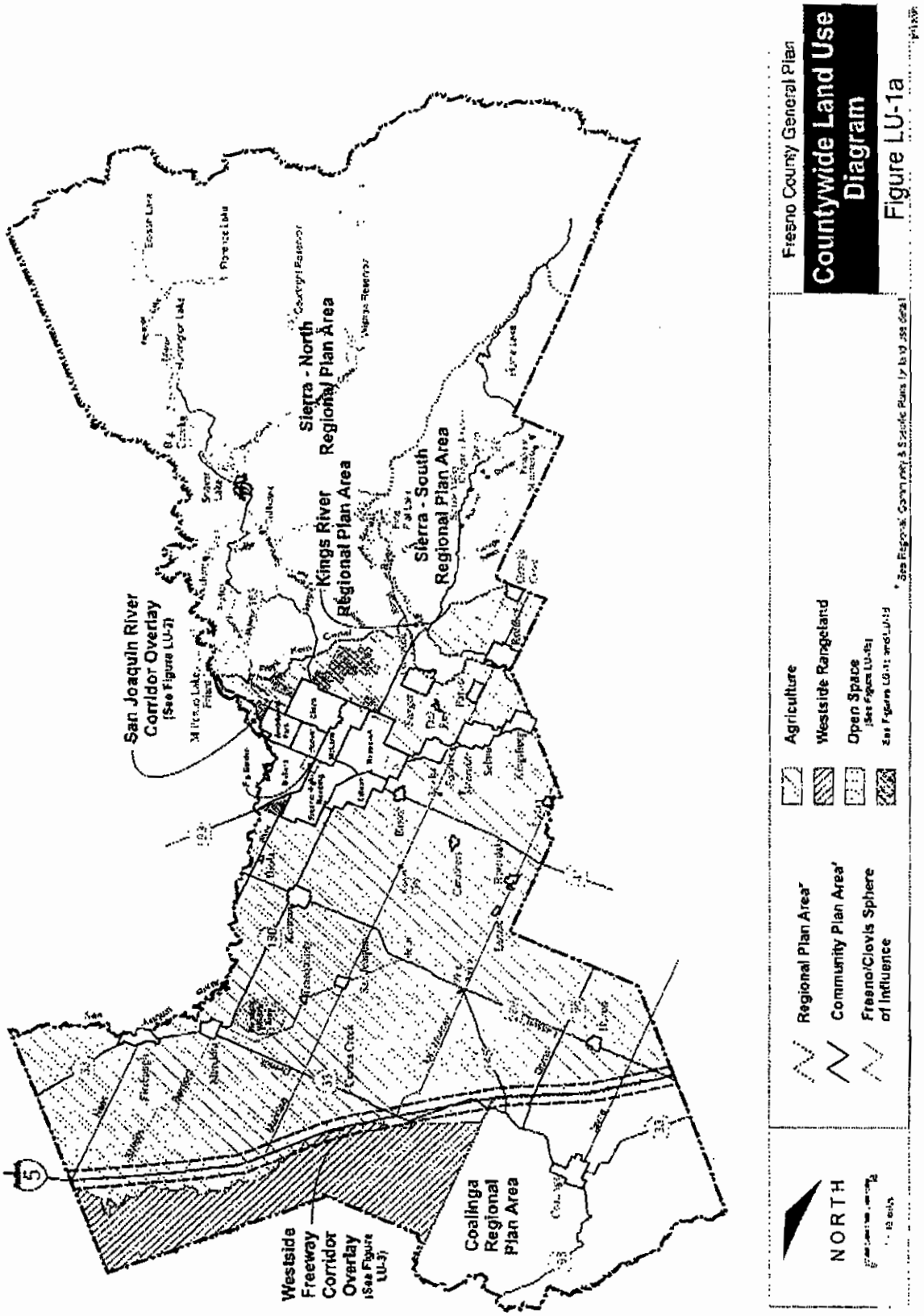

Fresno County General Plan
Countywide Land Use Diagram
Figure LU-1a
Regional Plan Area*
Community Plan Area*
Fresno/Clovis Sphere of Influence
Agriculture
Westside Rangeland
Open Space
NORTH
San Joaquin River Corridor Overlay (See Figure LU-2)
Sierra - North Regional Plan Area
Kings River Regional Plan Area
Sierra - South Regional Plan Area
Westside Freeway Corridor Overlay (See Figure LU-3)
Coalinga Regional Plan Area

EXHIBIT 5

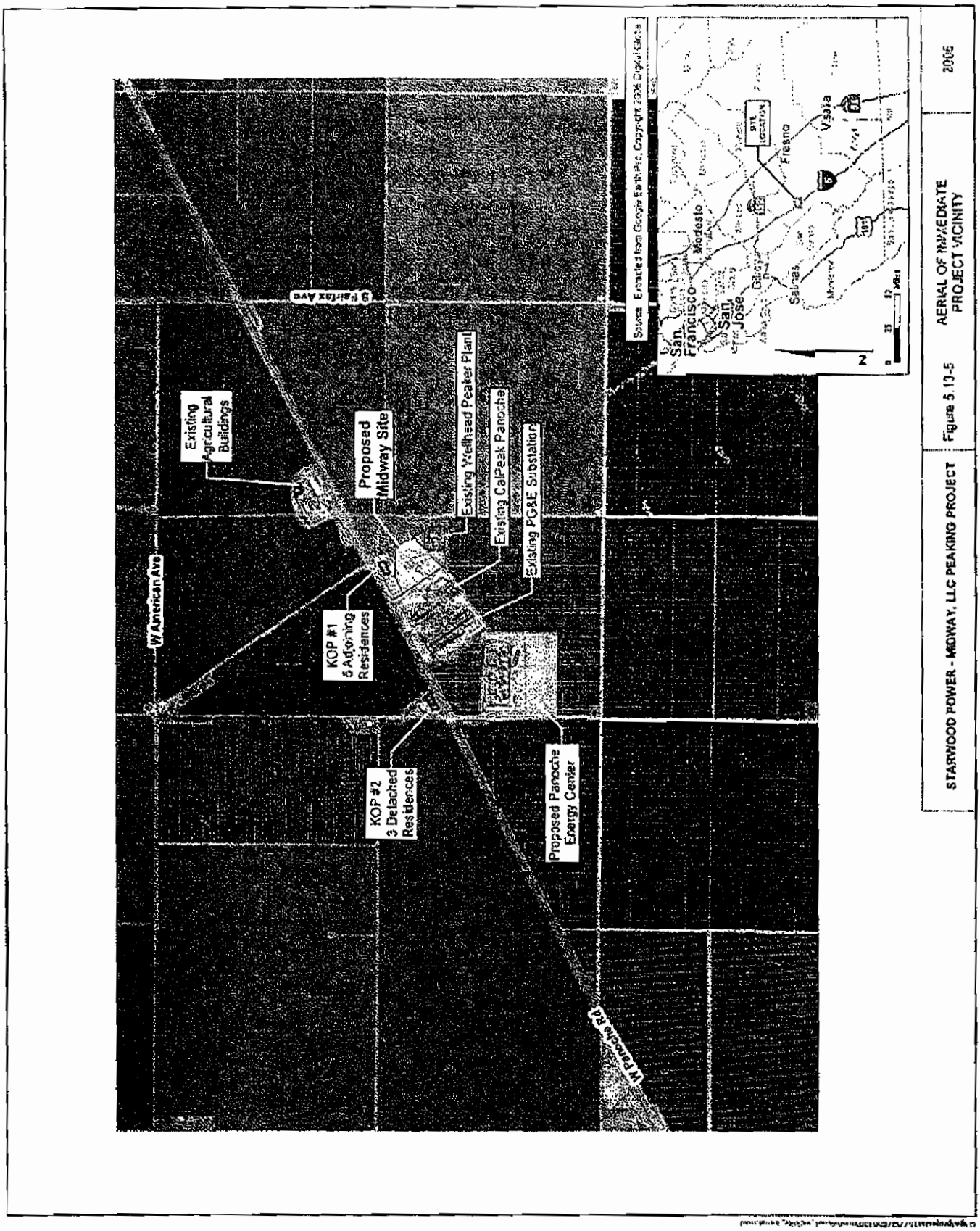
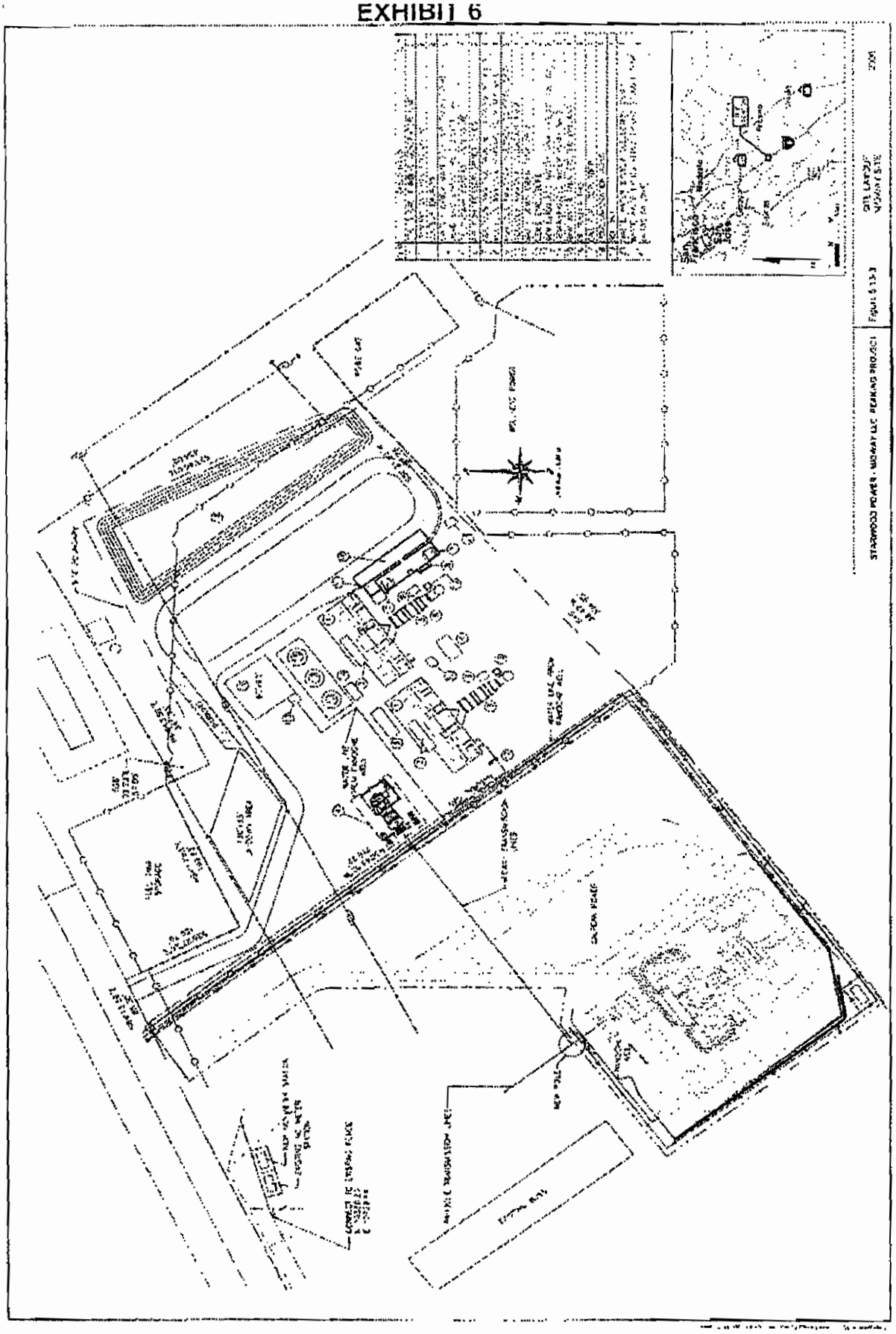

Existing Agricultural Buildings
Proposed Midway Site
Existing Wellhead Peaker Plant
Existing CalPeak Panoche
Existing PG&E Substation
KOP #1 5 Adjoining Residences
KOP #2 3 Detached Residences
Proposed Panoche Energy Center
W American Ave
S Fairfax Ave
W Panoche Rd
San Francisco
San Jose
Modesto
Fresno
Visalia
Salinas
SITE LOCATION
Source: Extracted from Google Earth Pro, Copyright 2006 DigitalGlobe
STARWOOD POWER - MIDWAY, LLC PEAKING PROJECT
Figure 5.13-5
AERIAL OF IMMEDIATE PROJECT VICINITY
2006

EXHIBIT 6



BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE *STARWOOD POWER PLANT*	**Docket No. 06-AFC-10** **PROOF OF SERVICE** **(Revised 3/16/07)**

INSTRUCTIONS: All parties shall either (1) send an original signed document plus 12 copies or (2) mail one original signed copy AND e-mail the document to the address for the Docket as shown below, AND (3) all parties shall also send a printed or electronic copy of the document, which includes a proof of service declaration to each of the individuals on the proof of service list shown below:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 06-AFC-10
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
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DECLARATION OF SERVICE

I, Amy Gramlich, declare that on August 21, 2007, I sent copies of the attached County of Fresno Letter regarding the General Plan Conformity Application, to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

[signature]

LAND USE APPENDIX 5

Starwood

Land Evaluation Worksheet

Land Capability Classification (LCC) and Storie Index Scores

A	B	C	D	E	F	G	H
Soil Map Unit	Project Acres	Proportion of Project Area	LCC	LCC Rating	LCC Score	Storie Index	Storie Index Score
442	5.6	1	I	100	100	85	85
		1					
Totals	5.6	(Must Sum to 1.0)		***LCC Total Score***	100	***Storie Index Total Score***	85

Panoche Clan Loam 0-2% slopes
Clan I soil
5.4-2 in AFC

Site Assessment Worksheet 1.

Project Size Score

I	J	K
LCC Class I - II	LCC Class III	LCC Class IV - VIII
5.6		
Total Acres 5.6		
Project Size Scores 0		

Highest Project Size Score 0

Site Assessment Worksheet 3.

Surrounding Agricultural Land and Surrounding Protected Resource Land

A	B	C	D	E	F	G
Zone of Influence						
Total Acres	Acres in Agriculture	Acres of Protected Resource Land	Percent in Agriculture (A/B)	Percent Protected Resource Land (A/C)	Surrounding Agricultural Land Score (From Table)	Surrounding Protected Resource Land Score (From Table)
5.6	0	995	100	100	100	100

Wastland Water Dist.

Site Assessment Worksheet 2. - Water Resources Availability

A	B	C	D	E
Project Portion	Water Source	Proportion of Project Area	Water Availability Score	Weighted Availability Score (C x D)
1	non-irrigated	1	90	90
2				
3				
4				
5				
6				
		(Must Sum to 1.0)	***Total Water Resource Score***	90

NOTES

Final LESA Score Sheet

Calculation of the Final LESA Score:

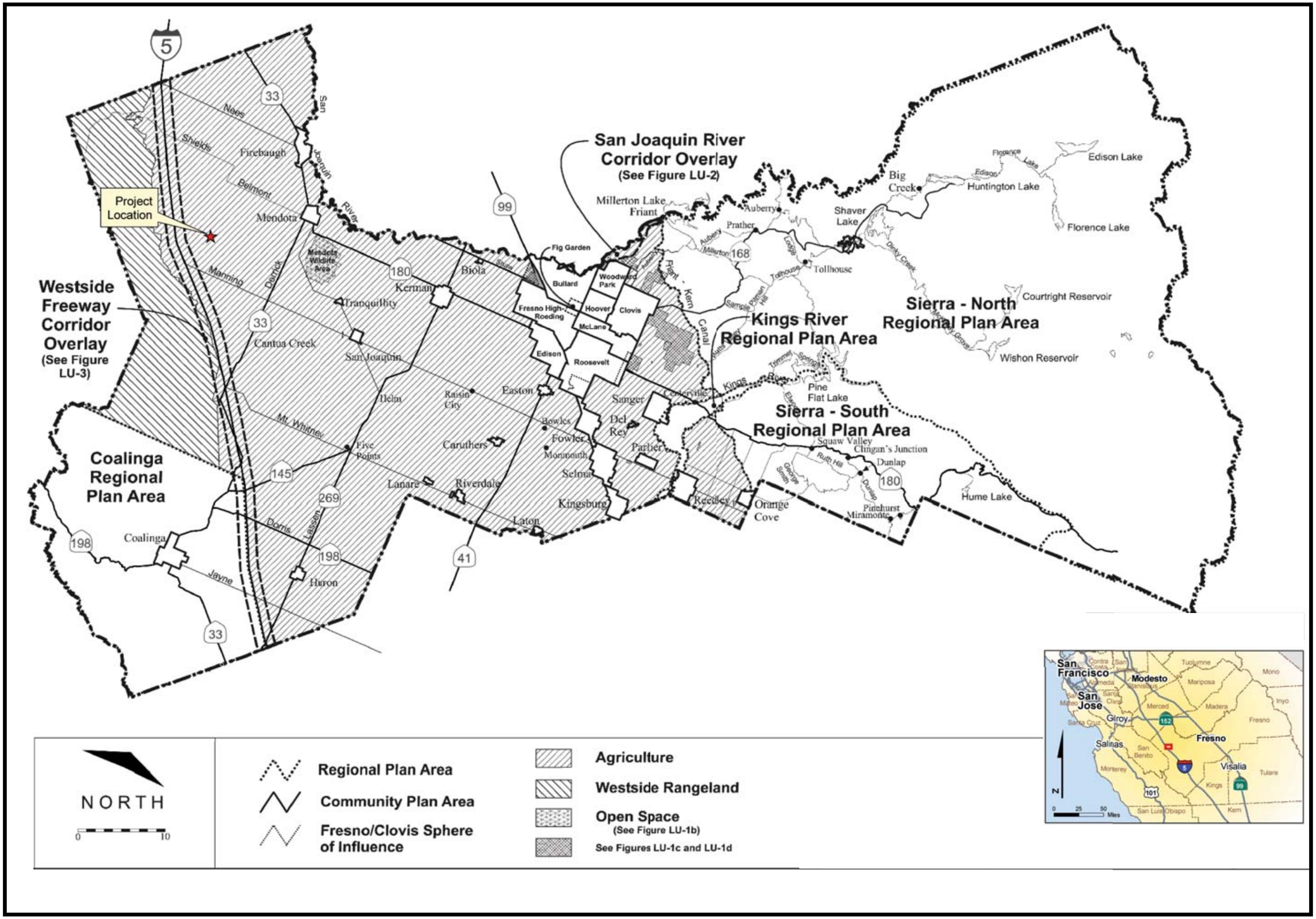
(1) Multiply each factor score by the factor weight to determine the weighted score and enter in Weighted Factor Scores column.
(2) Sum the weighted factor scores for the LE factors to determine the total LE score for the project.
(3) Sum the weighted factor scores for the SA factors to determine the total SA score for the project.
(4) Sum the total LE and SA scores to determine the Final LESA Score for the project.

	Factor Scores	Factor Weight	Weighted Factor Scores
LE Factors			
Land Capability Classification	<1> 100	0.25	25
Storie Index	<2> 85	0.25	21.25
LE Subtotal		***0.50***	
SA Factors			
Project Size	<3> 0	0.15	0
Water Resource Availability	<4> 90	0.15	13.5
Surrounding Agricultural Land	<5> 100	0.15	15.0
Protected Resource Land	<6> 100	0.05	5.0
SA Subtotal		***0.50***	
		Final LESA Score	79.75

For further information on the scoring thresholds under the California Agricultural LESA Model, consult Section 4 of the Instruction Manual.

LAND USE - FIGURE 1

Starwood Power Project - General Plan Designations

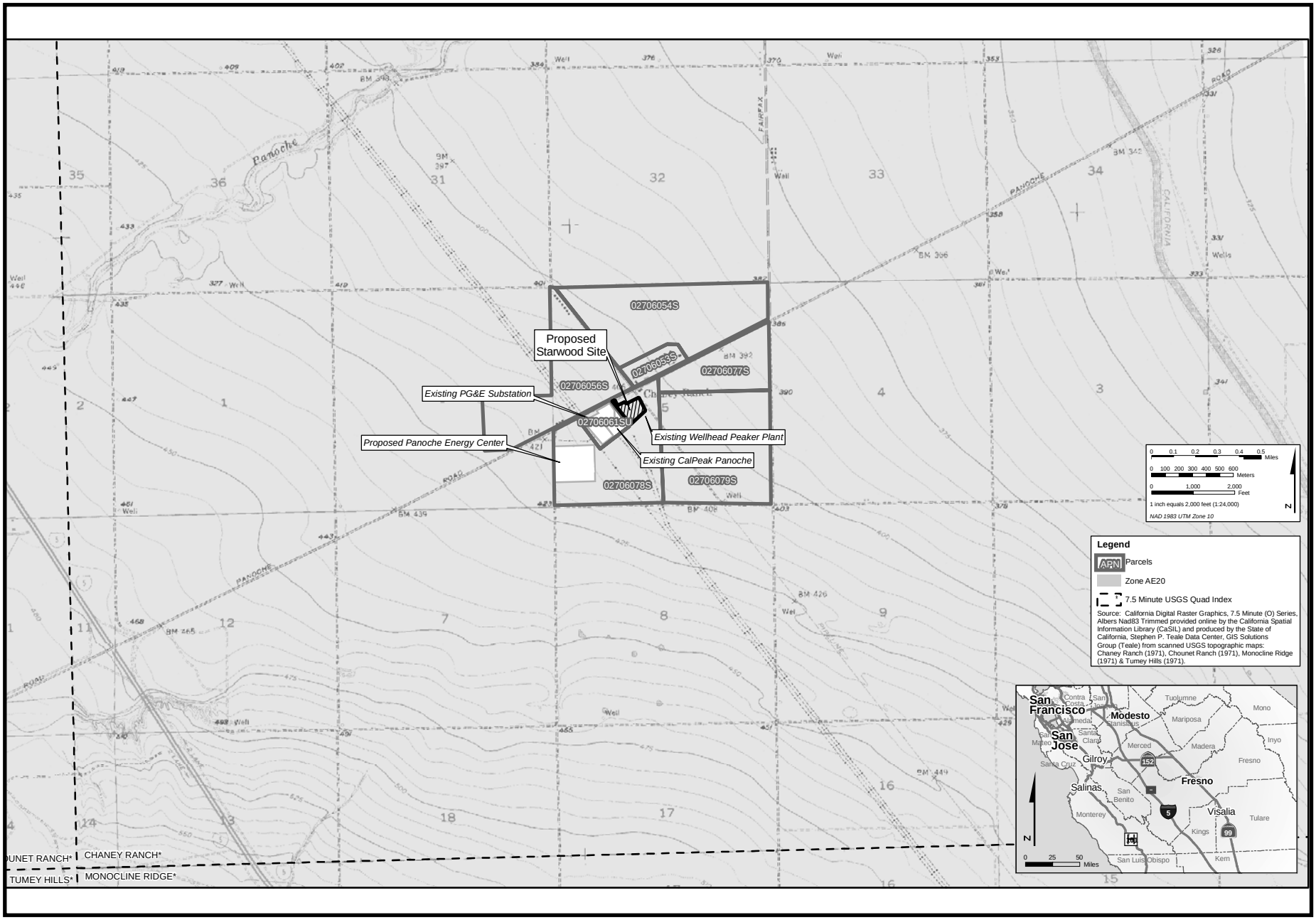


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 5.9-1

LAND USE - FIGURE 2

Starwood Power Project - Zoning Designations Surrounding Project Site



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 5.9-2

NOISE AND VIBRATION

Testimony of Shahab Khoshmashrab and Steve Baker

SUMMARY OF CONCLUSIONS

The Starwood Power Project, if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration laws, ordinances, regulations, and standards, and would produce no significant adverse noise impacts on people within the affected area including the minority population, either direct or cumulative.

INTRODUCTION

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

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

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

NOISE Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Occupational Safety & Health Act (OSHA): 29 USC § 651 et seq	Protects workers from the effects of occupational noise exposure.
U.S. Environmental Protection Agency Guidelines	Assists state and local government entities in development of state and local LORS for noise.
State	
California Occupational Safety and Health Act (Cal-OSHA): 29 USC § 651 et seq, Cal Code Regs, Title 8, §§ 5095-5099	Protects workers from the effects of occupational noise exposure.
Local	
Fresno County General Plan, Noise Element	Refers to the County of Fresno ordinance code for noise limits.
Fresno County Ordinance Code, Noise Control, section 8.40.040	Sets sound level limits at residences and outdoor activity areas.
Fresno County Ordinance Code, Noise Control, section 8.40.060	Restricts the hours of construction activities.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (29 USC § 651 et seq.), the US Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations (29 CFR § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **Noise Appendix A, Noise Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

Guidelines are available from the US Environmental Protection Agency to assist state and local government entities in development of state and local LORS for noise. Because there are existing local LORS that apply to this project, the US Environmental Protection Agency guidelines are not applicable.

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

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

STATE

California Government Code section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its general plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

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

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

LOCAL

Noise Element of the Fresno County General Plan

The SPP is located in an unincorporated area of western Fresno County. The noise element of the Fresno County General Plan (County 2006a) applies to the project. Policy HS-G.4 of this element requires an acoustical analysis where a proposed project is likely to produce noise levels in excess of the County's Ordinance Code at noise-sensitive locations (URS 2006a, section 5.12.2.3.1, Table 5.12-4). Policy HS-G.6 of this element states that the county shall regulate construction-related noise to reduce impacts on adjacent communities in accordance with the County's Ordinance Code.

According to this element, an exterior noise level of up to 60 dBA CNEL is compatible with residential land uses. (CNEL is the average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.) Because of the weighting and averaging nature of the CNEL, a constant noise source such as a power plant produces a CNEL approximately 7 dBA higher than its L_{eq}. Therefore, exterior noise levels produced by the SPP to levels up to 53 dBA L_{eq}

are compatible with residential land uses in the project area. This analysis requires the project to meet the more stringent requirement of the applicable local noise LORS, the County's Ordinance Code, as shown below.

Fresno County Ordinance Code

Chapter 8.40, Noise Ordinance, of the Fresno County Code (County 2006b) also applies to the SPP. Section 8.40.040 of this ordinance limits exterior noise levels from any stationary on-site or non-transportation noise source at any affected single- or multiple-family residence, school, hospital, church, or public library. These limits are summarized in **Noise Table 2** below.

NOISE Table 2
Exterior Noise Standards

Category	Cumulative Number of Minutes in any One-hour Time Period	Maximum Allowable Noise Level in dBA Daytime (7 a.m. to 10 p.m.)	Maximum Allowable Noise Level in dBA Nighttime (10 p.m. to 7 a.m.)
1	30	50	45
2	15	55	50
3	5	60	55
4	1	65	60
5	0	70	65

As seen above, this ordinance prohibits a project from producing a nighttime exterior sound level at any residence in excess of 45 dBA for more than 30 minutes in any one-hour period, or 45 dBA L_{50}. This is the lowest level, and thus, the most stringent requirement in the above table. The SPP operational noise levels shall meet this requirement at the most noise-sensitive residential receptors in the project vicinity (see below for the locations of these receptors).

Section 8.40.060 of this ordinance restricts construction activities to the hours between 6:00 a.m. and 9:00 p.m. on any day except Saturdays and Sundays, and between 7:00 a.m. and 5:00 p.m. on Saturdays and Sundays.

Staff uses these standards to evaluate the project noise impact from the operation and construction of the SPP.

SETTING

The proposed power plant will be built on a 5.6-acre parcel, located in an unincorporated area of western Fresno County, approximately 15 miles southwest of the city of Mendota. This site is zoned AE-20, Exclusive Agriculture District (see **Noise Figure 1**). Surrounding land uses are generally agricultural, with some residential use. The predominant noise sources in the area include vehicular noise from automobiles and agricultural equipment and industrial noise from mechanical equipment and

processes at the existing CalPeak Power Project, Wellhead Peaker Plant and Pacific Gas & Electric (PG&E) substation (URS 2006a, section 5.12.1.2).

Sensitive residential properties in the vicinity of the project include structures located north, northeast, and west of the site. The residential building north of the site is a multiplex with five units. This building (near ambient noise monitoring location ML1) is located approximately 460 feet from the center of the SPP. There are three single-family residential structures to the west of the site, in a row from east to west. The center building is inhabited; the other two appear to be uninhabitable. These buildings are near ambient noise monitoring location ML2 and are approximately 1,600 feet from the center of the SPP. There is a single-family residential structure to the northeast (near ambient noise monitoring location ML3), located approximately 1,300 feet from the center of the site.

For purposes of evaluating impacts on residential uses, the project noise is compared to the measured nighttime ambient noise levels, when residents are trying to sleep.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal Code Regs, tit 14, App G) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

- exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying bullet 3 above to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background at the nearest sensitive receptor by 5 dBA or more, including those receptors that are considered minority population (as identified in **Socioeconomics Figure 1**).

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA is

significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant depending on the particular circumstances of a case.

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

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

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

- the construction activity is temporary;
- use of heavy equipment and noisy activities is limited to daytime hours; and
- all industry-standard noise abatement measures are implemented for noise-producing equipment.

Staff uses the above method and threshold to protect the most sensitive populations including the minority population.

Ambient Noise Monitoring

To establish a baseline for comparison of predicted project noise to existing ambient noise, the applicant has presented the results of an ambient noise survey (URS 2006a, section 5.12.1.2, Tables 5.12-2, 5.12-3, Figure 5.12-1). This survey was performed on Monday, June 19, through Tuesday, June 20, 2006, using acceptable equipment and techniques. The noise survey monitored existing noise levels at the following three locations, shown on **Noise Figure 2**:

- Location ML1: This location is approximately 460 feet from the project site and represents the five-unit multiplex north of the site. It was monitored continuously from 1:00 p.m. on June 19 through 2:00 p.m. on June 20.
- Location ML2: This location is approximately 1,600 feet from the project site and represents the three single-family residential structures west of the site. It was monitored on June 19 from 2:00 p.m. to 3:00 p.m. and from 9:05 p.m. to 10:00 p.m., and on June 20 from 12:35 a.m. to 1:35 a.m.
- Location ML3: This location is approximately 1,300 feet from the project site and represents the single-family residential structure northeast of the site. This location

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

was monitored on June 19 from 3:30 p.m. to 4:30 p.m. and from 7:00 p.m. to 8:00 p.m., and on June 20 from 1:40 a.m. to 2:40 a.m.

As described above, the noise environment in the vicinity of the project site is dominated by vehicular traffic and industrial noise sources.

Noise Table 3 summarizes the ambient noise measurements (URS 2006a, section 5.12.1.2, Tables 5.12-2, 5.12-3).

NOISE Table 3
Summary of Measured Noise Levels

Measurement Sites	Measured Noise Levels, dBA		
	Average During Nighttime Hours		
	L_{eq}	L_{50}	L_{90}
ML1, five-unit multiplex to the north of the project site	50[1]	44[1]	42[1]
ML2, three single-family residential structures to the west of the project site	41[2]	41[2]	39[2]
ML3, single-family residential structure to the northeast of the project site	47[2]	41[2]	41[2]

Source: URS 2006a, sec 5.12.1.2, Tables 5.12-2, 5.12-3
[1.] Staff's calculations of average of four quietest consecutive hours of the nighttime
[2.] Results of the hourly measurements between midnight and 2:40 a.m.

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities, and by normal long-term operation of the power plant.

Construction Impacts and Mitigation

Construction noise is usually considered a temporary phenomenon. Construction of the SPP is expected to be typical of other power plants in terms of schedule, equipment used, and other types of activities.

Compliance with Laws, Ordinances, Regulations, and Standards

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. To allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances.

Sound levels of typical construction equipment range from approximately 65 dBA to 95 dBA at 50 feet from the source, with an average of 89 dBA at 50 feet during the noisiest activities. Based on this reference noise level for the noisiest activities, the applicant has predicted construction noise levels at the three noise monitoring locations. They are summarized here in **Noise Table 4**.

NOISE Table 4
Predicted Construction Noise Levels

Receptor/Distance	Highest Estimated Construction Noise Level (dBA) [1]	Measured Existing Ambient, Average Daytime L_{eq} (dBA) [2]	Cumulative (Combined)	Change
ML1/460 feet	70	63	71	+8
ML2/1,600 feet	58	46	58	+12
ML3/1,300 feet	60	55	61	+6

Sources: [1] URS 2006a, Table 5.12-6
[2] URS 2006a, Tables 5.12-2, 5.12-3; and staff's calculations

The applicable local noise LORS do not limit the loudness of construction noise, but staff compares the projected noise levels to ambient noise levels. Since construction noise typically varies continually with time, it is most appropriately measured by, and compared to, the L_{eq} (energy average) metric. As seen in **Noise Table 4** above, construction noise at the residential units near monitoring location ML1 may reach 70 dBA. The ambient daytime L_{eq} level at this location, as seen in **Noise Table 4**, is 63 dBA. The addition of the highest construction noise to the ambient would result in 71 dBA, an increase of 8 dBA over the ambient level. As described above (in **Method and Threshold for Determining Significance**), staff regards an increase of up to 5 dBA as a less than significant impact. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant depending on the particular circumstances of a case, such as the duration and frequency of the noise, the resulting noise level, and land use designation of the affected receptor. The applicant and the landowner of the five-unit multiplex have signed an agreement to relocate the current occupants to a more distant location prior to start of noisy construction activities (URS 2006a, sections 5.9.3, 5.12.5.1). To ensure that the relocation of these residents will occur, staff proposes Condition of Certification **NOISE-5**. Also, as required by proposed Condition of Certification **NOISE-7**, construction activities will be limited to daytime hours. In the event that actual construction noise should annoy nearby workers or residents, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a noise complaint process that requires the applicant to resolve any problems caused by construction noise.

As seen in **Noise Table 4**, the ambient daytime L_{eq} noise level at ML2, or 46 dBA, when added to the highest construction noise at this location, or 58 dBA, results in 58 dBA L_{eq}, an increase of 12 dBA over the existing ambient level. As described above (in **Method and Threshold for Determining Significance**), staff considers an increase of more than 10 dBA to be significant. Panoche Energy Center, LLC recently filed an application for certification with the California Energy Commission to construct and operate the Panoche Energy Center (PEC). The center of the PEC site would be approximately 800 feet from ML2. The PEC applicant has signed an agreement with the

landowner of the residence at ML2 to relocate the residents to a location that is approximately 4,000 feet north of the PEC site prior to start of the PEC's construction activities (PEC 2007d, data responses 69 and 70). Construction of the PEC is scheduled to begin ahead of the SPP's construction. So, at the time construction of SPP begins, ML2 will likely be unoccupied. At the new location, the above projected construction noise level would be substantially lower, about 50 dBA. This level would not likely create annoyance. However, because relocating the residents at ML2 would be done by the PEC applicant and because the following conditions of certification apply only to the SPP project, this analysis cannot require the relocation. It can, however, require that the applicant ensure the project's construction noise levels create less than significant impacts at the noise-sensitive receptors. Thus, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a noise complaint process to resolve any complaints regarding construction noise. Also, the construction activities will be temporary and use of heavy equipment and noisy activities will be limited to daytime hours. Therefore, this impact will likely create less annoyance than expected.

As seen in **Noise Table 4**, the ambient daytime L_{eq} level at ML3, or 55 dBA, when added to the highest construction noise at this location, or 60 dBA, results in 61 dBA L_{eq}, an increase of 6 dBA over the existing ambient level. This increase is noticeable and can potentially cause annoyance. Staff's proposed Conditions of Certification **NOISE-1**, **NOISE-2**, and **NOISE-7** ensure that the construction noise would not cause annoyance at ML3.

The applicant commits to performing noisy construction work during the daytime hours between 6:00 a.m. and 9:00 p.m. on any day except Saturdays and Sundays, and between 7:00 a.m. and 5:00 p.m. on Saturdays and Sundays (URS 2006a, section 5.12.5.1). This would be in compliance with the noise ordinance of the Fresno County Code (see Condition of Certification **NOISE-7**).

If the applicant complies with the conditions of certification below, the noise impacts of SPP construction activities will comply with the noise LORS and no further construction mitigation measures are necessary. For the evaluation of the impacts from pile driving activities, see below.

California Environmental Quality Act Impacts

As explained above, increases in the ambient noise levels resulting from construction activities would be mitigated to acceptable levels, construction noise is temporary in nature, and construction activities will occur during daytime hours. Staff thus concludes that project construction will create less than significant adverse impacts at these receptors. To ensure this, staff proposes Conditions of Certification NOISE-1 and NOISE-2, which would establish a noise complaint process to resolve any complaints regarding construction noise, and Condition of Certification **NOISE-7**, which would limit construction activities to daytime hours.

Linear Facilities

New offsite linear facilities associated with SPP construction would include approximately 200 feet of gas pipeline and a gas metering set, which will tap into the PG&E gas line, a 300-foot electric transmission line to tie into the PG&E Substation,

and a 1,200-foot underground water pipeline connecting the project to the existing CalPeak plant well (URS 2006a, sections 1.2.3, 1.2.5, 3.4.1, 3.4.4).

Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than two or three days. Further, the noise ordinance of the Fresno County Code limits the hours of construction to daytime hours. The applicant has committed to complying with this requirement (URS 2006a, section 5.12.5.1). To ensure compliance with these limitations and the remaining applicable restrictions, staff proposes Condition of Certification **NOISE-7**.

Pile Driving

It is anticipated that pile driving will be required for construction of the SPP. The applicant has predicted noise levels from pile driving at the three noise monitoring locations. They are summarized here in **Noise Table 5**.

NOISE Table 5
Predicted Pile Driving Noise Levels

Receptor/Distance	Measured Existing Ambient, Average Daytime L_{eq} (dBA) [1]	Estimated Pile Driving Noise Level (dBA L_{eq}) [2]
ML1/460 feet	63	81
ML2/1,600 feet	46	69
ML3/1,300 feet	55	71

Sources: [1] URS 2006a, Tables 5.12-2, 5.12-3; and staff's calculations
[2] URS 2006a, Table 5.12-6

As seen in this table, the predicted noise level from pile driving could reach 81 dBA L_{eq} at ML1. However, as described above, residents will be moved and no further mitigation will be necessary. To ensure the relocation, staff proposes Condition of Certification **NOISE-5**.

The above **Noise Table 5** shows the estimated pile driving noise levels of 69 dBA L_{eq} and 71 dBA L_{eq} at ML2 and ML3, respectively. These levels are high and can cause annoyance at the above receptors. Therefore, staff recommends that pile driving be performed using a quieter process. Staff has identified several commercially available technologies that reduce pile driving noise by 20 to 40 dBA compared to traditional pile driving techniques. These include padded hammers, “Hush” noise-attenuating enclosures, vibratory drivers, and hydraulic techniques that press the piles into the ground instead of hammering them (Eaton 2000, Gill 1983, Ken-Jet, Kessler & Schomer 1980, NCT, WOMA 1999, Yap 1987). To ensure that pile driving noise will not cause annoyance, staff proposes Conditions of Certification **NOISE-7** and **NOISE-8**.

Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving. ML1 is relatively close to the project site (460 feet) but not close enough to be significantly impacted by vibration. In addition, residents at this location will be moved prior to start of construction. At the distances of 1,600 feet at ML2 and 1,300 feet at ML3, pile driving vibration will be insignificant.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards, and has recognized those applicable LORS that would protect construction workers (URS 2006a, Table 5.12-4, sections 5.12.2.2, 5.12.2.2.2). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**.

Operation Impacts and Mitigation

The primary noise sources of the SPP during operational activities include the gas turbine generators, gas turbine air inlets, exhaust stacks, air compressors, electrical transformers, selective catalytic reduction duct walls, and various pumps and fans. Staff compares the projected SPP noise with applicable LORS, in this case, the noise ordinance of the Fresno County Code (County 2006b). In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project to identify any significant adverse impacts.

Proposed noise mitigation measures include the following (URS 2006a, section 5.12.5.2; URS 2007b, data response 50):

- noise barriers;
- acoustical enclosures;
- upgraded exhaust stack or air inlet silencers;
- building sound insulation treatments (in conjunction with other methods); and
- power plant operational controls.

In addition, the creation of annoying tonal (pure-tone) noises will be avoided by balancing the noise emissions of various power plant features during plant design.

Compliance with Laws, Ordinances, Regulations, and Standards

The applicant performed noise modeling to determine the project's operational noise impacts on sensitive receptors (URS 2006a, section 5.12.3.4, Table 5.12-8). Project operating noise is predicted to be 55 dBA at monitoring location ML1 (the multiplex north of the project site), 42 dBA at monitoring location ML2 (the residential receptor west of the project site), and 44 dBA at monitoring location ML3 (the single-family residential receptor northeast of the project site).

For residential receptors staff compares nighttime levels, when people are sleeping and more likely to be bothered by excessive noise. As explained above, the noise ordinance of the Fresno County Code (County 2006b) establishes the noise limits shown in **Noise**

Table 2 above. Staff uses the lowest of these limits, or 45 dBA L_{50}, to evaluate the project's noise impact at the above receptors.

The predicted project noise level at ML1, or 55 dBA, when combined with the average ambient noise level of the four quietest consecutive hours of the nighttime at this location, or 44 dBA L_{50} (see **Noise Table 3**), would result in 55 dBA L_{50}. This is 10 dBA above the LORS limit of 45 dBA L_{50} and thus violates county code. As explained above, the applicant has signed an agreement to relocate the current residents to a more distant location (URS 2006a, sections 5.9.3, 5.12.5.1). To ensure that the relocation of these residents will occur and the project noise level at this new location will comply with the LORS, staff proposes Condition of Certification **NOISE-5**. If the applicant relocates the residents to a location within one mile of the SPP project site, the SPP shall perform a noise monitoring survey during its operation at the new location. Staff chooses the one-mile zone because beyond that distance the power plant would likely be inaudible. If the survey indicates noncompliance with the noise LORS or significant impact at the new location, the SPP shall implement additional mitigation measures in order to bring the noise level into compliance (see Condition of Certification **NOISE-5** below).

The applicant has stated that after the construction and commissioning of the project, the project owner may wish to reevaluate the operational noise impact at ML1 and convert the five-unit multiplex back to a residential use if the project owner can demonstrate compliance with the LORS (URS 2007b, data response 50). To ensure the applicant will comply with the above noise LORS, Condition of Certification **NOISE-5** requires the project owner to conduct a community noise survey at ML1 after the start of operations if it wishes to convert the multiplex back to a residential use. The condition further requires implementing any additional mitigation measures necessary to reduce the noise in order to comply with the LORS and CEQA requirements at ML1.

The predicted project noise level at ML2, or 42 dBA, when combined with the nighttime ambient level of 41 dBA L_{50} (see **Noise Table 3** above), would result in 45 dBA L_{50}, which is in compliance with the LORS limit of 45 dBA L_{50}. The predicted project noise level at ML3, or 44 dBA, when combined with the nighttime ambient level of 41 dBA L_{50} at this location (see **Noise Table 3** above), would result in 46 dBA L_{50}. This is 1 dBA above the LORS limit. A 1 dBA increase is not audible and thus, staff considers the project's operational noise at ML3 to be in compliance with the LORS requirement. To ensure the applicant will comply with the above noise LORS, staff proposes Condition of Certification **NOISE-4**.

Staff concludes that the project operational noise levels at the most sensitive residential receptors will be in compliance with the noise ordinance of the Fresno County Code. To ensure compliance, staff also proposes Conditions of Certification **NOISE-1** and **NOISE-2**.

California Environmental Quality Act Impacts

Power plant noise is unique. A power plant operates essentially as a steady, continuous, broadband noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent

noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff typically compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or remove the impact.

In most cases, a power plant will be intended to operate around the clock for much of the year. Nighttime operation of a peaking power plant such as the SPP, though rare, could occasionally occur, which could annoy nearby residents. For residential receptors, staff evaluates project noise emissions by comparing them to the nighttime ambient background level; this assumes that the potential for annoyance due to power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than daytime levels; differences in background noise levels of 5 to 10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise level values to arrive at a reasonable baseline for comparison with the project's predicted noise level.

Adverse impacts, as defined in CEQA, can be detected by comparing predicted power plant noise levels to the ambient nighttime background noise levels at the nearest sensitive residential receptors (ML1, ML2, and ML3).

Combining the ambient noise level of 42 dBA L_{90} (**Noise Table 3** above) with the project noise level of 55 dBA at ML1 will result in 55 dBA L_{90}, 13 dBA above ambient. As described above (in **Method and Threshold for Determining Significance**), staff considers an increase of more than 10 dBA to be significant. As explained above, the applicant has signed an agreement to relocate the residents at this location. As such, this location will no longer be considered a sensitive receptor. Therefore, staff considers the project operational noise impact at ML1 to be less than significant. To ensure the relocation will occur and the project will not create significant adverse noise impact at the new location, staff proposes Condition of Certification **NOISE-5**.

Combining the ambient noise level of 39 dBA L_{90} (**Noise Table 3** above) with the project noise level of 42 dBA at ML2 will result in 44 dBA L_{90}, 5 dBA above the ambient. Staff typically considers the impact of 5 dBA increase in the ambient noise level to be less than significant.

Combining the ambient noise level of 41 dBA L_{90} (**Noise Table 3** above) with the project noise level of 44 dBA at ML3 will result in 46 dBA L_{90}, 5 dBA above the ambient. This increase is considered less than significant.

Staff thus concludes that project operation will create less than significant adverse impacts at the most noise-sensitive receptors. Staff has considered the minority population (as identified in **Socioeconomics Figure 1**) in its impact analysis and concludes that with the following proposed mitigation measures there are no potential significant adverse impacts, and therefore, there are no environmental justice issues.

Tonal Noises

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels,

stand out in sound quality. The applicant plans to address overall noise in design, and to take appropriate measures, as necessary, to eliminate tonal noises as possible sources of annoyance (URS 2006a, section 5.12.3.3.). To ensure that tonal noises do not cause annoyance, staff proposes Conditions of Certification **NOISE-4** and **NOISE-5**.

Linear Facilities

All water and gas piping will lie underground, and will be silent during operation. Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line and will thus be inaudible to any receptors (see **Transmission Line Safety And Nuisance** for further discussion).

Vibration

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

The operating components of a simple cycle power plant consist of high-speed gas turbines, compressors, and various pumps. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Gas turbine generator facilities using the FT8 machine have not resulted in ground-borne or airborne vibration impacts. Staff believes that the noise-sensitive receptors are not close enough to the project site to be affected by ground-borne vibration from the project equipment.

Airborne vibration (low-frequency noise) can rattle windows and objects on shelves, and can rattle the walls of lightweight structures. The SPP's chief source of airborne vibration would be the gas turbines' exhaust. In a power plant such as the SPP, however, the exhaust must pass through the selective catalytic reduction modules and the stack silencers before it reaches the atmosphere. The SCRs act as efficient mufflers; the combination of SCR units and stack silencers makes it highly unlikely that the SPP would cause perceptible airborne vibration effects.

Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance workers from noise hazards, and has committed to comply with applicable LORS (URS 2006a, Table 5.12-4, sections 5.12.2.2, 5.12.2.2.2). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. To ensure that plant operation and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-6**.

CUMULATIVE IMPACTS AND MITIGATION

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

As described above, the proposed 400 MW PEC would be located west/southwest of the SPP. It would be approximately 1,900 feet from ML1, about 800 feet from ML2, and approximately 3,300 feet from ML3 (PEC 2006a, section 5.12.1.2, Table 5.12-5). The SPP, in combination with the PEC project, will result in increases in the project area ambient noise. **Noise Table 6** below shows estimated noise levels from the individual operations of the two projects and their cumulative noise impacts at these monitoring locations during the nighttime hours.

NOISE Table 6
Cumulative Noise Impact (SPP plus PEC)

Receptor	Measured Ambient During Nighttime Hours, dBA L_{90}	SPP Generated Noise Level, dBA	PEC Generated Noise Level, dBA	Cumulative, dBA L_{90}	Change
ML1	42[1]	55	51	56	+14
ML2	39[2]	42	58	58	+19
ML3	41[2]	44	40	46	+5

Sources: URS 2006a, section 5.12.3.4, Table 5.12-8; PEC 2006a, section 5.12.1.2, Tables 5.12-2, 5.12-3
1. Staff's calculations of average of four quietest consecutive hours of the nighttime
2. Results of the hourly measurements between midnight and 2:40 a.m.

As shown in the above table, the cumulative noise would result in a 14 dBA increase in the ambient noise level at ML1. However, as explained above, the current residents at ML1 would be relocated to a new location not near the project site and any necessary noise mitigation measures would be implemented to comply with the above-identified noise LORS. Also, the above cumulative result is based on the assumption that both projects would be operating simultaneously during late night and early morning hours when L_{90} levels are lowest. Both of these are peaker projects and would likely operate mostly during day time. Therefore, it is anticipated that both of the projects would rarely operate simultaneously for long periods of time during nighttime hours. Thus, the above cumulative impact would likely cause less annoyance than expected. To ensure the relocation and compliance with the LORS, staff proposes Condition of Certification **NOISE-5** below.

As shown above, the cumulative noise would result in a 19 dBA increase in the ambient noise level at ML2. However, as explained above, the residents at ML2 would be relocated to approximately 4,000 feet away from the PEC site. At this distance, the cumulative noise level from these two projects would be substantially lower, approximately 45 dBA L_{50} or less (see **Compliance with Laws, Ordinances, Regulations, and Standards** under **Operation Impacts and Mitigation** above). This level of noise is considered tolerable and would not likely create significant impact. Alternatively, if the relocation does not occur, additional mitigation measures would need to be implemented to mitigate the impact to an acceptable level. To ensure compliance, staff proposes Condition of Certification **NOISE-4** below. At ML3, an

increase of 5 dBA would result due to the cumulative impact. This increase is noticeable but it is not likely to create annoyance.

Other projects within the vicinity of the SPP include the CalPeak Power Plant and the Wellhead Peaker Project. These are, however, existing projects and their noise impacts have been measured as part of the above existing ambient noise measurements and therefore included in the above cumulative analysis. Staff is not aware of any other projects that, when combined with the SPP, would create significant direct cumulative noise impacts in the project area.

In light of the above proposed mitigation measures and the following proposed conditions of certification, staff believes that it is unlikely that the SPP, combined with other new noise-producing developments, would produce significant cumulative noise impacts. Staff has considered the minority population in its cumulative impact analysis and concludes that with the following proposed mitigation measures there are no potential significant adverse impacts, and therefore, there are no environmental justice issues.

FACILITY CLOSURE

Upon closure of the SPP, all operational noise from the project would cease. , and no further adverse noise impacts from operation of the SPP would be possible. The remaining potential temporary noise source would be the dismantling of the structures and equipment, and any site restoration work that would be performed. Since this noise would be similar to that caused by the original construction, it can be treated similarly. Noisy work would be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS in existence at that time would apply. Applicable conditions of certification included in the Energy Commission decision would also apply unless modified.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The County of Fresno submitted the following comment regarding the project noise. “Section 5.12 of the AFC concludes that no impacts from operational noise were identified at locations ML2 and ML3 utilizing CNEL and L_{eq} measurements. However, these do not directly correlate with the exterior noise standards outlined in the Fresno County Ordinance Code 8.40.040 (County 2006c).”

Staff’s response:

Staff, in this analysis, compares the project noise at all three monitoring locations to the most stringent noise limit of 45 dBA L_{50}, as outlined in the County Ordinance Code 8.40.040 (see the above analysis). Staff concludes that, in light of the mitigation measures proposed above and the following conditions of certification, the SPP would comply with this noise standard.

CONCLUSIONS

The SPP, if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration laws, ordinances, regulations, and standards, and would produce no significant adverse noise impacts on people within the affected area, either direct or cumulative. Staff has considered the minority population (as identified in **Socioeconomics Figure 1**) in its impact analysis and concludes that with the following proposed mitigation measures there are no potential significant adverse impacts, and therefore, there are no environmental justice issues. The applicant has proposed appropriate mitigation, in the form of good design practice and inclusion of necessary project equipment that would avoid any significant adverse impacts.

PROPOSED CONDITIONS OF CERTIFICATION

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

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

NOISE COMPLAINT PROCESS

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

- use the noise complaint resolution form below, or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- attempt to contact the person(s) making the noise complaint within 24 hours;
- conduct an investigation to determine the source of noise related to the complaint;

- if the noise is project related, take all feasible measures to reduce the noise at its source; and
- submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts, and if obtainable, a signed statement by the complainant, stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the noise complaint resolution form with the local jurisdiction and the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated noise complaint resolution form when the mitigation is implemented. The owner may present proof of compliance with established and agreed upon noise limits in lieu of implementing additional noise mitigation elements, when appropriate as determined by the CPM.

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

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

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause noise levels due to plant operation plus ambient, during the four quietest consecutive hours of the nighttime, to exceed an average of 45 dBA L_{50} as measured near monitoring locations ML2 (approximately 1,600 feet west of the center of the project site) should the residents at ML2 not be relocated, and ML3 (43405 West Panoche Road).

No new pure-tone components may be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

- When the project first achieves a sustained output of 90 percent or greater of rated capacity, the project owner shall conduct a short-term nighttime noise survey during every hour of the nighttime hours, from 10 p.m. to 7 a.m. at monitoring location ML3 (or at monitoring location ML2 if the residents at ML2 have not been relocated) or at a closer location acceptable to the CPM. This survey during full load power plant operation shall also include measurement of one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been caused by the project.

The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, closer to the plant (e.g., 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected receptor locations to determine the presence of pure tones or other dominant sources of plant noise.

- If the results from the above noise survey indicate that the power plant noise level plus ambient (L_{50}) at the affected receptor site(s) exceeds the above value during the above specified time periods, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

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

Verification: The survey shall take place within 30 days of the project first achieving a sustained output of 90 percent or greater of rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report shall be a description of any additional mitigation measures necessary to achieve compliance with the above-listed noise limit, and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

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

NOISE-5 Prior to ground disturbance, or prior to commencement of pile driving if this operation occurs, the project owner shall relocate the residents on the property at ML1 to a location not near the project site. The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause noise levels due to plant operation plus ambient, during the four quietest consecutive hours of the nighttime, to exceed an average of 45 dBA L_{50} as measured near this new location.

No new pure-tone components may be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

- If the new location is within one mile of the project site, when the project first achieves a sustained output of 90 percent or greater of rated capacity, the project owner shall conduct a short-term survey of noise at this new location or at a closer location acceptable to the CPM. The short-term noise measurements shall be conducted during every hour of the nighttime hours, from 10 p.m. to 7 a.m., during the period of the survey.

- If during the operating life of the project, the project owner plans to convert the five-unit multiplex at ML1 back to a residential use, the project owner shall repeat this survey at ML1 or at a closer location acceptable to the CPM, prior to any resident(s) occupying the multiplex.
- The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, closer to the plant (e.g., 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected receptor locations to determine the presence of pure tones or other dominant sources of plant noise.
- If the results from any of the above noise surveys indicate that the power plant noise level plus ambient (L_{50}) at the affected receptor sites exceeds the above value during the above specified time period, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit. ML1 shall not be reoccupied (as explained above), unless the SPP can demonstrate compliance with this requirement at this location.
- If the results from the noise surveys indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement, signed by the project owner's project manager, stating that the residents in the property at ML1 have been relocated, and describing the new location and its distance to the project site.

The first noise survey shall take place within 30 days of the project first achieving a sustained output of 90 percent or greater of rated capacity. If the second survey is needed (as described above) it shall take place prior to the property at ML1 being reoccupied. Within 15 days after completing each of the surveys, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report shall be a description of any additional mitigation measures necessary to achieve compliance with the above-listed noise limit, and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

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

NOISE-6 Following the project first achieving a sustained output of 90 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099

(Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

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

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

CONSTRUCTION TIME RESTRICTIONS

NOISE-7 Heavy equipment operation and noisy construction work relating to any project features (including pile driving work) shall be restricted to the times delineated below, unless a special permit has been issued by the County of Fresno:

Any day except Saturdays and Sundays	6 a.m. to 9 p.m.
Saturdays and Sundays	7 a.m. to 5 p.m.

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

PILE DRIVING MANAGEMENT

NOISE-8 The project owner shall perform pile driving using a quieter process than the traditional pile driving techniques to ensure that noise from these operations does not cause annoyance at monitoring locations ML2 (if the residents at ML2 have not been relocated) and ML3.

Verification: At least 30 days prior to first pile driving, the project owner shall submit to the CPM a description of the pile driving technique to be employed, including calculations showing its projected noise impacts at monitoring locations ML2 (if the residents at ML2 have not been relocated) and ML3.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Starwood Power Project (06-AFC-10)

NOISE COMPLAINT LOG NUMBER _____

Complainant's name and address:

Phone number: _____

Date complaint received: _____
Time complaint received: _____

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

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

Description of corrective measures taken:

Complainant's signature: _____ Date: _____

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

This information is certified to be correct:

Plant Manager's Signature: _____

Attach additional pages and supporting documentation, as required.

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NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

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

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

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

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

Noise Table A1
Definition of Some Technical Terms Related to Noise

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

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

Noise Table A2
Typical Environmental and Industry Sound Levels

Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment Producing Similar Level	Subjective Impression
Civil Defense Siren (at 100')	140-130		Pain threshold
Jet take-off (at 200')	120		Very loud
Very loud music	110	Rock music concert	
Pile driver (at 50')	100		
Ambulance siren (at 100')	90	Boiler room	
Train (at 50')	85		
Pneumatic drill (at 50')	80	Printing press Kitchen with garbage disposal running	Loud
Freeway traffic (at 100')	70		Moderately loud
Vacuum cleaner (at 100')	60	Data-processing center Department store Office	
Light traffic (at 100')	50	Private business office	
Large transformer (at 200')	40		Quiet
Soft whisper (at 5')	30	Quiet bedroom	
	20	Recording studio	
	10		Threshold of Hearing

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

Subjective Response to Noise

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

- subjective effects of annoyance, nuisance, dissatisfaction.
- interference with activities such as speech, sleep, and learning.
- physiological effects such as anxiety or hearing loss.

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

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

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

- Except under special conditions, a change in sound level of one dB cannot be perceived.
- Outside of the laboratory, a three dB change is considered a barely noticeable difference.
- A change in level of at least five 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. (Kryter, Karl D., 1970, The Effects of Noise on Man)

Combination of Sound Levels

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

Noise Table A3
Addition of Decibel Values

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

Source: Architectural Acoustics, M. David Egan, 1988

Sound and Distance

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

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

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed. These levels are listed in the table below.

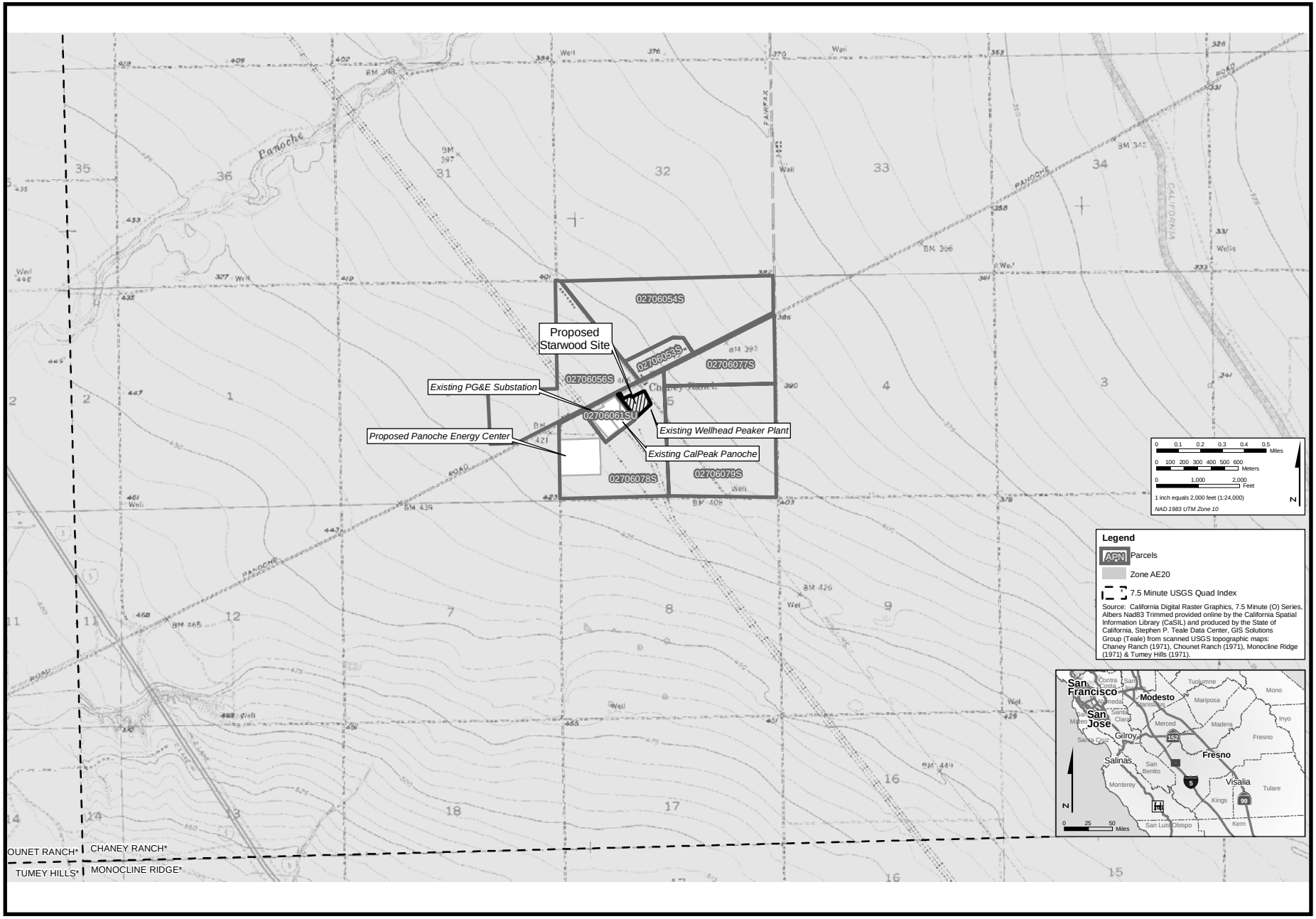
Noise Table A4
OSHA Worker Noise Exposure Standards

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

Source: 29 CFR § 1910.

NOISE - FIGURE 1

Starwood Power Project - Zoning Designations Surrounding Project Site

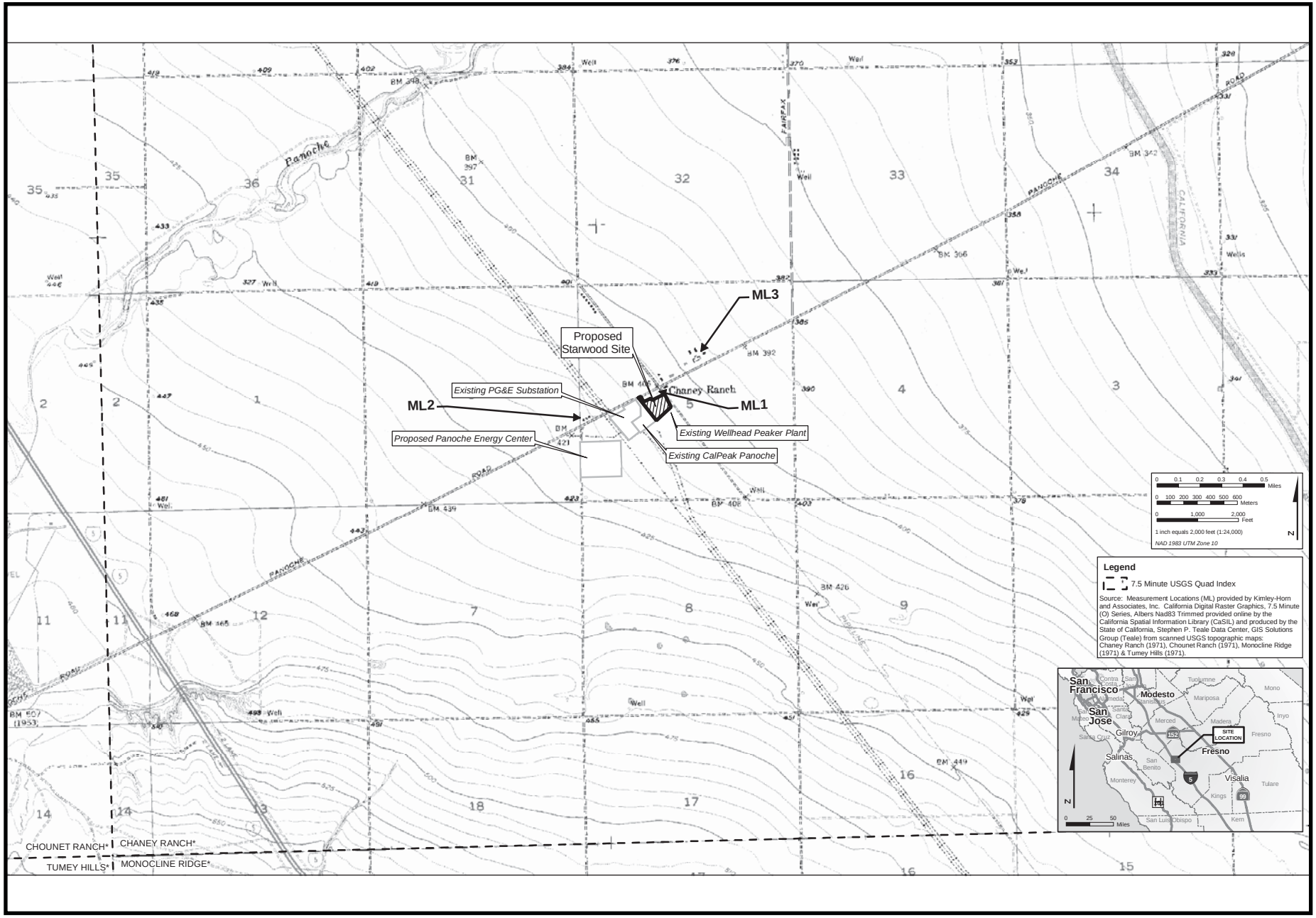


CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC 2006, Figure 5.9-2

NOISE - FIGURE 2

Starwood Power Project - Vicinity Map



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SOURCE: AFC 2006, Figure 5.12-1

PUBLIC HEALTH

Testimony of Obed Odoemelam, Ph.D.

SUMMARY AND CONCLUSIONS

Staff has analyzed the potential public health risks from the toxic air pollutants associated with construction and operation of the proposed Starwood Power Project (SP) and does not expect that there would be any significant adverse cancer or short- or long-term health effects. The toxic pollutants (non-criteria pollutants) considered in this analysis are pollutants for which there are no established air quality standards. The potential for significant public health impacts from emission of the other group of pollutants for which there are specific air quality standards (criteria pollutants) is discussed in the **Air Quality** section with particular regard to those for which existing area levels exceed their respective air quality standards.

INTRODUCTION

The purpose of this **Public Health** analysis is to determine if toxic emissions from the proposed Starwood Power Project would have the potential to cause significant adverse public health impacts or violate standards for public health protection in the project area. Toxic pollutants (or non-criteria pollutants) are pollutants for which there are no specific air quality standards. The other pollutants for which there are such air quality standards are known as criteria pollutants. If potentially significant health impacts are identified for the non-criteria pollutants considered in this analysis, staff would evaluate mitigation measures to reduce such impacts to less than significant levels.

Although the emission and exposure levels for criteria air pollutants are addressed in the **Air Quality** section, staff has included **Attachment A** at the end of this **Public Health** section to provide specific information on the nature of their respective health effects. The discussion in the **Air Quality** section mainly focuses on the potential for above-standard exposure and the regulatory measures necessary to mitigate such exposures with particular emphasis on ozone, and particulate matter for which existing area levels exceed their respective air quality standards. The impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section while the health and safety impacts from electric and magnetic fields are addressed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams are discussed in the **Soils and Water Resources** section. Facility releases in the form of hazardous and non-hazardous wastes are addressed in the **Waste Management** section.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Public Health Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (42 U.S. Code section 7412)	Requires new sources which emit more than ten tons per year of any specified hazardous air pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology (MACT).
State	
California Health and Safety Code sections 39650 et seq.	These sections mandate the California Air Resources Board (CARB) and the Department of Health Services to establish safe exposure limits for toxic air pollutants and identify pertinent best available control technologies. They also require that the new source review rule for each air pollution control district include regulations that require new or modified procedures for controlling the emission of toxic air contaminants.
California Health and Safety Code section 41700	This section states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Code of Regulations, Title 22, Section 60306	Requires that whenever a cooling system uses recycled water in conjunction with an air conditioning facility and a cooling tower that creates a mist that could come into contact with employees or members of the public, a drift eliminator shall be used and chlorine, or other, biocides shall be used to treat the cooling system re-circulating water to minimize the growth of Legionella and other micro-organisms.
Local	
San Joaquin Valley Unified Air Pollution Control District Rule 2201	Requires safe exposure limits for Toxic Air Pollutants (TACs), use of best Available Control Technology (BACT) and New Sources Review (NSR).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section describes staff's method of analyzing the potential health impacts of toxic pollutants together with the criteria used to determine their significance.

METHOD OF ANALYSIS

The toxic emissions addressed in this **Public Health** section are those to which the public could be exposed during project construction and routine operation. If such toxic contaminants are released into the air or water, people may come in contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

The ambient air quality standards for the criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide are set to ensure the safety of everyone including those with heightened sensitivity to the effects of environmental pollution in general. Since non-criteria pollutants do not have such standards, a process known as a health risk assessment is used to determine if people might be exposed to them at unhealthy levels. The risk assessment procedure consists of the following steps:

- Identification of the types and amounts of hazardous substances that a source could emit into the environment;
- Estimation of worst-case concentrations of project emissions into the environment using dispersion modeling;
- Estimation of the amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact; and
- Characterization of the potential health risks by comparing worst-case exposures to safe standards based on known health effects.

For SP and other sources, a screening level risk assessment is initially performed using simplified assumptions intentionally biased toward protecting public health. That is, an analysis is designed that overestimates public health impacts from exposure to the emissions. In reality, it is likely that the actual risks from the project will be much lower than the risks estimated by the screening level assessment. This overestimation is accomplished by identifying conditions that would lead to the highest, or worst-case risks, and then assuming them in the study. The process involves the following:

- using the highest levels of pollutants that could be emitted from the source;
- assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- using the type of air quality computer models which predict the greatest plausible impacts;
- calculating health risks at the location where the pollutant concentrations are estimated to be highest;
- using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses); and
- assuming that an individual's exposure to cancer-causing agents would occur over a 70-year lifetime.

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances, which could present a health hazard from non-inhalation pathways of exposure (see

California Air Pollution Control Officers Association (CAPCOA) 1993, Table III-5). When these substances are present in facility emissions, the screening level analysis is conducted to include the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (CAPCOA 1993, p. III-19).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) non-cancer effects, and cancer risk (also long-term). Acute health effects result from short-term (one-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature, and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those that result from long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from ten to one hundred percent of a lifetime (from seven to seventy years). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for non-cancer health effects compares the maximum project contaminant levels to safe levels called "reference exposure levels" or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (CAPCOA 1993, p. III-36). This means that such exposure limits would serve to protect such sensitive individuals as infants, school pupils, the aged, and people suffering from illnesses or diseases, which make them more susceptible to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effects reported in the medical and toxicological literature, and include specific margins of safety, which address the uncertainties associated with inconclusive scientific and technical information available at the time of standard setting. They are, therefore, intended to provide a reasonable degree of protection against hazards that research has not yet identified. Each margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant exposures that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection can be expected if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety is assumed to exist between the predicted exposure and the estimated threshold for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformance with CAPCOA guidelines, the health risk assessment assumes that the effects of the individual substances are additive for a given organ system (CAPCOA 1993, p. III-37). In those cases where the actions may be synergistic (where the effects are greater than the sum), this approach may underestimate the health impact in question.

For carcinogenic substances, the health assessment considers the risk of developing cancer and conservatively includes the previously noted assumption that the individual would be continuously exposed over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in terms of chances per million of developing cancer and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (known as “potency factor”, and established by the California Office of Environmental Health Hazard Assessment), and the length of the exposure period. Cancer risks for individual carcinogens are added together to yield the total cancer risk from the source being considered. The conservative nature of the screening assumptions used means that actual cancer risks are likely to be considerably lower than those estimated.

The screening level analysis is performed to assess worst-case public health risks associated with the proposed project. If the screening analysis were to predict a risk of no significance, no further analysis would be necessary. However, if the risk were to be above the significance level, further analysis, using more realistic site-specific assumptions would be performed to obtain a more accurate estimate of the public health risk in question.

SIGNIFICANCE CRITERIA

Commission staff assesses the health effects of exposure to toxic emissions by first considering the impacts on the maximally exposed individual. This individual is the person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above. If the potential risk to this individual is below established levels of significance, staff would consider the potential risk as also less than significant anywhere else in the project area. As described earlier, non-criteria pollutants are evaluated for short-term (acute) and long-term (chronic) non-cancer health effects, as well as cancer (long-term) health effects. The potential significance of project health impacts is determined separately for each of the three categories of health effects.

Acute and Chronic Non-Cancer Health Effects

Staff assesses the significance of non-cancer health effects by calculating a “hazard index” for the exposure being considered. A hazard index is a ratio obtained by comparing exposure from facility emissions to the reference (safe) exposure level for the toxicant. A ratio of less than one would signify a worst-case exposure below the safe level. The hazard indices for all toxic substances with the same types of health effect are added together to yield a total hazard index for the source being evaluated. This total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that the cumulative worst-case exposure would be within safe levels. Under these conditions, health protection would be assumed even for sensitive members of the population. In such a case, staff would assume that there would be no significant non-cancer public health impacts from project operations.

Cancer Risk

Staff relies upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, §§ 25249.5 et seq.) for guidance in establishing the level of significance for its assessed cancer risks. Title 22, California Code of Regulations, section 12703(b) states in this regard, that “the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming

lifetime exposure." This risk level is equivalent to a cancer risk of ten in one million, which is often written as $10x10^{-6}$. An important distinction from the provisions in Proposition 65 is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals from the source in question. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than with Proposition 65.

As noted earlier, the initial risk analysis for a project is normally performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. When a screening analysis shows the cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. If facility risk, based on refined assumptions, were to exceed the significance level of ten in one million, staff would require appropriate measures to reduce risk to less than significant. If, after all risk reduction measures have been considered, a refined analysis still identifies a cancer risk of greater than ten in one million, staff would deem such risk to be significant, and would not recommend project approval.

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emission plume from a facility may affect elevated areas before lower terrain areas, because of a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influences population density and, therefore, the number of individuals potentially exposed to the project's emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

According to the information from the applicant, Starwood Power-Midway, LLC (SPP 2006a, pp. 3-1, 3-2, 5.2-2, 5.9-1 through 5.9-7, and 5.16-1 and 5.16-2), the proposed SPP site is a 5.6-acre parcel within a larger, 128-acre piece located approximately 50 miles west of the City of Fresno in unincorporated Fresno County. The area within 10 miles of the site is agricultural land with relatively few rural residences. The nearest communities, which include Mendota, El Porvenir, Firebaugh, and San Joaquin, are between 12 and 22 miles from the site.

The nearest of the area's few rural residences is located approximately 100 feet from the northern boundary of the site. However, the occupants will be relocated from the site as a noise mitigation measure (SPP 2006a 5.16-20). The applicant (SPP 2006a, p 5.16-16, Figure 5.16-1) provided specific information identifying the sensitive receptor locations within a three-mile radius of the site together with their respective directions and distances from the site. Sensitive receptor locations are those housing sensitive individuals such as the elderly, school pupils and individuals with respiratory diseases who, as previously noted, are usually more sensitive to the effects of environmental

pollutants than the general public. In most cases these locations would include schools pre-schools daycare centers, schools, nursing homes, medical centers, hospitals, colleges; but for this project only 12 residences and one park were identified within this three-mile study area. Staff holds all projects to the same health standards, whether proposed for a major population center, with many sensitive receptors, or a sparsely populated area (as with the proposed project) with relatively few.

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

The proposed project site is in an area of mild climate with relatively low precipitation, as it is separated from the rainier and cooler coastal regions by the Diablo and Coastal mountain ranges to the northwest, southeast, and west. This climate is strongly influenced by the large-scale warming and sinking of the air in the semi-permanent subtropical high-pressure center over the Pacific Ocean. This high-pressure system blocks out most mid-latitude storms except in the winter when most of the area's 11.9 inches of rainfall occurs. The site is at an elevation of between 395 and 420 feet in a terrain that slopes gently downward to the north, northeast, and east towards the San Joaquin River 15 miles from the site. The yearly maximum temperature averages 76°F while the minimum averages 48°F.

Because of the area's winds of low speeds (with little seasonal variation), the atmosphere has a limited capacity to disperse the area's air contaminants from the points of generation to other locations. Strong atmospheric temperature inversions frequently occur especially in the late mornings and early afternoons. These inversions severely limit vertical air mixing and result in the buildup of air pollutants by restricting their movement from the ground level to the upper atmosphere out of the air basin.

Atmospheric stability is a measure of the turbulence that influences such pollutant dispersion. Mixing heights (the height above ground level below which the air is well mixed and in which pollutants can be effectively dispersed) are lower during the morning hours because of temperature inversions, which are followed by temperature increases in the warmer afternoons. Staff's **Air Quality** section presents a more detailed discussion of the area's meteorology as related to pollutant dispersion.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of San Joaquin Valley Air Pollution Control District (SJVAPCD). By examining average toxic concentration levels from representative air monitoring sites in California with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual is about 1 in 4, or 250,000 in one million.

The toxic air monitoring station closest to the Starwood Power Project site is on First Street in Fresno, approximately 50 miles from the project site. Based on levels of toxic air contaminants measured at this monitoring station in 2000, the background cancer risk calculated for this location is 225 in one million (CARB 2001). The pollutants 1, 3-butadiene and benzene, emitted primarily from mobile sources, were the two highest contributors to risk and together accounted for over half of the total. The risk from 1, 3-butadiene was about 73 in one million, while the risk from benzene was about 68 in one million. Formaldehyde accounts for about 12% of the ambient cancer risk determined for Fresno, with a risk of about 26 in one million. Formaldehyde is emitted directly from vehicles and other combustion sources, such as the proposed project.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxics and associated cancer risk during the past few years. For example, at the Fresno monitoring station, cancer risk was 497 in one million based on 1991 data and 314 in one million based on 1995 data (CARB 2001).

The noted toxic pollutant-related background risk estimates can be compared with the normal background lifetime cancer risk (from all cancer causes) of one in four, or 250,000 in a million, as will be noted later. The potential risk from SPP and similar sources should best be assessed in the context of their potential addition to these background risk levels.

The criteria pollutant-related air quality for the project area is assessed in the **Air Quality** section by adding the existing levels (as measured at area monitoring stations), to the project-related levels, and comparing the resulting levels with the applicable air quality standards. Public health protection would be ensured only through specific technical and administrative measures that ensure below-standard exposures when the project is operating. It is such a combination of measures that is addressed in the **Air Quality** section.

IMPACTS

POTENTIAL IMPACTS OF PROJECT'S NON-CRITERIA POLLUTANTS

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

Construction Phase Impacts

Possible construction-phase health impacts, as noted by the applicant (SPP 2006a pp. 5.2-11 through 5.2-13, and Appendix I), are those from human exposure to the windblown dust from site excavation and grading, and emissions from construction-related equipment. The dust-related impacts may result from exposure to the dust itself as PM10, or PM 2.5, or exposure to any toxic contaminants that might be adsorbed on to the dust particles. As more fully discussed in the **Waste Management** section, results of the applicant's site contamination assessments (SPP 2006a, p. 5.14-1, and Appendix O) showed no areas of possible chemical contamination from past agricultural

or other uses. This means that particulate-related chemical exposures would be unlikely during the site preparation and project erection phases.
The applicant has specified the mitigation measures necessary to minimize construction-related fugitive dust as required by SJVAPCD Rules 4201, 8021, 8061, and 8071. The only soil-related construction impacts of potential significance would result from the possible impacts of PM10, or PM 2.5 as a criteria pollutant for the 10-month construction period. As mentioned earlier, the potential for significant impacts from criteria pollutants is assessed in the **Air Quality** section where the requirements for the identified mitigation measures are presented as specific conditions of certification.

The exhaust from diesel-fueled construction and other equipment has been established as a potent human carcinogen. Thus, construction-related emission levels should be regarded as possibly adding to the carcinogenic risk of specific concern in this analysis. Appendix I (SPP 2006a), presents the diesel emissions from the different types of equipment to be used in the construction phase. Staff considers the recommended control measures specified in **Air Quality** Condition of Certifications (AQ-SC3, and AQ-SC4) as adequate to minimize any cancer risk during the relatively short (approximately 10-month) construction period.

Operational Impacts

The main health risk from SPP operations would be associated with emissions from its combustion turbines and testing of the emergency diesel firewater pump engine.

Public Health Table 1 lists the project's toxic emissions and shows how each contributes to the risk estimated from the health risk analysis. For example, the first row shows that oral exposure to acetaldehyde is not of concern but, if inhaled, may have cancer and chronic (long-term) non-cancer health effects, but not acute (short-term) effects.

As noted in a publication by the South Coast Air Quality Management District (SCAQMD 2000, p. 6), one property that distinguishes the air toxics of concern in this analysis from the criteria pollutants is that the impacts from air toxics tend to be highest in close proximity to the source and quickly drop off with distance. This means that the levels of SPP's air toxics would be highest in the immediate area and would decrease rapidly with distance. One purpose of this analysis, as previously noted, is to determine whether or not such exposures would be at levels of possible health significance as established using existing assessment methods.

The applicant's estimates of SP's potential contribution to the area's carcinogenic and non-carcinogenic pollutants were obtained from a screening-level health risk assessment conducted according to procedures specified in the 1993 CAPCOA guidelines. The results from this assessment (summarized in staff's **Public Health Table 2**) were provided to staff along with documentation of the assumptions used (SPP 2006a pp. 5.16-2, through 5.16-12 and Appendix-Q). This documentation included:

- pollutants considered;
- emission levels assumed for the pollutants involved;

- dispersion modeling used to estimate potential exposure levels;
- exposure pathways considered;
- the cancer risk estimation process;
- hazard index calculation; and
- characterization of project-related risk estimates.

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

Public Health Table 1
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

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

Source: Prepared by staff using reference exposure levels and cancer unit risks from CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993, SRP 1998, and Office of Environmental Health Hazard Assessment Air Toxics Hot Spots Program Risk Assessment Guidelines.

As shown in **Public Health Table 2**, the chronic hazard index for the maximally exposed individual is 0.001 while the maximum hazard index for acute effects is 0.022. These values are well below staff's significance criterion of 1.0, suggesting that the pollutants in question are unlikely to pose a significant risk of chronic or acute non-cancer health effects anywhere in the project area.

Public Health Table 2
Operation Hazard/Risk

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Non-cancer	0.022	1.0	No
Chronic Non-cancer	0.001	1.0	No
Individual Cancer	0.062×10^{-6} (a)	10.0×10^{-6}	No

Staff's summary of information from SPP 2006a pp. 5.16-8, 5.16-9 and Appendix Q.
(a) Risk from normal project operations

The cancer risk to the maximally exposed individual from normal project operation is shown as 0.062 in a million, which is well below staff's significance criterion of 10 in one million for this screening level assessment. Thus, project-related cancer risk from routine operations would be less than significant for all individuals in the project area. Staff notes that the maximum risks from the assessed turbines and cooling towers occur at different locations, so adding these risk estimates together as done in this analysis further adds to the conservatism in the assessment process.

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

Staff reviewed Census 2000 information showing that there are minority populations within a six-mile radius from the SP site (see **Socioeconomics Figure 1**). Since staff has established that no significant health impacts would result anywhere in the project area from exposure to the toxic emissions considered in this analysis, the issue of environmental justice would not arise during operations.

CUMULATIVE IMPACTS

The applicant has provided a list of area projects with the potential to significantly contribute to total area exposure to the pollutants of concern in this analysis. The most important sources in this regard are the existing CalPeak Panoche Power, Wellhead Peaker, and the proposed Panoche Energy Center. The pollutants from the existing sources could be seen as contributing to the existing background levels thereby contributing to the normal background cancer and non-cancer impacts. The present approach to regulating this group of pollutants is to ensure that further additions from identifiable sources are maintained within insignificant levels.

As previously noted, the maximum impact locations for the proposed SP and similar sources would be the spot where pollutant concentrations would theoretically be highest. Even at this location, staff does not expect any significant SP-related changes in lifetime risk to any person, given the calculated incremental cancer risk of only 0.062 in one million, which staff regards as not potentially contributing significantly to the previously noted average lifetime individual cancer risk of 250,000 in one million. Modeled facility-related residential risks are much lower for more distant locations. The potential risk for the proposed Panoche Energy Center was estimated in the related Application for Certification (Panoche Energy Center 2006a) as 3.46 in one million, which staff also considers as not significantly adding to the existing background health risk. Given the previously noted conservatism in the utilized calculation method, the actual risks for each of these sources would likely be much smaller. Therefore, staff does not regard the incremental risk estimate for SP's operation as pointing to a potentially significant contribution to the area's cancer risk when considered by itself or together with existing or proposed area pollution sources.

The worst-case long-term non-cancer health impact from the project (represented as a chronic hazard index of 0.001) is well below staff's significance level of 1.0 at the location of maximum impact. A similar value for the Panoche Energy center is 0.0026. At these levels, staff does not expect any cumulative health impacts to be significant for the toxic pollutants as emitted from the proposed Starwood Power project. The cumulative impacts from emission of the criteria pollutants are addressed in the **Air Quality** section.

COMPLIANCE WITH LORS

The toxic pollutant-related cancer and non-cancer risks from SP project operation reflect the effectiveness of control measures (including an oxidation catalyst which reduces hazardous air pollutant emissions) proposed by the applicant. Since these risk estimates are much below the significance levels in the applicable LORS, staff concludes that the related operational plan would comply with these LORS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any agency or public comments on the public health aspects of the proposed project.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the toxic air emissions from the construction and operation of the proposed natural gas-burning SP project are at levels that do not require mitigation beyond the specific emission control measures noted above. Since the potential impacts would be at insignificant levels, there would be no environmental justice issues when the project is operating. The conditions for ensuring compliance with all applicable air quality standards are specified in the **Air Quality** section for the area's criteria pollutants.

PROPOSED CONDITION OF CERTIFICATION

Staff recommends approval of the proposed project with respect to public health and proposes no conditions of certification.

REFERENCES

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ATTACHMENT A - CRITERIA POLLUTANTS

OZONE (O_3)

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

The U.S. EPA revised its federal ozone standard on July 18, 1997 (62 Fed. Reg. 38856), based on health studies that had became available since the standard was last revised in 1979. These new studies showed that adverse health effects could occur at ambient concentrations much lower than reflected in the previous standard, which was based on acute health effects experienced during heavy exercise. In proposing the new standard, the EPA identified specific health effects known to have been caused by short-term exposures (of one to three hours) and prolonged exposure (of six to eight hours) (61 Fed. Reg. 65719). However, a 1999 federal court ruling blocked implementation of the ozone 8-hour standard, which is yet to be implemented.

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

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

CARBON MONOXIDE (CO)

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

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

PARTICULATE MATTER (PM)

Particulate matter is a generic term for particles of various substances, which occur as either liquid droplets or small solids of a wide range of sizes. Particles with the most potential to adversely affect human health are those less than 10 micrometers (millionths of a meter) in diameter (known as PM10), which may be inhaled and deposited within the deep portions of the lung (PM10). PM may originate from anthropogenic or natural sources such as stationary or mobile combustion sources or windblown dust. Particles may be emitted directly to the atmosphere or result from the physical and chemical transformation of gaseous emissions such as sulfur oxides, nitrogen oxides, and volatile organic compounds. PM10 may be made up of elements such as carbon, lead, and nickel; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and soil fragments. The size, chemical composition, and concentration of ambient PM10 can vary considerably from area to area and from season to season within the same area.

PM10 can be grouped into two general sizes of particles, fine and coarse, which differ in formation mechanisms, chemical composition, sources, and potential health effects. Fine-mode particles are those with a diameter of 2.5 micrometers or less (PM2.5), while the coarse-mode fraction of PM consists of particles ranging from 10 micrometers down to 2.5 micrometers in diameter.

Coarse-mode PM10 is formed by crushing, grinding, and abrasion of surfaces, and in the course of reducing large pieces of materials to smaller pieces. Coarse particles consist mainly of soil dust containing oxides of silicon, aluminum, calcium, and iron; as

well as fly ash, particles from tires, pollen, spores, and plant and insect fragments. Coarse particles normally have shorter lifetimes (minutes to hours) and only travel over short distances (of less than tens of kilometers). They tend to be unevenly distributed across urban areas and have more localized effects than the finer particles.

PM2.5 is derived both from combustion by-products, which have volatilized and condensed to form primary PM2.5, and from precursor gases reacting in the atmosphere to form secondary PM2.5. Components include nitrates, organic compounds, sulfates, ammonium compounds, and trace elements (including metals) as well as elemental carbon such as soot. Major sources of PM2.5 are fossil fuel combustion by electric utilities, industry and motor vehicles, vegetation burning, and the smelting or other processing of metals. Dry deposition of fine mode particles is slow allowing such particles to often exist for long periods of time (of from days to weeks) in the atmosphere and travel hundreds to thousands of kilometers. They tend to be uniformly distributed over urban areas and larger regions and are removed from the atmosphere primarily by forming cloud droplets and falling out within raindrops.

The health effects of PM10 from any given source usually depend on the toxicity of its constituent pollutants. The size of the inhaled material usually determines where it is deposited in the respiratory system. Coarse particles are deposited most readily in the nose and throat area while the finer particles are more likely to be deposited within the bronchial tubes and air sacs, with the greatest percentage deposited in the air sacs. Until recently, PM10 particles had been considered to be the major fraction of airborne particulates responsible for various adverse health effects. The PM10 fraction is known to be capable of penetrating the thoracic and alveolar regions of the human and animal lungs. The PM2.5 fraction, however, was found to pose a significantly higher risk for health. This is due to their size and associated deposition and retention characteristics in the respiratory tract, enabling it to penetrate and deposit within the deeper alveolar regions of the lung. The following aspects of PM2.5 deposition all contribute to the more serious health effects attributed to smaller particles:

- The deposition of PM2.5 favors the periphery of the lungs, which is especially vulnerable to injury for anatomical reasons.
- Clearance of the PM2.5 from within the deeper reaches of the lungs is a much slower process than from the upper regions. Consequently, the residence time is longer, implying longer exposure, and hence greater risk.
- The human anatomy further allows the penetration of the superficial tissues by PM2.5 and entry into the bodily circulation without much effort in the periphery of the lungs.

Many epidemiological studies have shown exposure to particulate matter capable of inducing a variety of health effects, including premature death, aggravation of respiratory and cardiovascular disease, changes in lung function and increases in existing respiratory symptoms, effects on lung tissue structure, and impacts on the body’s respiratory defense mechanisms. The underlying biological mechanisms are still poorly understood. Based on their review of a number of these epidemiological studies (as published after 1987 when the federal standards were revised), together with suggestion of PM2.5 concentrations as a more reliable surrogate for the health impacts

of the finer fraction of PM than PM10, the U.S. EPA concluded that the then-current standards were not sufficiently stringent to protect against significant effects in exposed humans. Therefore, federal PM standards were revised on July 18, 1997 (62 Fed. Reg. 38652) to add new annual and 24-hour PM2.5 standards to the existing annual and 24-hour PM10 standards. Taken together, these new standards were meant to provide additional protection against a wide range of PM-related health effects, including premature death, increased hospital admissions and emergency room visits, primarily among sensitive individuals such as the elderly, children and individuals with cardiopulmonary diseases such as asthma. Other impacts include decreased lung function (particularly in children and asthmatics), and alterations in lung tissue and structure.

California has also had 24-hour and annual standards for PM10 (CARB 1982, pp. 81, 84). These studies were aimed at establishing the PM10 levels capable of inducing asthma, premature death and bronchitis-related symptoms. They were set to protect against such impacts in the general population as well as sensitive individuals such as patients with respiratory disease, declines in pulmonary function, especially as related to children (Tit. 17, Cal. Code Regs. §70200). These standards were set to be more stringent than the federal standard, which the ARB regarded as inadequate for the protection desired (CARB 1991, p. 26).

On June 20, 2002, the ARB approved the adoption of a lower annual state standard for PM10, as well as a new annual standard for PM2.5 (CARB 2002). The new standards took effect on July 5, 2003. The 24-hour PM10 standard was not changed. The standards were established to prevent excess death, illnesses such as respiratory symptoms, bronchitis, asthma exacerbation, and cardiac disease, and restrictions in activity from short- and long-term exposures (Title 17, Cal. Code Regs. §70200).

NITROGEN DIOXIDE (NO_2)

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

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

Several groups, which may be especially susceptible to nitrogen dioxide-related health effects have been identified from human studies (CARB 1992, Appendix A, and p. 3).

These include asthmatics, persons with chronic bronchitis, infants and young children, cystic fibrosis and cancer patients, people with immune deficiencies, and the elderly.

Studies involving brief, controlled exposures on sensitive individuals have shown an increase in bronchial reactivity or airway responsiveness of some asthmatics, as well as decreased lung function in some patients with chronic obstructive lung disease (CARB 1992, Appendix A, p. 2). In general, bronchial hyper reactivity (an increased tendency of the airways to constrict) is markedly greater in asthmatics than in non-asthmatics upon exposure to initiating respiratory irritants (CARB 1992a, p. 107). At exposure concentrations of specific relevance to the current one-hour ambient standard, there appears to be little, if any, effect on respiratory symptoms of asthmatics (CARB 1992a, p. 108).

SULFUR DIOXIDE (SO_2)

Sulfur dioxide is formed when any sulfur-containing fuel is burned. SO_2 is highly soluble and consequently absorbed in the moist passages of the upper respiratory system. Exposure to sulfur dioxide can lead to changes in lung cell structure and function that adversely affect a major lung defense mechanism known as mucociliary transport. This mechanism functions by trapping particles in mucus in the lung and sweeping them out via the cilia (fine hair-like structures) also in the lung. Slowed mucociliary transport is frequently associated with chronic bronchitis.

Exposure to sulfur dioxide can produce both short- and long-term health effects. Therefore, California has established sulfur dioxide standards to reflect both short- and long-term exposure concerns. Based on controlled exposure studies of human volunteers, investigators have found that asthmatics comprise the group most susceptible to adverse health effects from exposure to sulfur dioxide (CARB 1994, p. V-1).

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

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

ATTACHMENT A - REFERENCES

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SOCIOECONOMICS

Testimony of Joseph Diamond, Ph. D.

SUMMARY OF CONCLUSIONS

Staff has determined that the 120 MW Starwood Power Project (SPP) would not cause a significant adverse direct or cumulative socioeconomic impact on the area's housing, schools, police, emergency services, hospitals, and parks and recreation. Public benefits from the project include capital costs, construction and operation payroll, property taxes and sales taxes.

INTRODUCTION

This California Energy Commission staff socioeconomics impact analysis evaluates the project induced changes on community services and/or infrastructure, and related community issues such as Environmental Justice (EJ). Staff discusses the estimated impacts of the construction and operation of the SPP and other related economic impacts.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

CALIFORNIA EDUCATION CODE, SECTION 17620

The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities.

CALIFORNIA GOVERNMENT CODE, SECTIONS 65996-65997

These sections include provisions for school district levies against development projects. As Amended by Senate Bill (SB) 50 (Stats. 1998, ch. 407, sec. 23), these sections state that except for those fees established under Education Code 17620, public agencies at the state and local level may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

SETTING

The proposed SPP would be located at 43627 West Panoche Road in the unincorporated area of western Fresno County approximately 50 miles west of the City of Fresno. The SPP would employ an average of 74 construction workers per month (for 10 months) and one employee to operate the facility (one maintenance technician/operator) (URS 2006a).

The 2000 U.S. Census shows that California had a total population of 33,871,648, with minority (non-white and white-Hispanic) population of 18,054,858 (53.3%) and a white population of 15,816,790 or (46.7%). Fresno County had a total population of 865,620 in 2004 which is an increase of approximately 8% from 799,407 in 2000. By 2010,

projections show a California population of 38,067,134, and 1,001,600 residents in Fresno County (URS 2006a and California Department of Finance 2000).

The unemployment rate for Fresno County was 9.2% in January 2007 (not seasonally adjusted). This is not full employment for Fresno County. Full employment has been defined as 4% to 5% unememployment over the last few decades. For California in January 2007 (not seasonally adjusted), the unemployment rate was 5.3% (CAEDD 2006a).

DEMOGRAPHIC SCREENING

The purpose of an environmental justice screening analysis is to determine whether a below poverty level and/or minority population exists within the potentially affected area of the proposed site. Staff conducted the demographic screening in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis" (Guidance Document) (EPA 1998). People of color populations, as defined by this Guidance Document, are identified where either:

- The minority population of the affected area is greater than 50% of the affected area's general population; or
- The minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.
- One or more census blocks in the affected area have a minority population greater than 50%.

In 1997, the President's Council on Environmental Quality issued Environmental Justice

Guidance that defines minority as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander; Black not of Hispanic origin; or Hispanic. Low-income populations are identified with the annual statistical poverty thresholds from the Bureau of the Census's Current Population Reports, Series P-60 on Income and Poverty (OMB 1978).

Staff has reviewed Census 2000 information that shows the minority population by census block (the smallest geographic unit for which the Census Bureau collects and tabulates data) is 98.16% and 100% within a six-mile and one-mile radius of the proposed SPP site (See **Socioeconomics Figure 1**). Census 2000 by census block group (a combination of census blocks and a subdivision of a census tract) information shows that the below poverty population is 20.20% within the six-mile radius. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old.

ASSESSMENT OF IMPACTS

Staff reviewed the socioeconomic section of the AFC and other socioeconomic data. Staff used the socioeconomic data provided and referenced from governmental agencies, trade associations and its own independent analysis to form the following socioeconomic analysis and conclusions.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project may have a significant effect on population, housing and public services if the project will:

- induce substantial population growth in an area, either directly or indirectly;
- displace substantial numbers of people and/or existing housing, necessitating the construction of replacement housing elsewhere; or
- adversely impact acceptable levels of service for fire and police protection, schools, parks, and other public facilities.

A socioeconomic analysis looks at beneficial impacts on local finances from property and sales taxes as well as potential adverse impacts on public services. In order to determine if a project would have any significant impacts, staff analyzes whether the current status of these community services and capacities can absorb the project related impacts in each of these areas. If the project's impacts could appreciably strain or degrade these services, staff considers this to be a significant adverse impact and would propose mitigation. A project's property taxes, sales tax or local school impact fees or development fees can help local governments to augment public services needed to support the project.

In this analysis staff used fixed percentage criteria for environmental justice in evaluating potential impacts. For environmental justice, staff uses a threshold of greater than 50% for minority/below poverty population as a subset of the total population in the local area. Education impacts are subjectively determined but are moot, as described later. Impacts on housing, medical services, parks and recreation, and law enforcement, and cumulative impacts are based on subjective judgments or input from local and state agencies. Substantial employment of people who come from regions outside the study area has the potential to result in significant adverse socioeconomic impacts. Significance criteria for subject areas such as utilities, fire protection, water supply and wastewater disposal are analyzed in the **Reliability**, **Worker Safety and Fire Protection**, **Soil and Water Resources** and **Waste Management** sections of this Preliminary Staff Assessment (PSA).

DIRECT/INDIRECT/INDUCED IMPACTS

Population and Employment

Research has shown construction workers may commute as much as two hours one-way from their communities rather than relocate (Electric Power Research Institute 1982). During construction of the proposed project most workers would potentially be drawn from Fresno, Madera, Tulare, and Kings counties which are largely within a two hour one-way commute of the project site. Staff and the applicant utilized this four-county labor market area for its evaluation of construction worker availability and Fresno County for community services and infrastructure impacts from the construction of the SPP (URS 2006I). Staff also used the Fresno-Madera Metropolitan Statistical Area (MSA) for analysis of the construction and operation labor markets.

One operational worker would be required for operation and maintenance of the project. This worker is expected to be hired from Fresno County (URS 2006a).

In addition, secondary economic impacts for income, employment and output were estimated for Fresno, Madera, Tulare, and Kings counties (URS 2007b and CEC 2007z). Fiscal and other non-fiscal (private sector) benefits and other potential socioeconomic impacts from the SPP were for Fresno County.

Socioeconomics Table 1 shows that total labor, by skill, in the Fresno-Madera MSA, with annual averages for 2002 and a projection for 2012, is large when compared to the project's needs. The Fresno-Madera MSA has a fairly large construction trade workforce of 13,410 as of 2002 (CAEDD 2006b). The peak construction activity (110 workers) for the SPP represents about less than 1% of the total construction workforce based on **Socioeconomics Table 1.**

SOCIOECONOMICS Table 1
Total Labor in Fresno-Madera MSA by Skill for Construction and Operations

Occupational Title	Annual Averages 2002	2012	Maximum Needed Per Month By Starwood Power Project
Insulation Workers	120	180	10
Mechanical Equipment Erection (Electromechanical Equipment Assemblers)	80	80	16
Carpenters/Cement Finishers	3,090	4,620	12
Electricians	1,120	1,600	15
Cement Masons	800	1,240	10
Iron Workers (Structural Iron and Steel Workers)	250	330	8
Laborers	2,230	3,290	16
Millwrights	60	90	8
Operating Engineer	670	980	4
Painters	690	930	6
Pipe fitters (Plumbers&Steamfitters)	1,220	1,790	20
Teamsters (Truck Drivers, Heavy and Tractor-Trailer)	4,100	4,730	2
Field Staff	N/AV *	N/AV	5

Source: Panoche 2006a, URS 2006a, CAEDD 2006b.
* Not Available (N/AV)

Staff agrees with the applicant that most construction workers travel to the job site on a daily basis, which may involve as much as a one or two-hour commute. Construction workers who live in communities at greater distances than a two-hour, one-way commute tend to relocate to the project area for the work week, and then return home on the weekend. Based on current projected labor and employment data from the California Employment Development Department and Building and Construction Trades Council of Fresno, Madera, Tulare, and Kings counties, the applicant expects that

construction labor requirements would be met with workers from Fresno, Madera, Tulare, and Kings counties within a daily commute of the site except for an estimated five (field or contractor's staff) construction workers who would most likely temporarily relocate to the area (URS2006a, URS 2006I,). This is a conservative scenario since it includes not just the Fresno-Madera MSA but Tulare and Kings counties which staff views as useful and accepts. Additional labor force within a two-hour commute to the site could come from San Benito and Merced counties. The operational workforce is forecast to also be from Fresno County and would commute rather than relocate (URS 2006a). This small increase in employment would have little effect on employment. There would be little induced population growth and no displacement of population by the SPP.

Project construction is expected to occur over a ten month period. The greatest number of construction workers (peak) would occur in the fifth month of construction. The number of construction workers would range from about 26 in the first month of construction to 110 workers at peak construction. There will be an average of 74 workers per month during construction.

The Impact Analysis for Planning (IMPLAN) model (an input-output model), used by the applicant to estimate employment impacts from the project on the study area, is acceptable to staff. The University of California at Berkeley uses the IMPLAN model for regional economic assessment, and it has been used to assess other generating projects in California and the U.S. IMPLAN is a disaggregated type of model that divides the (regional) economy into sectors and provides a multiplier for each sector (Lewis et al. 1979). IMPLAN multipliers are used to calculate direct, indirect, and induced jobs and expenditures in the regional economy.[3] Social Accounting Matrix (SAM) multipliers were used for the applicant's economic impact analysis. Type SAM multipliers capture inter-institutional transfers and account for social security and income leakages, institutional savings, and commuting. SAM multipliers are similar to Type II multipliers because they include both indirect and induced effects (secondary impacts).

IMPLAN model runs estimate the total construction employment is estimated at 146 total jobs (72 secondary jobs) based on an average of 74 project related construction jobs. The applicant's secondary construction impacts would result in $2.5 million in labor income and $7.3 million in output (total value of goods and services) for Fresno, Madera, Tulare, and Kings counties. The estimated SAM multipliers for construction employment, income, and output are approximately 2.0. 1.3 and 1.7, respectively.

The applicant's analysis shows that 1 direct operations job and 1 job as secondary impacts would yield an estimated total of two jobs. Also, operation of the Starwood project would yield secondary operation impacts of $34,506 labor income and approximately $104,239 in output for Fresno, Madera, Tulare, and Kings counties. The estimated SAM multipliers for operation employment, income, and output are approximately 2, 1.4, and 1.4, respectively (URS 2007b and CEC 2007z).

[3] Indirect changes are production changes in industries supplying the original industry (backward linkages). Induced changes are changes in regional household spending levels caused by regional employment impacts.

Staff finds the applicant's economic impact analysis is generally consistent with the economic literature benchmarks cited by many economists of 2 to 2.5 over the long-run (Moss et al. 1994). SAM total effects multipliers usually range from 1.5 to 2.5 (Mulkey 2000). Therefore staff considers these projected beneficial economic impacts to be reasonable.

Fiscal and Non-Fiscal Effects

Some fiscal (having to do with the public treasury) impacts (2005 dollars) of the Starwood Power Project include:

- Property taxes: $793,000 for 2009 (estimated by staff based on initial capital costs);
- Construction total local sales tax: $79,750 (estimated by staff);
- Operation local sales tax: $7,950 annually (estimated by staff); and
- School impact fee: $8,337 (URS 2006a).

Non-fiscal (private sector) impacts in 2005 dollars include:

- Initial capital costs are estimated at $67 million to $70 million.
- The construction payroll would be $6.5 million. The operations payroll is $85,000.
- Approximately $1 million would be spent locally on construction materials and supplies and $100,000 each operation year for locally purchased materials as part of an operation and maintenance budget within Fresno County (URS 2006a and 2006j, and CEC 2006j).

Housing

As of January 1, 2000, there were approximately 270,767 housing units in Fresno County. The vacancy rate for this housing averages approximately 6.6% for Fresno County, which includes single family, multi-family and mobile homes. In addition, there were 1,618 units in the City of Firebaugh and 1,919 units in the City of Mendota (URS 2006a).

As of July 2006, there are four hotel/motels with approximately 150 rooms in Mendota and Firebaugh (URS 2006a). As of August 10, 2006, there were 51 hotels/motels, 6,000 rooms, and a vacancy rate of 66% in the City of Fresno (Castillo 2006).

Again, the construction labor workforce is expected to come from Fresno, Madera, Tulare, and Kings counties and commute daily (URS 2006a and 2007b). Staff concludes that the supply of permanent and temporary housing is sufficient to accommodate the estimated five (field or contractor's staff) construction workers who would most likely temporarily relocate to the area (URS 2006a).

The residents of an existing 5 unit apartment building would be relocated to existing replacement housing as a result of the project (URS 2006a). This impact is not considered significant because the number of people to be moved would be small, and no new housing would be constructed. The entire permanent operational workforce is expected to commute from within Fresno County (URS 2006a).

Staff concludes that there would be no significant adverse socioeconomic impacts on housing as a result of the SPP.

Schools

Fresno County had 311 schools and 191,464 students in 2004-2005 (California Department of Education 2006). The project site is in the Mendota Unified School District, which has four schools and an enrollment of 2,383, and the Firebaugh-Las Deltas School District which has four schools and 2,434 students. The Mendota Unified School District is currently at capacity with plans to grow and add a middle school. The Firebaugh-Las Deltas School District is currently experiencing low enrollment based on the past few years (URS 2006a).

The addition of project-related children to schools that are at or over-capacity could increase costs in terms of supplies, equipment and/or teachers. However, this scenario is unlikely to occur since construction workers from outside the four-county area would likely commute weekly to the Starwood site, returning home to their families on the weekend for the relatively short duration of construction. The one operational worker is expected to be hired from Fresno County who would commute to the project site (URS 2006a). Staff concludes that no significant socioeconomic adverse impact on educational resources would occur as a result of the construction and operation of the SPP.

Education Code section 17620 authorizes a school district to levy a fee against any construction within a district. State and local agencies are precluded from imposing additional fees or other required payments on development projects for the purpose of mitigating possible enrollment impacts to schools. School impact fees to the Mendota Unified School District are estimated to be $8,377 (URS 2006a). Therefore, staff recommends **SOCIO-1** condition of certification to demonstrate proof of payment of this fee and compliance with LORS.

Law Enforcement

Fresno County Sheriff's Department provides service for the County and the Starwood site which is in the unincorporated part of western Fresno County. It is served by Area 1 station in the City of San Joaquin about 24 miles or approximately 30 minutes from the Starwood site. Area 1 station has one lieutenant, seven sergeants, one office assistant, four community service officers, and 34 deputy sheriffs. At any time, at least three personnel are on staff at the station with five or six cars on patrol. There are also air support units from the Fresno County Sheriff's Department to aid life threatening, emergency situations (URS 2006a). The project area is also patrolled by the California Highway Patrol.

Staff concludes that law enforcement resources are adequate and there would be no significant adverse socioeconomic impacts on law enforcement resources as a result of the SPP. This conclusion is based on the fact that the Fresno County Sheriff's Department confirms that law enforcement would be able to respond to emergency situations without a negative impact to the Sheriff's services to the community. Additionally, the project will take steps during construction and operation to minimize the potential for law enforcement impacts. This includes the installation of a security fence

around the entire project site and the provision of access gates as required (URS 2006a).

Parks and Recreation

Most of the construction labor force would commute from Fresno, Madera, Tulare, and Kings counties, and the operation workforce would be small (one worker) and from Fresno County. Staff concludes there would be no significant adverse socioeconomic impacts on parks and recreation in the project area.

Medical Services

Fresno County contracts private emergency medical services (EMS) from American Ambulance. American Ambulance has basic and advanced service and at least one paramedic and emergency medical team (EMT) available at all times. The project site is covered by the Mendota Station located about 16 miles away. Overall response time to the site is about 30 minutes. Mendota Station receives supplies of additional units from neighboring stations in Kerman and Los Banos in Merced County to ensure continuous emergency response coverage. In addition, American Ambulance has rapid response helicopter service in Fresno County, Skylife, which is located 45 miles away from the SPP or about a ½ hour one-way flight 24 hours a day. The service has a flight nurse, flight paramedic, and EMS pilot (URS 2006a).

Hospitals available for American Ambulance and Skylife are: Fresno Trauma Center (City of Fresno), Coalinga Regional Memorial Hospital (Kings County), Memorial Hospital Los Banos (Merced County), and Dos Palos Memorial Hospital (Merced County) depending on the injury (URS 2006a). Staff concludes that EMS resources are adequate for the Starwood project and therefore construction and operation of the project would not cause a significant adverse socioeconomic impact.

CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. “Cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. (Cal. Code Regs., tit. 14, section 15130.)

Cumulative impacts could occur when more than one project has an overlapping construction schedule that creates a demand for workers that cannot be met by local labor, resulting in an influx of non-local workers and their dependents.

Construction on the SPP would average 74 workers per month (110 during the peak month), for ten months from approximately June 2008 to March 2009.

Other power projects licensed or planned in Fresno County are:

- San Joaquin Valley Energy Center, an approved 1,087 MW combined- cycle power plant currently on hold.
- Panoche Energy Center (PEC), a proposed 400 MW power plant in Fresno County.

- Bullard Energy Center, a 200 MW natural gas peaker, proposed in the City of Fresno.

A Federal Bureau of Prisons (BOP) medium security Federal Correctional Institution (FCI) is slated to be built in Mendota, Fresno County, 12 miles from the PEC and Starwood power plant sites. Major construction of the new FCI was scheduled to begin in 2005 and completion was expected in 2008 (U.S. Department of Justice Federal Bureau of Prisons). Phase I was completed in March 2007 but the construction status of Phase II is unknown (CEC 2007y). Future housing development in Mendota includes 300 units of prison employee-related housing, 72 additional units of a 422 unit housing development, and a Lotus development of 63 houses. There are no additional known projects with similar construction needs in Fresno County.

Construction estimates for three power plant projects in Fresno County are shown in **Socioeconomics Table 2**. The schedule for Bullard has significantly slipped as they are considering a new site and filing an AFC supplement. Bullard has been in suspension since August 27, 2007. So this is a worse case scenario. In October 2008, the peak construction workforce would be 629 workers for all three projects which would be only approximately 5% of the 2002 construction workforce of 13,410 for Fresno-Madera MSA. However, the peak for Starwood and the two other projects demand for millwrights may exceed supply and require some short-term labor force from outside the four-county area of Fresno, Madera, Tulare, and Kings counties as well as San Benito and Merced counties. Staff estimates the three-project total for millwrights would be 111 in November 2008 and the Fresno-Madera MSA (Fresno and Madera counties) 2008 estimate of millwrights would be 78. No millwrights were forecast for Tulare, Kings, San Benito, and Merced counties. Millwrights from outside the four-county area would most likely relocate during weekdays in hotels and motels in the City of Fresno where there is considerable spare capacity and return home on the weekends. Hence, staff finds no significant adverse socioeconomic cumulative impacts associated with the SPP.

SOCIOECONOMICS Table 2
Cumulative Impact Analysis of the PEC, Bullard , and SPP Construction Workforces 2008 to 2009

	PEC	Bullard*, **	SPP	Total Construction Workforce
2008				
April	14	130		144
May	34	92		126
June	54	112	26	192
July	125	158	56	339
August	146	190	90	426
September	216	229	106	551
October	263	256	110	629
November	324	196	100	620
December	364	169	88	621
2009				
January	235	124	86	445
February	167	80	55	302
March	99		26	125

Source: Panoche 2006a, Bullard 2006, and URS 2006a.
* Includes power plant construction and linears (gas pipeline, sewer line, and water supply line).
** Includes construction and commissioning.

NOTEWORTHY PUBLIC BENEFITS

Important public benefits discussed under the fiscal and non-fiscal effects section are: capital expenditures, construction payroll, annual property taxes and sales taxes, and the value of locally purchased construction and operation equipment and materials.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or members of the public regarding socioeconomics.

CONCLUSIONS

Staff concludes that construction and operation of the Starwood project would not cause a significant direct or cumulative adverse socioeconomic impact on the study area's housing, schools, parks and recreation, law enforcement, emergency services, and hospitals. Hence, there are no socioeconomic environmental justice issues related to this project. The project, as proposed, is consistent with applicable LORS.

Estimated gross public benefits from the Starwood project include increases in property and sales taxes, employment, and income for Fresno County. There are estimated to be an average of 74 direct project-related construction jobs for the ten months of construction. The project is estimated to have total capital costs of $67 million to $70 million. The construction payroll is estimated at $6.5 million for ten months and the

operation payroll is $85,000 annually. Property taxes are estimated at $793,859 for the first year for a project life of 30 years. The estimated total sales and use tax during construction is $79,750 and during operation the local sales tax is $7,975 annually over the life of the project. An estimated $1 million would be spent locally for materials and equipment during construction, and an additional $100,000 would be spent annually on the operations and maintenance budget.

Finally, the following **Socioeconomics Table 3** provides a summary of socioeconomic data and information from this analysis, with emphasis on SPP's economic benefits.

SOCIOECONOMICS Table 3
Data And Information

Estimated Project Capital Costs	Initial: $67-$70 million
Estimate of Locally Purchased Materials	
Construction	$1 million
Operation (Operation and Maintenance)	$100,000 per year
Estimated Annual Property Taxes	$793,859 in 2009 (estimated by staff)
Estimated School Impact Fees	$8,337 to the Mendota Unified School District
Estimated Direct Employment	
Construction (average)	74 jobs (average per month)
Operation	1 job
Estimated Secondary Employment	
Construction & Commissioning	72 jobs
Operation	1 job
Estimated Local Secondary Income	
Construction	$2.5 million in labor income
Operation	$34,506 in labor income
Estimated Payroll	
Construction	$6.5 million
Operation	$85,000 annually
Estimated Sales Taxes	
Construction	$79,750 (estimated by staff)
Operation	$7,975 annually (estimated by staff)
Existing Unemployment Rates	Existing – 9.2% for Fresno County and 5.3% for California in January 2007, (Not Seasonally Adjusted)
Percent Minority Population (6 mile radius)	98.16%
Percent Poverty Population (6 mile radius and beyond)	20%
Percent Minority Population (1 mile radius)	100%

Table 3 uses 2005 dollars , construction is for 10 months (unless otherwise indicated) and the projects life is planned for 30 years. Economic (non-fiscal and fiscal) impacts and unemployment is for Fresno County for construction and operations. The results of the IMPLAN/Input-Output modeling are for Fresno, Madera, Tulare, and Kings Counties and show secondary, indirect and induced impact. as well as direct impacts. Population is for a six mile and one mile radius from the power plant except as noted.

PROPOSED CONDITION OF CERTIFICATION

Socio-1 The project owner shall pay the one-time statutory school development fee to the Mendota Unified School District as required by Education Code Section 17620.

Verification: At least 30 days prior to start of project construction, the project owner shall provide the Compliance Project Manager (CPM) proof of payment of the statutory development fee.

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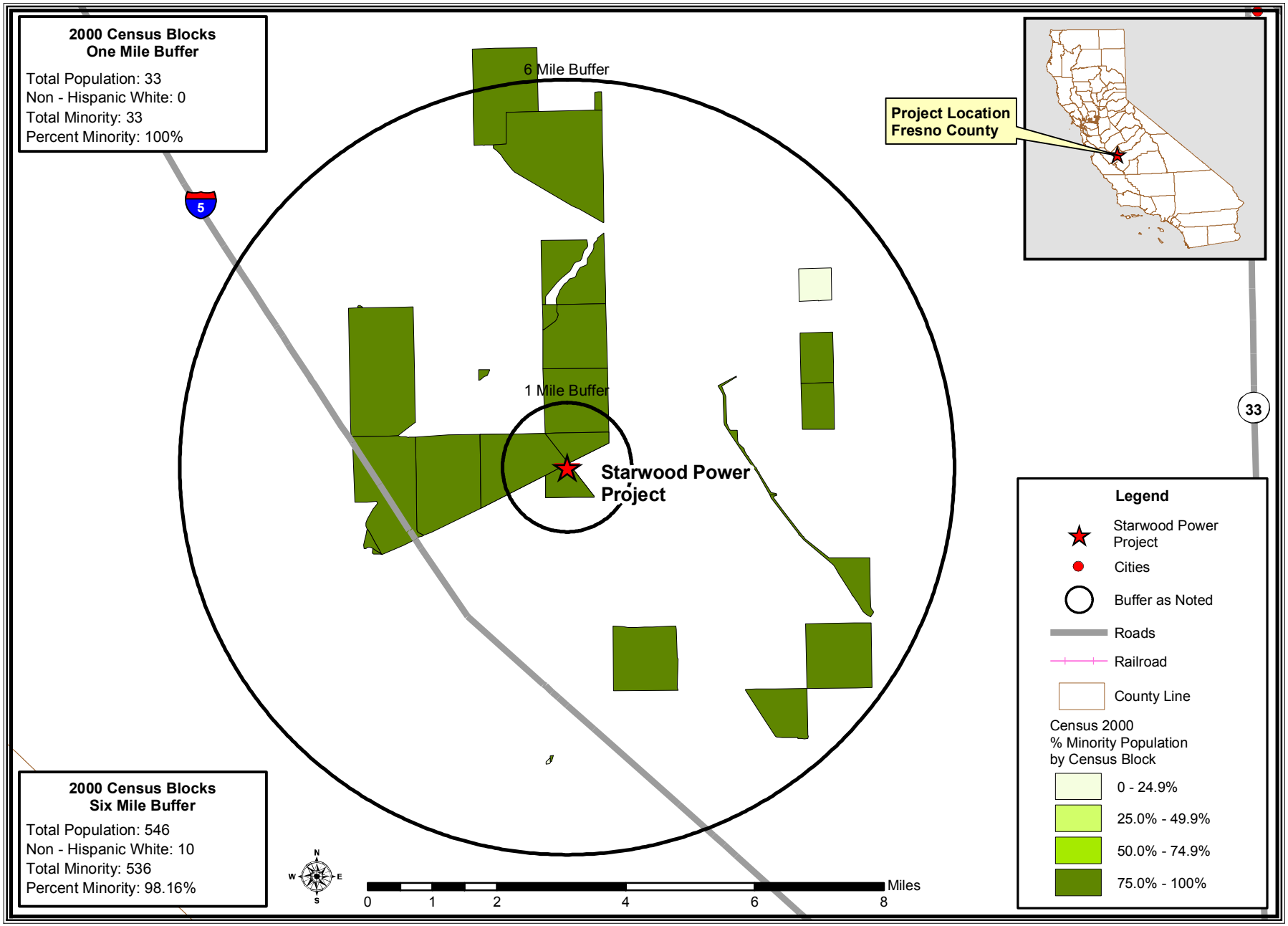
SOCIOECONOMICS - FIGURE 1

Starwood Power Project - Census 2000 Minority Population by Census Block - One and Six Mile Buffer



OCTOBER 2007

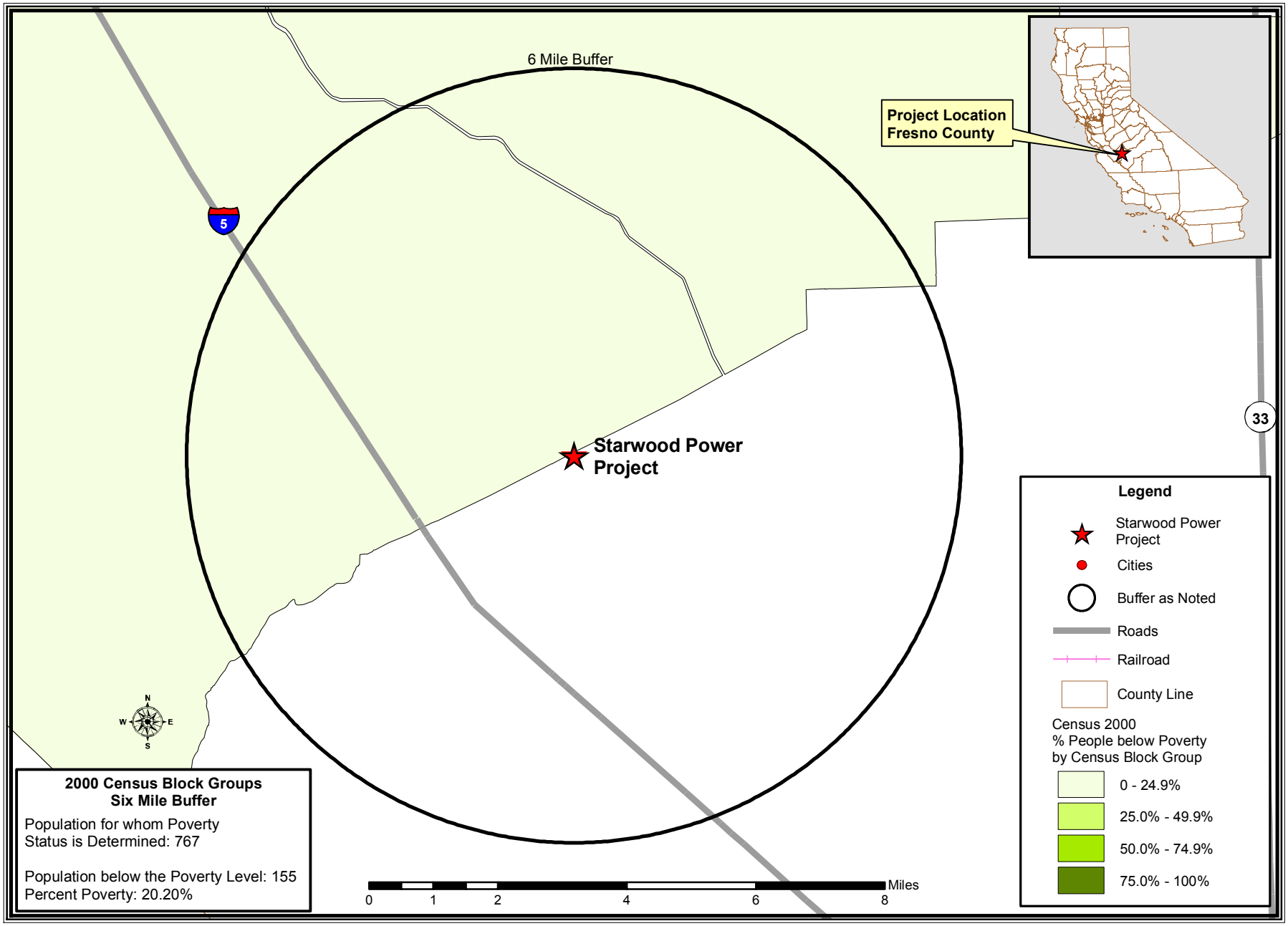
SOCIOECONOMICS

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: California Energy Commission Statewide Power Plant Maps 2006 - Census 2000 PL 94-171 Data - Matrix PL2

SOCIOECONOMICS - FIGURE 2

Starwood Power Project - Census 2000 Percentage of People below Poverty by Census Block Group - Six Mile Buffer



CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: California Energy Commission Statewide Power Plant Maps 2006 - Census 2000 - SF3

SOIL & WATER RESOURCES

Testimony of Somer Goulet and Richard Anderson

SUMMARY OF CONCLUSIONS

This section of the Final Staff Assessment (FSA) analyzes the potential effects on soil and water resources that would occur by construction and operation of the proposed Starwood Power Project simple-cycle power generation project. Based on its assessment of the proposed Starwood Power Project (SPP) project, staff concludes the following:

- Implementation of Best Management Practices (BMPs) during SPP construction and operation in accordance with effective Storm Water Pollution Prevention Plans and a Drainage, Erosion and Sedimentation Control Plan would avoid significant adverse effects that could be caused by transport of sediments or contaminants from the SPP site by wind or water erosion.
- The proposed water supply for the project, groundwater from the semi-confined aquifer, would not cause a significant adverse environmental impact or affect current or future users of the semi-confined groundwater aquifer. The semi-confined aquifer is the lowest quality water supply reasonably available to the project and is not considered fresh inland water. Staff considers it to be consistent with state water use and conservation policies.
- The applicant's alternatives it considered to its proposed water supply consisting of Baker Farm irrigation water filter backwash (Alternative 1) and the confined aquifer (Alternative 2) would not cause significant impacts to water supply or water quality. However, both are considered fresh inland water under all criterion including Title 22 of the California Code of Regulations, and State Water Resources Control Board (SWRCB) Policies 75-58 and 88-63. Neither comply with state water policy found in the California Constitution, SWRCB Resolution 75-58, and the Energy Commission's 2003 Integrated Energy Policy Report (IEPR) water policy.
- The proposed project would be constructed to comply with 100-year flood requirements and would not exacerbate flood conditions in the vicinity of the project.
- The discharge of wastewater to an on-site evaporation pond would not degrade surface or groundwater quality of waters used for other beneficial purposes.
- The proposed project would comply with all applicable federal, state and local laws, ordinances, regulations and standards with the adoption of the recommended conditions of certification.
- The SPP project would not result in any unmitigated project-specific or cumulative significant adverse impacts to soil or water resources with adoption of the conditions of certifications.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

SOIL AND WATER RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards (LORS) and Policies

Applicable LORS	Description
Federal	
Clean Water Act (CWA) (33 USC Section 1251 et seq.)	The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non point source discharges to surface water. This includes regulation of storm water discharges during construction and operation of a facility normally addressed through a general National Pollutant Discharge Elimination System (NPDES) permit.
CWA Section 401	Section 401 of the CWA requires that any activity that may result in a discharge into a water body must be certified by the Regional Water Quality Control Board (RWQCB)
CWA Section 404	Section 404 of the CWA authorizes the U.S. Army Corps of Engineers (ACOE) to regulate the discharge of dredged or fill material to the waters of the U.S. and adjacent wetlands. The ACOE issues site specific or general (Nationwide) permits for such discharges.
Resource Conservation and Recovery Act (RCRA) (40 CFR Part 260, et seq.)	RCRA seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes.
State	
California Constitution, Article X, Section 2	The State Constitution requires that the water resources of the state be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited.
Porter Cologne Water Quality Control Act (PCWQCA) (Water Code §13000 et seq.)	PCWQCA requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. These standards are typically applied to the proposed project through the Waste Discharge Requirements (WDRs) permit. These regulations require that the RWQCB issue Waste Discharge Requirements specifying conditions regarding the construction, operation, monitoring and closure of waste disposal sites, including injection wells and evaporation ponds for waste disposal.
California Water Code (CWC) Section 13550	CWC Section 13550 requires the use of reclaimed water for industrial purposes subject to reclaimed water being available and meeting certain conditions such as the quality and quantity of the reclaimed water are suitable for the use, the cost is reasonable, and the use is not detrimental to public health.
California Water Code (CWC) Section 13552.6	CWC Section 13552.6 prohibits the use of domestic water for cooling towers if suitable recycled water is available.
The California Safe Drinking Water and Toxic Enforcement Act (California Health & Safety Code §25249.5 et seq.)	The California Safe Drinking Water and Toxic Enforcement Act prohibit actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity.
Recycling Act of 1991 (Water Code § 13575 et esq.)	The Water Recycling Act of 1991 encourages the use of recycled water for certain uses and establishes standards for the development and implementation of recycled water programs.
California Code of Regulations, Title 22	Under Title 22 of the California Code of Regulations, the California Department of Health Services (DHS) reviews and approves wastewater treatment systems to ensure they meet tertiary treatment standards allowing use of reclaimed water for industrial processes such as steam production and cooling water. DHS also specifies Secondary Drinking Water Standards in terms of Consumer Acceptance Contaminant

	Levels, including TDS ranging from a recommended level of 500 mg/l, an upper level of 1,000 mg/l and a short term level of 1,500 mg/l.
Warren-Alquist Act Public Resources Code Section 25500 et seq.	The California Energy Commission has the exclusive authority to certify the construction and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, §25500). The Energy Commission must review power plant AFCs to assess potential environmental and public health and safety impacts, potential measures to mitigate those impacts (Pub. Resources Code, §25519), and compliance with applicable governmental laws and standards (Pub. Resources Code, §25523 (d)).
State Policies	
Energy Commission Integrated Energy Policy Report (IEPR) 2003	Consistent with State Water Resources Control Board Policy 75-58 and the Warren–Alquist Act, the Energy Commission will approve the use of fresh water for cooling purposes by power plants it licenses only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound". "Additionally, the Energy Commission will require zero liquid discharge technologies unless such technologies are shown to be "environmentally undesirable" or "economically unsound".
State Water Resources Control Board (SWRCB) Policies: Resolution 75-58 & Resolution 88-63	The principal policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. Resolution 75-58 defines brackish waters as "all waters with a salinity range of 1,000 to 30,000 mg/l" and fresh inland waters as those "which are suitable for use as a source of domestic, municipal, or agricultural water supply and which provide habitat for fish and wildlife". Resolution 88-63 defines suitability of sources of drinking water. The total dissolved solids must exceed 3,000 mg/L for it to not be considered suitable, or potentially suitable, for municipal or domestic water supply.
Local	
County of Fresno Ordinances Building & Construction, Grading & Erosion Chapter 15.28 Street & Utility Improvement Chapter 17.68 Water & Sewage Chapter 14.04 & 14.08	The County of Fresno has permit requirements associated with Grading and Erosion Control, Encroachment Permits and securing a Franchise Agreement for the natural gas and recycled water lines within County right-of-ways and requirements associated with a Well Drilling Permit.
Fresno County Department of Community Health, Environmental Health System, California Well Standards Ordinance and California Well Standards, Bulletins 74-81 and 74-90	The Fresno County Environmental Health System regulates the construction of new water wells; the reconstruction, repair or deepening of existing wells; and the destruction of abandoned wells in unincorporated Fresno County.
Fresno County General Plan, Water Quality Policies OS-A.23 through OS-A.30 and Programs OS-A.A through OS-AD	The purpose of these policies and programs is to help control potentially significant impacts of development, including non-point sources of water pollution, such as runoff from urban areas, grading, construction, and agricultural activities.
Fresno County Department of Health and Safety, Fresno County Ordinance Code	Any place for the disposal of sewage, feculent matter, etc. which has been produced or formed as a result of or incidental to the operation of any industrial plant requires an environmental health permit and is

8.50.050 4-B	subject to inspection fees.
Fresno County Ordinance Title 15	Fresno County Ordinance Title 15 requires that projects within the hazard zone be raised to ensure that, in the event of a 100-year storm, the site and equipment is not subjected to any flood damage.

SETTING

The SPP is a proposed simple-cycle electric generation project located in an unincorporated area of western Fresno County approximately 50 miles west of the City of Fresno. The nearest intersection to the project site is West Panoche Road and South Fairfax Avenue. The project site is approximately two miles east of Interstate 5.

REGIONAL SETTING

The proposed SPP project would be located in the central part of the western San Joaquin Valley within the northern portion of Westlands Water District service area. The hydrogeology, groundwater quality, and history of agricultural irrigation of the western San Joaquin Valley largely define the soil and water conditions of the region.

There are no natural or artificial water bodies in the vicinity of the site with the exception of the California Aqueduct, approximately two miles to the east, and Panoche Creek, the main drainage in the area, which is approximately two miles northwest of the proposed project. This rural unincorporated section of Fresno County is characterized by extremely flat topography, agriculture practices, and sparsely located houses.

Hydrogeology

The San Joaquin Valley is a north-south trending asymmetrical basin, bound by the Coast Ranges on the west, the Tehachapi Mountains on the south, the Sierra Nevada on the east, and the delta of the San Joaquin and Sacramento Rivers on the north. The axis of the valley is closer to the Coast Ranges than to the Sierra Nevada and is defined by the San Joaquin River and the Fresno Slough. The sediments that fill the San Joaquin Valley and form the aquifer system are derived from erosion of the Coast Ranges and the Sierra Nevada.

The aquifer system in the central part of the western San Joaquin is composed of three layers: an upper, semi-confined aquifer, underlain by a low-permeability aquitard and a lower confined aquifer. The confined aquifer is underlain by a deep succession of marine deposits containing saline water, which are not part of the freshwater aquifer system.

The semi-confined aquifer consists of three hydrogeologic units: Coast Range alluvium, Sierran sand and flood plain deposits. The Coast Range alluvium in this area is dominated by the Panoche Creek fan, one of the two largest alluvial fans on the west side of the valley (Bull 1964). The deposits are primarily sand and gravel at the fanhead and along the stream channels, grading to silt and clay at the fan boundaries. The thickness of the Coast Range alluvium is more than 800 feet along the Coast Ranges and thins to zero near the valley axis where it interfingers with Sierran sand. The Sierran sand consists of medium- to coarse-grained, stream-deposited sand derived from the Sierra Nevada. The Sierran sand is 400 to 500 feet thick along the valley axis and thins to east and west. Flood plain deposits, composed of clay and silt, blanket the

Sierran sand in the center of the valley and range in thickness from five to 35 feet (Laudon and Belitz 1989).

The low-permeability aquitard, which divides the groundwater flow system into an upper semi-confined aquifer and a lower confined aquifer, is the Corcoran Clay Member of the Tulare Formation. The Corcoran Clay is an extensive lakebed deposit that underlies much of the San Joaquin Valley and creates confining (pressurized) conditions in the underlying aquifers. In the central part of the western San Joaquin, U.S. Geological Survey (USGS) investigators report that the Corcoran Clay ranges in thickness from 20 feet to 120 feet (Page 1986).

The confined aquifer beneath the Corcoran Clay is a lower member of the Tulare Formation. The confined aquifer consists primarily of poorly consolidated flood plain, deltaic, alluvial fan and lakebed deposits. Each of these deposits have distinct compositional and structural characteristics that determine their ability to transmit water. The deposits are interlayered and their occurrence and distribution determine the variation of permeability and storage within the confined aquifer. In general, coarse- to medium-grained deposits dominate the aquifer adjacent to the Coast Range and grade to deposits primarily composed of silt and clay in the center of the valley. The thickness of the confined aquifer ranges from 570 feet to 2,460 feet (Williamson 1989).

Regional Groundwater Quality

Water quality varies significantly from east to west within the semi-confined aquifer. The mineral composition of the sediments derived from the Sierra Nevada and the Coast Ranges have largely determined the chemical composition of groundwater in the semi-confined aquifer. The Sierran sands contain relatively low concentrations of soluble salts and minerals. Accordingly, groundwater produced from the Sierran sands is relatively good quality. In contrast, the Coast Range sediments contain relatively high concentrations of soluble salts and minerals, including selenium. As a result, the salinity of the groundwater produced from Coast Range alluvium is relatively high, except along mountain front and major streams, which have flushed dissolved salts and minerals from the aquifer. Because the Sierran sands interfinger with the Coast Ranges alluvium, the water in the semi-confined aquifer (at depth) grades from fairly good quality near the San Joaquin River to very poor quality to the west.

In the lowlands near the San Joaquin River, water quality in the semi-confined aquifer also varies significantly between the shallow flood plain deposits and the underlying Sierran sands. In fact, the highest groundwater salinity in the region occurs in the flood plain deposits. However, in contrast to the Coast Range alluvium and the Sierran sands, the salinity in the flood plain deposits is not derived from its mineral composition.

Prior to the development of irrigated agriculture and groundwater pumping in the region, streams flowing from the Coast Range were the primary source of recharge to the aquifer system. Scant rainfall provided limited areal recharge. Groundwater moved slowly through the aquifer and discharged to low-lying areas adjacent to the river along the valley floor. Over time, evaporation of groundwater discharge in the lowlands caused the accumulation of minerals and salts in the flood plain deposits, which blanket this part of the valley.

When irrigated agriculture developed in the region, percolation from irrigation occurred between the corridors of natural recharge along the streams. This new recharge mobilized additional salts and minerals from the unsaturated portions the Coast Range alluvium, causing an increase in groundwater salinity in the semi-confined aquifer. In addition, evaporation caused salts and minerals to accumulate in irrigated soils, which required additional water application to flush the soil. Correspondingly, the groundwater that discharged to the valley lowlands became more saline.

When imported surface water replaced groundwater for irrigation, additional acreage was brought into cultivation, which, in turn, increased the rate of groundwater discharge to the valley lowland and expanded the extent of high water-table conditions in low-lying areas. High water-table conditions made the land unusable for farming because water flooded the crop root-zones and increased evaporation rates from the soil, causing greater accumulation of salts. When tile drains were installed to reclaim land for farming, the drains increased the discharge of saline groundwater to the surface water system (Fio and Leighton 1994).

Disposal of agricultural drainage water from the western San Joaquin is a major problem because the concentration of salts and minerals, most notably selenium, make the water unusable for most human, agricultural and environmental purposes and cause significant degradation if discharged to fresh-water streams. Agricultural drainage water was initially discharged to surface water systems, including the San Luis Drain and the Kesterson National Wildlife Refuge. However, in the 1980's the USGS identified high concentrations of selenium in drain water from the western San Joaquin Valley and the detrimental effects of selenium on waterfowl at the Refuge (Deverel and others 1984, Presser and Barnes 1984, Ohlendorf and others 1986).

Federal, state and local agencies have most recently adopted a program, entitled the San Luis Drainage Feature Re-evaluation Project, which includes a range of components to control and resolve this water quality problem. The project includes land retirement and water efficiency programs, which will decrease total irrigated acreage, the average water use per acre and the total amount of drain discharge. In addition, these programs will increase the availability of surface water per acre for the remaining farms and, correspondingly, decrease the need for groundwater use.

REGIONAL WATER USE HISTORY

Significant water use in the western San Joaquin Valley began in the 1920s with advances in groundwater pumping technology. Large-scale farming and irrigation steadily increased and by the early 1950's Westlands Water District, the largest water district in the area, pumped almost 1 million acre-feet of water annually. Most of the water was pumped from the confined aquifer beneath the Corcoran Clay.

The increase in groundwater use and the expansion of irrigated acreage significantly altered the hydrology of the region. Percolation from irrigation far exceeded percolation from streams and became the primary source of groundwater recharge. Discharge of water through wells and evapotranspiration from crops replaced evapotranspiration from native vegetation as the primary mechanism of discharge. Groundwater levels in the confined aquifer dramatically declined, causing changes in the direction of groundwater flow. Prior to groundwater development, groundwater throughout the system flowed to

the northeast, toward the axis of the valley. During this period of intensive groundwater use, inland groundwater levels dropped dramatically and the flows in the confined aquifer reversed and flowed west toward the center of the groundwater pumping. Significant downward vertical gradients developed, drawing water from the semi-confined aquifer, which received percolation from irrigation, through the Corcoran Clay, to the confined aquifer. By the early 1950's, the confined aquifer was drawn down 100 to 200 feet from estimated predevelopment levels (Belitz 1990).

Changes in the groundwater levels also caused structural changes within the aquifer system. Declines in water levels in the confined aquifer reflected a drop in the hydrostatic pressure within the aquifer. Depressurization causes compaction of sediments. The pores between sand and gravel can be depressurized, and even drained, but can subsequently be refilled. However, clays are deposited in plate-like structures, like a house of cards. When clays are depressurized, the structure of the clays collapses. The clays structure is permanently compacted and cannot be restored. The depressurization and compaction of clays is the primary cause of land subsidence in the western San Joaquin Valley. Groundwater pumping from 1920 to 1970 caused land subsidence of more than two feet through the central western San Joaquin Valley and as much as 28 feet locally. Land subsidence causes numerous agricultural and engineering infrastructure problems, including the collapse of well casings.

Partially in response to land subsidence problems, importation of surface water from the Central Valley Project (CVP) began in 1967. The availability of surface water for irrigation rapidly replaced the use of groundwater. As a result, groundwater levels in the confined aquifer have significantly recovered and stabilized. Although purchasing CVP water is more expensive than using local groundwater, surface water offered several advantages. The cessation of groundwater use allowed the recovery of groundwater levels and a halt to subsidence. In addition, the quality of CVP water is significantly better than water from the confined aquifer, so a wider variety of higher-value crops could be produced and the rate of salt accumulation in irrigated soils decreased.

The importation of surface water also brought new problems. The acreage of irrigated agriculture expanded in the region with importation of a plentiful supply of surface water. As irrigation increased, recharge to the semi-confined aquifer increased. The decline in groundwater pumping in the confined aquifer caused a decrease in downward vertical gradients, which had previously tended to control the rise in the water table. Importation of surface water lead to the expansion of areas with a shallow water table, a significant increase in the production of agricultural drainage water, and the need for new agricultural management methods to control and dispose of drainage water.

Although cutbacks in the CVP water supply during the last state-wide drought lead to a resurgence of intensive groundwater use in the early 1990's, which reached a high of 600,000 acre-feet in 1991 and 1992, groundwater pumping rapidly declined when normal surface-water deliveries were restored (Westlands 2005). Westland reports that district groundwater use has averaged 185,000 acre-feet per year over the last 30 years, which is less than 20% of the historical record of one million acre-feet/year pumped in the 1950's. Perennial yield can be defined as the average amount of groundwater that can be pumped without causing long-term groundwater level declines. Using this definition, Westland calculates that the perennial yield of the groundwater

basin is about 200,000 acre-feet annually. Groundwater pumping rates would have to exceed the perennial yield for a sustained period of years to cause a progressive decline in groundwater levels. Groundwater levels would have to approach historic low levels for a sustained period of years to initiate additional land subsidence.

PROJECT, SITE, AND VICINITY DESCRIPTION

The SPP site is in an unincorporated area of Fresno County on West Panoche Road. The proposed site is a 5.6-acre parcel within a 128-acre site. Existing use on the proposed site is a CalPeak Power storage yard. The main land use in the surrounding area is agricultural; however, adjacent to the site on the west is the Wellhead Power Peaking Plant and the CalPeak Power Peaking Plant. The PG&E Panoche transmission substation is located approximately .2 mile from the existing CalPeak facility. The proposed Panoche Energy Center which is under review by the Energy Commission is located one-quarter mile away.

The SPP would include a water treatment system using a reverse-osmosis (RO) unit that would feed a demineralizer to provide high-purity water to the gas turbines for water injection/inlet fogging. The water treatment system would include one 75,000-gallon raw water storage tank, a RO unit, a mobile water treatment system, two 75,000-gallon demineralized water storage tanks, and a forwarding system to deliver the demineralized water to the gas turbines. The project would include a waste water system to collect oily water waste from the site including an on-site 4,700 gallon storage tank to contain drainage from the CTG units. Oily waste would be collected in sumps and pumped to above-ground storage tanks and sent off site for disposal. A site stormwater drainage system would convey drainage of rain water away from areas where equipment is stored. An on-site, lined evaporation pond would collect waste discharge water from the RO unit.

Soils

The SPP site is surrounded by agricultural land; however, the actual site is being used as a storage yard for large equipment left over from the construction of the CalPeak Power generation project. The adjacent property, approximately 122 acres, is prime agricultural land in a Williamson Act preserve contract and has been designated by the State of California as farmland of statewide importance. The Williamson Act contract was partially cancelled by Fresno County in March 2007, with the sites for the proposed project and adjacent proposed Panoche project subject to the partial cancellation.

The native soils present at the SPP site consist of the Panoche Series. Panoche Series soils typically slope at zero to two percent, with medium runoff. Panoche Series soils in this area are made up of about 85% Panoche clay loam, 5% Cerini clay loam, 4% Calfax clay loam, 2% Ciervo clay loam, 2% Posochanet clay loam saline-sodic, and 2% Kimberlina sand loam.

Panoche clay loam soils are capability classification I, subclass VIIc. There are no major limitations and few overall limitations for this soil. Permeability of this soil is moderate, with an available water capacity that is high or very high. Effective rooting depth is 60 inches or more. As stated, runoff is medium, and the hazard of water erosion is slight.

The surface layer is light brownish gray clay loam about seven inches thick. The upper nine inches of the subsoil is light brownish gray loam. The next 27 inches is light gray loam over 14 inches of light brownish gray loam. The lower part to a depth of 72 inches is light brownish gray sandy loam. The soil is calcareous throughout. In some areas the surface layer is clay, sandy clay loam, or loam.

As stated above, the site has been historically disturbed by agriculture production, and is currently being used as a storage yard.

The following is a table of the major soils in the area and their characteristics.

SOIL AND WATER RESOURCES Table 2
Soils in the Starwood Power Project Area

Primary Soil Name	Parent Material	Natural Drainage Class	Surface Runoff	Slowest Permeability	Present Flooding
Panoche clay loam 0-2% slopes	Alluvium derived from calcareous sedimentary rock	Well drained	Negligible	Moderate	Very rare
Cerini clay loam 0-2% slopes	Alluvium derived from calcareous sedimentary rock	Well drained	Low	Moderately slow	Very rare
Calfax clay loam, subsided, 0-2% slopes	Alluvium derived from calcareous sedimentary rock	Moderately well drained	Medium	Slow	Very rare
Ciervo clay loam 0-2% slopes	Alluvium derived from calcareous sedimentary rock	Moderately well drained	Medium	Slow	Very rare
Posochanet sandy loam	Alluvium derived from calcareous sedimentary rock	Moderately well drained	Medium	Slow	Very rare
Kimberlina sandy loam	Alluvium derived from calcareous sedimentary rock	Well drained	Negligible	Moderately rapid	Very rare

Source: http://websoil/survey.nrcs.usda.gov/app

Based on the characteristics of the SPP site and associated linear facilities, erosion potential from wind and water is low; although, construction activity could temporarily increase soil erosion.

Surface Water Hydrology

The largest streambed in the SPP area is Panoche Creek, which is located approximately two miles northwest of the project site. The site elevation is approximately 420 feet above mean sea level and the site slopes gently down to the northeast at an approximate one-percent grade.

Water Uses

Peak water use associated with the SPP would include 98 gallons per minute (URS 2006a, p 5-5.9) of demineralized water for NOx control and 40 gallons per minute for inlet fogging. The maximum annual water use for the project will be 136 acre-feet when operating a maximum of 4,000 hours a year.

Raw water will be chlorinated for use at service-water hose connections as well as for sanitary water uses; however, the sanitary water will not be potable. Signs will be posted indicating that sanitary water is not potable and should not be consumed. Bottled water will be provided for potable uses.

Water Supply Alternatives

The applicant has proposed to use semi-confined aquifer water as SPP's water supply. They have also proposed two alternative water supplies. These are irrigation water filter backwash from the nearby Baker Farm and water from the confined aquifer below the site. Groundwater quality in the SPP site vicinity is generally good in the confined aquifer. The semi-confined aquifer, however, generally has poor water quality with high dissolved solids, chloride, and sulfate concentrations (USGS 2000). **Soil and Water Resources Table 3** includes water quality information for the three alternatives.

Semi-confined Aquifer

SPP's primary proposed water supply, is to use low-quality non-potable semi-confined aquifer groundwater. SPP would use the existing CalPeak Panoche peaker power plant well for the semi-confined aquifer water. The semi-confined aquifer has total dissolved solids (TDS) of approximately 3,400 mg/L and is not expected to supply a domestic, agricultural or public water system due to low quality; therefore, the semi-confined aquifer water is not considered fresh water and is the most degraded source reasonably available to SPP.

Baker Farm Irrigation Water Filter Backwash (Alternative 1)

Alternative one would consist of using irrigation water filter backwash. The Baker Farm Company, LLC farms approximately 7,000 acres of land in the region. Baker Farm has developed a water delivery system that serves all of the property it farms in the area near SPP, utilizing approximately 24,000 acre-feet of water annually. The farming operation produces approximately 160 acre-feet of wastewater from irrigation water filter backwash on an annual basis. Greater agricultural wastewater quantities are produced during the irrigation season, April to September. This wastewater is discharged to a series of evaporation ponds. The irrigation water filter backwash could potentially supply SPP water needs. However, at this time there is no conveyance system for supplying SPP. Using Baker Farm irrigation water filter backwash would require constructing an approximately one-and-a-half mile four-inch diameter pipeline from the evaporation

pond collection system to the SPP site. Use of the irrigation water filter backwash would not be consistent with the California State Water Resources Control Board (SWRCB) Resolution No. 75-58 nor the Energy Commission 2003 IEPR policy because it's quality is that of fresh water. The confined aquifer is considered freshwater as defined by Title 22, and the SWRCB's Policy 75-58 and Resolution 88-63.This is discussed more fully in the Compliance with LORS section.

Confined Aquifer Deep Well (Alternative 2)

Alternative two would consist of SPP utilizing a new 1,500-foot deep well to access the confined aquifer water. This new well would be located on-site adjacent to the RO unit in order to limit the amount of piping needed. The deep well would access the confined aquifer water located below the Corcoran Clay formation. The groundwater in the confined aquifer has moderately high TDS concentrations (820-1100 mg/l) and is used for domestic purposes by local residents and as a backup to curtailments on deliveries of CVP water for agricultural purposes in the area. Use of the confined aquifer water would not be consistent with the California State Water Resources Control Board Resolution No. 75-58 nor the Energy Commission 2003 IEPR policy addressing the use of fresh water. The confined aquifer is considered fresh water as defined by Title 22, and the SWRCB's Policy 75-58 and Resolution 88-63. This is discussed more fully in the Compliance with LORS section.

Water Quality

The SPP project proposes to use the semi-confined aquifer, which is the most degraded water supply reasonably available to SPP. **Soil And Water Resources Table 3** compares the semi-confined aquifer groundwater quality from the Cal Peak Panoche well that will be the source of water for the proposed SPP project with the irrigation water filter backwash (alternative 1) and the confined aquifer water (alternative 2). The quality of the semi-confined aquifer water is much lower than the other two alternatives, not usable for domestic or agricultural purposes and therefore, from a conservation policy, preferable for the SPP's process water supply needs.

SOIL AND WATER RESOURCES Table 3
SPP Alternative Water Supplies Water Quality

Constituent (Units)	Proposed Water Supply Semi-Confined Aquifer	Alternative 1 Baker Ranch Irrigation Water Filter Backwash Water	Alternative 2 Confined Aquifer
Chloride (mg/L)	200	48	40-85
Sulfate as SO_4 (mg/L)	1900	21	370-440
Total Dissolved Solids (mg/L)	3400	170	820-1100
Hardness (mg/L equiv $CaCO_3$/L)	1500	61	40-56
Silica (mg/L)	47	10	31-40

Source: URS 2006a

Reverse Osmosis and Demineralization Treatment

Reverse osmosis and demineralization are processes that would purify SPP's proposed water supply from the semi-confined aquifer well water. The same systems would be used to purify the other alternative water sources. Well water will be pumped at a rate of up to 100 gallons per minute (gpm) to the on-site facility where the water will be filtered and then treated by RO. The treated water would flow at a rate of approximately 75 gpm into the raw water storage tank. Approximately 25 gpm of RO reject water would be generated. The raw water storage tank has capacity for approximately 18 hours of storage at the feed-water rate of 75 gpm. From the raw water storage tank, the water will be withdrawn by a pump and distributed to the demineralization treatment units and/or the service water distribution system. Following treatment, demineralized water flows from the demineralization treatment units to the demineralized storage tanks. The demineralized storage tanks have the capacity to store approximately 33 hours of demineralized water at the inlet feed rate of 75 gpm if no water is withdrawn. If water is withdrawn and no water is being pumped to the storage tanks, the tanks have a capacity of approximately 18 hours. If the tanks are being fed at the same time that water is being withdrawn from the system, the tanks have a storage capacity of approximately 37 hours. In short, as part of SPP design, ample storage has been included to meet water-supply demand (URS 2006a, p 5.5-10).

Process and Sanitary Wastewater

The RO process will generate an average of 25 gpm of reject waste water. Process and industrial wastewater discharge from the proposed SPP plant will consist of nonhazardous RO reject water that would range from 3.4 acre-feet per year based on 400 hours of operation, to approximately 34 acre-feet per year based on 4,000 hours of

operation. The wastewater discharge will be sent to an evaporation pond on the east side of the site through a 4-inch PVC gravity pipe. The evaporation pond will be a 25,000-square-foot surface impoundment with a polyethylene liner. Following drying in the evaporation pond, the non-hazardous solids will be removed to a local landfill. The following table lists the estimated wastewater quality data using the proposed semi-confined aquifer water. Wastewater quality data has not been provided for neither of the other two alternatives at this time.

SOIL AND WATER RESOURCES Table 4
Estimated SPP Wastewater Quality

Constituent	Concentration
Alkalinity (as $CaCO_3$)	560 mg/L (milligrams per liter)
Ammonia (NH_3-N)	Negligible
Bicarbonate (as $CaCO_3$)	560 mg/L
Boron (B)	17 mg/L
Calcium (Ca)	960 mg/L
Carbonate (as $CaCO_3$)	4.0 mg/L
Chloride (Cl)	800 mg/L
Hardness (as $CaCO_3$)	6,000 mg/L
Hydroxide (as $CaCO_3$)	Negligible
Iron (Fe)	Negligible
Magnesium (Mg)	880 mg/L
Nitrate (NO_3)	560 mg/L
o-Phosphate (o-PO_4-P)	Negligible
Potassium (K)	34 mg/L
Silica – total (SiO_2)	188 mg/L
Sodium (Na)	1,880 mg/L
Sulfate (SO_4)	7,600 mg/L
Total dissolved solids	13,600 mg/L
Total suspended solids	Negligible

Source: URS 2006a p 5.5-12

Sanitary wastes from the portable toilets at the SPP site will be hauled off site for disposal in accordance with county rules and regulations.

Storm Water

The SPP project lies within the Federal Emergency Management Agency special flood hazard area (Zone A), which means that at its current elevation the area would be inundated by a 100-year flood. Fresno County Ordinance Code Title 15 requires the project be raised to ensure that, in the event of a 100-year storm, the site and equipment are not subjected to any flood damage. The applicant has proposed to elevate the project site three feet to meet these requirements. All stormwater will be directed to the evaporation pond.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This section provides an evaluation of the expected direct, indirect and cumulative impacts to soil and water resources that would be caused by construction, operation and maintenance of the project. The analysis of impacts is conducted pursuant to CEQA, the Warren-Alquist Act, and the Energy Commission siting regulations. Potential impacts to water resources include the effects of project demand on the water supply and existing water users and the effects of construction activities and plant operation on water quality. Potential impacts to soil resources include the effects of construction and operation activities that result in erosion of soils and sedimentation moving into surface waters off-site. The threshold of significance for these impacts is based upon the ability of the project to be built and operated without violating erosion, sedimentation, flood, surface or groundwater quality, water supply, or wastewater discharge standards. The LORS and Policies presented in **Soil & Water Table 1** were used to determine the threshold of significance for this proceeding.

Mitigation is designed to reduce the effects of potentially significant project impacts to less than significant.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Erosion Control and Stormwater Management

Construction and operation activities for managing erosion and stormwater must be addressed to avoid potential adverse impacts to water quality and soil resources. Accelerated wind and water-induced erosion may result from earth moving activities associated with construction of the proposed project. Alteration of the soil structure leaves soil particles vulnerable to detachment and removal by wind or water. Soil erosion can cause the loss of topsoil and can increase the sediment load in surface receiving waters downstream of areas affected by power plant construction and operations. Increasing the amount of impervious surfaces would increase the amount of runoff and peak discharges. Runoff from stormwater can also convey contaminants to soil, groundwater and surface water if hazardous materials and waste are not properly stored, handled and disposed as applicable.

As noted above in **Soil & Water Resources Table 2**, soils that would be affected by the proposed project consist of the Panoche Series, which has a moderate susceptibility to erosion. Since the project site currently is disturbed land used for agriculture production, the protective cover of vegetation has been removed and the structure of the surface soil has been altered.

Construction activities will consist primarily of access road construction, excavation and construction of foundations, erection of major equipment and structures, laydown area clearing and stabilization, and installation of a 1,200-foot long 3-inch water pipeline, a new 650-foot natural gas pipeline, electrical systems, and control systems. The only surface materials that will be used at the site are concrete and gravel. Construction would increase short-term soil erosion. The project site, when completed, will be

partially covered with impervious surfaces. During project operation, an increase in the amount of impervious surfaces could increase runoff, leading to erosion of unprotected surfaces.

The site will drain gradually to the evaporation basin. Construction activities would increase short-term soil erosion. With implementation of Best Management Practices (BMP) including stabilizing construction entrances, applying water for dust suppression, placement of silt fencing, berms, and hay bales as needed, and conveying all stormwater to the evaporation basin, erosion would be reduced to less than significant and water quality would not be affected by any off-site discharges. During SPP operations, industrial stormwater would be conveyed by overland flow and swales to the evaporation basin located on site. The evaporation basin would serve to collect about 85% of the annual stormwater runoff, and would manage the peak storm discharge from the site during runoff from a 100-year 24-hour event. Although SPP proposes that stormwater drainage associated with some areas such as parking lots and the switchyard would leave the proposed site as sheet flow, staff recommends that all runoff from the site be treated as industrial stormwater and that it be directed to the evaporation basin (Condition of Certification **SOIL & WATER-2).**

Staff recommends the adoption of three conditions that address mitigation measures designed to reduce any soil erosion and stormwater impacts to less than significant levels.

Condition of Certification **SOIL & WATER-1** requires the project owner to comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity, including the development and implementation of a Storm Water Pollution Prevention Plan for Construction.

Condition of Certification **SOIL & WATER-2** requires the project owner to obtain Compliance Project Manager (CPM) approval for a site-specific final Drainage, Erosion and Sedimentation Control Plan (DESCP) that addresses all project elements and ensures protection of water and soil resources for the construction and operational phases of the project. Condition of Certification **SOIL & WATER-3** requires the project owner to comply with all requirements of the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity, including the development and implementation of an operational Storm Water Pollution Prevention Plan. The SPP has included design features to isolate storm water from hazardous materials and equipment. Liquids storage areas are designed with spill containment.

With the implementation of Conditions of Certification **SOIL & WATER-1 through 3**, staff concludes that the SPP project would mitigate any potential significant adverse impacts caused by erosion or storm water discharge during construction and operation of the project.

Water Supply

The applicant proposes to use water from the existing CalPeak Panoche semi-confined aquifer well adjacent to the site. SPP also identifies two alternative water supplies:

Baker Farm irrigation water filter backwash (Alternative 1), and a new deep well into the confined aquifer at the SPP site (Alternative 2).

Semi-confined Aquifer Water

The applicant proposes to use the existing CalPeak Panoche semi-confined aquifer well adjacent to the SPP site. This would require the installation of a 1,200-foot, 3-inch diameter pipeline from this well to the SPP site. The well will provide up to 136 acre-feet of water per year to the SPP, which is sufficient to meet the peak water demand of the project. The semi-confined aquifer groundwater is not considered "fresh inland water" within the meaning of Title 22 and the SWRCB Resolutions 75-58 and 88-63 because it is not a suitable source of domestic, municipal, or agricultural water supply as is evident by local practices and due to the high TDS and salinity levels.

Soil and Water Resources Table 3 compares water quality of the alternative water supplies. Water from the semi-confined aquifer is of much lower quality than that of the confined aquifer or Baker Farm irrigation water filter backwash water. Confined aquifer water has a TDS range of 820-1100 mg/l and chloride content of 41-87 mg/l. The semi-confined aquifer has a TDS of approximately 3400 mg/l and chloride content of 200 mg/l.

Semi-Confined Aquifer Water Supply Availability Analysis

The availability of groundwater depends on aquifer conditions, recharge and competition for these resources. Aquifer conditions are defined by the hydraulic conductivity, storativity, saturated thickness and areal extent of the aquifer. The project site is located in the upper portion of the Panoche alluvial fan. USGS investigations report that sediments comprising this portion of the semi-confined aquifer are 50% sand and gravel, which are highly transmissive (Belitz 1993). The local aquifer conditions reported by the USGS are well within the requirements needed to support pumping rates required by the project.

Overall, recharge to the semi-confined aquifer significantly exceeds demand for this supply. Under current conditions, the primary source of recharge to the semi-confined aquifer is percolation from agricultural irrigation. Staff estimates that recharge to the semi-confined aquifer from Westlands is about 80,000 acre-feet per year from surface water irrigation alone (Rhodes 2007). However, consumption of water from the semi-confined aquifer is very limited.

In the area of the proposed project, the semi-confined aquifer is generally not used because water quality is too poor for most agricultural and domestic uses (Freeman 2007b). The proposed Panoche Energy Center and CalPeak Power Peaking Plant (occasional use) have been identified as the only other potential users of the semi-confined aquifer near the SPP.

The semi-confined aquifer does supply municipal water to several small towns near the San Joaquin River, east of the proposed SPP site. The semi-confined aquifer near the river is composed of Sierran sands and, therefore, produces much better quality water than the project site. The nearest town, Mendota, which is located about 12 miles east of the SPP project, has a population of less than 10,000. Mendota's annual water

consumption is approximately 2,500 acre-feet per year, based on typical residential water use of one acre-foot for a family of four. In addition, the new prison planned for Mendota would use groundwater for domestic and sanitary needs. Prison complexes do not have the landscaping-water requirements that homes frequently require. Therefore, based on prison wastewater projections of 500,000 gpd, the fresh water demand would be approximately 600 acre-feet per year. The other small communities in the region would use similar quantities of water to meet municipal demands. Given the limited use of the semi-confined aquifer and the distance between the project site and the nearby towns, project use of the semi-confined aquifer would have a negligible effect on municipal wells.

Staff concludes that the semi-confined aquifer could support a productive project well and would provide an ample quantity of water to meet the projects water demand. Water quantity would not be a limiting factor in the use of the semi-confined aquifer.

Semi-confined Aquifer Well Interference Impacts

Significant well interference impacts can occur when a project pumps groundwater. Pumping can cause substantial and unacceptable declines in groundwater levels in existing nearby wells. Well interference impacts can include increases in pumping lift and the declines in well productivity or usability. Declines in groundwater level may require costly modifications including the cost of lowering pumps or the cost of deepening a well. Substantial increases in pumping lift can cause significant increases in energy costs.

The magnitude of well interference is defined by the drawdown of groundwater levels, which radiates from the pumping well and decreases with distance. The radial influence and depth of drawdown are determined by five factors: (1) the rate of pumping, (2) the duration of pumping, (3) the depth of the well screens (water-intake depth of well), (4) local aquifer parameters and (5) aquifer boundary conditions.

Aquifer parameters, storativity and hydraulic conductivity, are determined by the layering and thickness of coarse-grained materials, gravel and sand, and fine-grained materials, clay and silt. The composition of aquifers varies widely throughout an aquifer. To determine accurately the impact of pumping specific to the project, calculations of well interference must be based on the aquifer conditions within the vicinity of the pumping wells.

Well interference with the Panoche Energy Center (PEC) well is the only direct potential adverse impact caused by project use of the semi-confined aquifer that was identified by staff. If PEC, as evaluated by staff, were to use the semi-confined aquifer as an alternative to its proposed supply from the confined aquifer, the potential water supply well for the PEC project is the only well identified near the proposed project that may pump water from the semi-confined aquifer with any regularity other than the existing Calpeak well.

For the PEC project, staff analyzed the potential well interference that PEC well pumping from the semi-confined aquifer would have on the SPP/Calpeak well. Staff estimated that the effect would be on the order of 10 feet of drawdown, and concluded that this was less than significant considering SPP’s water demands are about 138 gpm

compared to PEC's that would be approximately 642 gpm, SPP would have even less well interference effect on PEC.

Based on the volume of water in the aquifer and the annual recharge rate, staff concludes well interference impacts would not be significant.

Baker Farm Irrigation Water Filter Backwash (Alternative 1)

The Baker Farm irrigation water filter backwash is disposed of in a series of evaporation ponds. The use of this water for power plant cooling would put it to beneficial use instead of evaporating it to the atmosphere. The use of this water would not cause a significant impact on other water users or on the quality of other waters. A pumping and filtering facility and a pipeline would have to be constructed to transport the water to the SPP site. The applicant has not provided sufficient information to analyze the route and associated impacts. However, this water source does not comply with state water policy regarding the use of fresh inland water. See the discussion of this issue in the Compliance with LORS section.

Confined Aquifer Deep Well (Alternative 2)

SPP has considered the alternative of using the confined aquifer for the project's water supply. If this alternative were to be implemented the applicant would construct a well on the SPP site. This water is considered fresh inland water and is used for domestic and agricultural purposes in the area.

Confined Aquifer Well Interference Impacts

The predominate land use near the proposed project is large-scale farms. Westland reports that agricultural wells in this area use water exclusively from the confined aquifer as a backup to curtailments in CVP water because the semi-confined aquifer is too saline for irrigation (Freeman 2007b). Westlands Water District reports that agricultural wells near the project site typically have a production capacity of 1,400 to 1,800 gpm and are spaced every quarter mile in this area Therefore, given the location and the production capacity of the CalPeak well, project pumping would have no significant affect on existing agricultural wells.

In an agricultural area with large farms and a history of groundwater use, such as Westlands, large fluctuations in drawdown would be normal. Wells are constructed and equipped to handle large changes in water level. Therefore, drawdown caused by project pumping would not impact the usability of existing wells. Well interference impacts from the project wells would be limited to a less than significant increase in the cost of increased pumping lift. Therefore, staff concludes that well interference impacts to existing well owners caused by project pumping from the confined aquifer would be less than significant

Confined Aquifer Groundwater Pumping: Effects on Groundwater Quality

Project pumping could potentially cause upwelling or transport of groundwater with higher concentrations of saline water into the freshwater aquifer, causing degradation of aquifer quality. The applicant considered the alternative of pumping groundwater from the confined aquifer, which contains the best-quality groundwater that occurs locally. The confined aquifer is sandwiched between the base of the Corcoran Clay and the

base of the fresh water aquifer. Both the semi-confined aquifer above the Corcoran Clay and the sediments beneath the fresh water aquifer contain higher salinity water than the confined aquifer. The USGS estimates that the base of the Corcoran clay is about 350 feet below mean sea level and the base of the fresh water aquifer is approximately 1200 feet below mean sea level in the area of the project (Belitz 1990). Westlands Water District reports that agricultural wells in the vicinity of the project site draw water exclusively from the confined aquifer and typically have a production capacity of 1,400 to 1,800 gpm (Freeman 2007b).

The maximum pumping rate proposed by the SPP (100 gpm) is much less than the typical range of agricultural pumping rates for the area. Staff also determined that there are currently no regional restrictions on well construction designed to minimize upwelling in the project area.

Based on local conditions and proposed project well placement data and pumping rates, staff concludes that the project will cause no significant degradation of the confined aquifer.

Proposed and Alternative Water Supply Impact Conclusions

There would be no significant adverse effects on water supply or water quality from the proposed water supply or from either of the two alternatives. Well interference and associated pumping costs would be less than significant. The increase in water use from any of the water supplies would have no impact on municipal wells or the regional groundwater supply.

The semi-confined aquifer is the lowest quality water reasonably available for the SPP project. Staff considers SPP's proposed use of water from the semi-confined aquifer as an economically sound and environmentally desirable water supply for SPP. Staff has also evaluated the alternative for the nearby Panoche Energy Center to use the semi-confined aquifer as its water source, and believes it is technically feasible to treat this water for power plant process use (CEC 2007). Staff does not believe that SPP's use of water from either the Baker Farm Irrigation water Filter Backwash (Alternative 1) or the confined Aquifer (Alternative 2) would comply with state water policy regarding the use of fresh inland water.

Wastewater Discharge

Reverse Osmosis Reject Water

The SPP would pump 100 gpm of groundwater to the on-site RO system, which will generate 25 gpm of reject water. The reject water will be evaporated in a 25,000-square-foot (surface area) evaporation pond lined with a polyethylene liner, resulting in a residue that will be disposed of in a landfill. The use of the evaporation pond is similar to a zero liquid discharge process where no wastewater leaves the site that could degrade either surface water or groundwater. Therefore, an evaporation pond, when managed with care, is an acceptable wastewater disposal technique. To further ensure that SPP employs a reliable wastewater system, Condition of Certification **SOIL&WATER-5** requires that a report of waste discharge be filed with the Central Valley Regional Water Quality Control Board to obtain waste discharge requirements.

The report of waste discharge will be filed early in the design process so the evaporation pond facilities are constructed in accordance with the requirements.

If the evaporation pond reaches maximum capacity, the applicant has proposed to shut down the RO system temporarily. With the RO system shut down, the demineralization units will continue to process the low-quality well water (see Conditions of Certification **SOIL&WATER-5 and -6**). All other liquid wastes generated by the project will flow by gravity to oily-water sumps that then pump the liquid waste to a 4,700-gallon tank that will be used to temporarily store the waste before it is hauled off site for disposal. Staff concludes that if the SPP is constructed and operated as proposed, wastewater will not cause any adverse impact to soil and water resources.

CUMULATIVE IMPACTS AND MITIGATION

Cumulative impacts consist of impacts that are created as a result of the proposed project in combination with impacts from other past, present and reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time.

Temporary and permanent disturbances associated with construction of the proposed project will cause accelerated wind- and water-induced erosion. However, staff has concluded that the implementation of proposed mitigation measures, the storm water pollution prevention plan and the drainage, erosion, and sediment control plan will ensure that the project will not contribute significantly to cumulative erosion and sedimentation impacts.

The process wastewater from the SPP will be conveyed to the on-site 25,000 square-foot lined evaporation pond and allowed to evaporate. Therefore, there will be no process wastewater discharge off-site. The residue after evaporation will be hauled to an appropriate landfill. Additionally, oily and chemical laden drain water would be contained and transported off-site to be properly disposed. Therefore, no wastewater-related cumulative impacts are expected.

The SPP will use a maximum of 136 acre-feet of water a year of non-potable semi-confined aquifer groundwater. Staff has not identified any nearby development projects or activities, including the Panoche Energy Center, Federal Medium Security Prison, City of Mendota, or drought related water use that will be affected by the use of semi-confined aquifer groundwater for the SPP.

The stormwater discharge would not exacerbate flooding conditions in the area. Wastewater discharge from the site is not expected with the implementation of Condition of Certification **SOIL&WATER-6**.

Baker Farm Irrigation water Filter backwash (Alternative 1)

No cumulative impacts are expected from the use of Baker Farm irrigation water filter backwash water. The water is destined for evaporation with no other current uses in the area.

Semi-confined aquifer water (Proposed water use) and Confined aquifer water (Alternative 2)

Overdraft is defined as the withdrawal of groundwater in excess of the safe yield of the basin. Safe yield (also called perennial yield) is the long-term average amount of water that can be withdrawn from a groundwater basin without producing an undesired result.

In most cases, including the use of groundwater for power plant operations, overdraft is a cumulative impact. Typically, the perennial yield of a basin measured in hundreds of thousands of acre-feet. Overdraft occurs as the result of the cumulative impact of pumping by many wells.

The future water supply for the region is uncertain. A federal ruling on August 30, 2007 may result in significant additional reductions in CVP deliveries to contractors, including Westlands. However, the duration of the ruling, the magnitude of CVP delivery cutbacks and contractor's response to the cutbacks is not yet known. In the short term, groundwater use in Westlands will probably increase. However, a significant, sustained increase in groundwater use and reoccurrence of overdraft is unlikely to occur for several reasons.

First of all, groundwater pumping rates would have to exceed the perennial yield for a sustained period of years for overdraft to reoccur. As long as Westlands has access to CVP water, groundwater water will be used only as a supplemental supply. Surface water is preferable to groundwater for irrigation because the quality of the surface water supply is far better than the quality of groundwater and, thus, increases crop productivity and the range of crops that can be grown.

More importantly, agriculture in the western San Joaquin Valley can no longer be economically sustained with groundwater alone. The increase in the cost of energy, which effects pumping lift costs, must be offset by growing high-value crops. However, high-value crops are sensitive to water quality and cannot be irrigated with groundwater alone. In addition, regional soils are becoming increasingly saline, which makes soils increasingly toxic to crops (CDWR 2007b). Irrigation with groundwater will accelerate this process. Blending of the surface and groundwater supplies is currently occurring, and the proportion of groundwater may increase. However, a reliance on groundwater and a return to historical pumping rates is not probable because of groundwater and soil salinity.

Given the current rates of groundwater pumping, the western San Joaquin aquifer system is not overdrafted and subsidence has been halted. Staff has identified no probable, reasonably foreseeable conditions that would cause a long-term significant increase in groundwater use for the region. Therefore, staff concludes that SPP pumping from either the semi-confined or confined aquifer will not contribute to cumulative overdraft or subsidence effects.

COMPLIANCE WITH LORS

STORMWATER AND WASTEWATER

Clean Water Act

Staff has determined that the SPP project would satisfy the requirements of the General National Pollutant Discharge Elimination System permit with the adoption of Conditions of Certification **SOIL&WATER-1 and -3**, which requires the development and implementation of storm water pollution prevention plans for construction and industrial activity.

Energy Commission's 2003 Integrated Energy Policy Report

Based, in part, on the State Constitution and SWRCB Policy 75-58, the Energy Commission adopted its own policy for water conservation in the cooling of power plants and treatment of wastewater. With respect to wastewater, the Energy Commission's Integrated Energy Policy Report, 2003 ("IEPR") specifies that "the Energy Commission will require zero liquid discharge technologies unless such technologies are shown to be 'environmentally undesirable' or 'economically unsound'." The applicant proposes to discharge wastewater to a lined evaporation pond. Staff supports the SPP's use of an evaporation pond and believes that this technology meets the intent of no liquid discharge off-site, that otherwise could degrade the surface or ground waters of the state.

Porter-Cologne Water Quality Control Act

Staff has concluded that the SPP will satisfy the requirements of the Porter-Cologne Water Quality Control Act by complying with Condition of Certification **SOIL&WATER-5**, which requires the project owner to file a report of waste discharge with the Central Valley Regional Water Quality Control Board to obtain waste discharge requirements. The report of waste discharge will be filed early in the design process so the evaporation pond facilities are constructed in accordance with the requirements.

FRESH INLAND WATER

In order to understand LORS guiding water use by power plants, it is necessary to distinguish possible sources of water supply as to whether or not they can be considered fresh inland water. SWRCB Resolution 75-58 defines fresh inland water as "those inland waters which are suitable for use as a source of domestic, municipal, or agricultural water supply and which provide habitat for fish and wildlife." **Soil and Water Resources Table 5** is provided to compare the quality of the proposed water supply and the applicant's alternatives in reference to the LORS defining quality of fresh inland water.

SOIL AND WATER RESOURCES TABLE 5
TDS Comparison of the Proposed and Alternative Water Supplies with LORS Criteria Defining Fresh Inland Water
(Yes indicates it conforms with criteria for fresh inland water)

	TDS (mg/L)	Title 22	SWRCB Res. 75-58	SWRCB Res. 88-63	Source Meets All Criteria for Fresh Inland Water
LORS Criteria		Recommended ≤ 500 mg/l Upper ≤ 1,000 mg/l Short-term ≤ 1,500 mg/l	Waters suitable for use as domestic, municipal or agricultural supply	≤ 3,000 mg/l	
Proposed Water Supply **Semi-Confined Aquifer**	3,400	No	No	No	No
Alternative 1 **Baker Ranch Irrigation Water Filter Backwash**	170	Yes	Yes	Yes	Yes
Alternative 2 **Confined Aquifer**	820 – 1,100	Yes	Yes	Yes	Yes

Further descriptions of these LORS and their applicability to the applicant's proposed and alternative water supplies for defining whether or not they are considered fresh inland waters is as follows.

Title 22 of the California Code of Regulations

Department of Health Services (DHS) provides guidance for defining fresh inland water by specifying secondary drinking water standards for community water systems under Title 22 of the California Code of Regulations. The standards are represented according to the secondary maximum contaminant level (MCL), and are aesthetics-based and intended to protect odor, taste and appearance. Exceeding these levels does not restrict the use of this water for drinking. The standards include MCLs for a number of constituents, and in the case of the proposed and alternative water supplies for SPP, the measure of Total Dissolved Solids (TDS) serves as the simplest indicator to characterize these sources of water supply as to whether or not they are considered fresh water. The secondary drinking water standards for TDS (mg/l) listed as MCLs for consumer acceptance are as follows: a) Recommended MCL of ≤ 500 mg/l; b) Upper Limit MCL of < 1,000 mg/l; and c) Short-term MCL of ≤ 1,500 mg/l . (Cal. Code Regs., tit. 22, §§64431, 64449).

In reference to **Soil and Water Resources Table 5**, the proposed water supply consisting of the semi-confined aquifer with a TDS of 3,400 mg/l exceeds all Title 22 criteria for fresh inland water, and therefore staff believes it is not. Both of the applicant's alternatives consisting of the Baker Farm Irrigation Water Filter Backwash (Alternative 1) and the lower confined aquifer (Alternative 2) with TDS of 170 and 820 – 1,100 mg/l respectively, meet Title 22 criteria for fresh inland water.

SWRCB Resolution 75-58

SWRCB Resolution 75-58 provides a definition of fresh inland water as "those inland waters which are suitable for use as a source of domestic, municipal, or agricultural water supply and which provide habitat for fish and wildlife." While the resolution goes on to define brackish waters as including all waters with a salinity range (TDS) of 1,000 to 30,000 mg/l, it also states that the term brackish is not intended to imply that such water is no longer suitable for industrial or agricultural purposes.

In reference to **Soil and Water Resources Table 5**, the proposed water supply consisting of the upper semi-confined aquifer with a TDS of 3,400 mg/l is not suitable for use as a source of domestic, municipal, or agricultural water supply, as evinced by local practices for using only CVP water or higher quality groundwater from the confined aquifer for these purposes. Both of the applicant's alternatives consisting of the Baker Farm Irrigation Water Filter Backwash (Alternative 1) and the confined aquifer (Alternative 2) with TDS of 170 and 820 – 1,100 mg/l respectively, meet SWRCB criteria as fresh inland water. The Baker Farm backwash is essentially irrigation water used to clean filters, and its quality both before and after use for backwash is suitable for domestic and municipal supply (after normal treatment and disinfection is performed to meet potable water standards), and for agriculture after suspended solids from backwashing are settled or removed. Groundwater from the confined aquifer is currently used locally for agricultural water supply, and is therefore by definition, fresh inland water.

The SWRCB policy also calls for water availability studies for projects to be constructed in the Central Valley to consider potential impacts of Delta outflow, groundwater pumping and water quality objectives. The SSP project using semi-confined aquifer water or either of the alternative water sources would have no effect on the Delta.

SWRCB Resolution 88-63

SWRCB Resolution 88-63 provides a definition of fresh inland water from the perspective of quality needed to serve as a source of drinking water. The applicable excerpt from the resolution states "All surface and ground waters of the State are considered to be suitable, or potentially suitable, for municipal or domestic water supply and should be so designated by the Regional Boards with the exception of:

1. Surface and ground waters where:
    a) The total dissolved solids (TDS) exceed 3,000 mg/l (5,000 uS/cm, electrical conductivity) and it is not reasonably expected by Regional Boards to supply a public water system, …"

In reference to **Soil and Water Resources Table 5**, the proposed water supply consisting of the upper semi-confined aquifer with a TDS of 3,400 mg/l exceeds the Resolution 88-63 criteria for fresh inland water of 3,000 mg/l, and therefore staff believes it is not. Both of the applicant's alternatives consisting of the Baker Farm Irrigation Water Filter Backwash (Alternative 1) and the confined aquifer (Alternative 2) with TDS of 170 and 820 – 1,100 mg/l respectively, meet the Resolution 88-63 criteria for fresh inland water.

WATER USE

California Constitution, Article X, Section 2

Article X, Section 2 of the California Constitution requires that the water resources of the state be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited. The project, using the CalPeak Panoche semi-confined aquifer well for all process, sanitary and landscape irrigation purposes will conserve fresh water through use of the lowest quality water reasonably available, if the project is constructed and operated as proposed. Therefore, staff believes that the SPP, using the CalPeak Panoche semi-confined aquifer well as proposed for all process, sanitary and landscape irrigation purposes, will be consistent with terms of the California Constitution, Article X, Section 2. SPP's use of either the Baker Farms irrigation water filter backwash (Alternative 1) or groundwater from the confined aquifer (Alternative 2) would not comply with the Constitution since fresh inland water would be consumed for process use, rather than being conserved for higher beneficial uses such as domestic and irrigation.

SWRCB Resolution 75-58 and Energy Commission's 2003 Integrated Energy Policy Report

LORS and water policies applicable to this project stem from, among other things, Article X, Section 2 of the California Constitution, which declares that "the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented…" In order to better define what "unreasonable use" means in terms of power plant cooling, the State Water Resources Control Board (SWRCB) issued Resolution 75-58, "Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling" ("Resolution 75-58"). It sets forth, in priority order, a list of preferable water sources for power plant cooling as follows: (1) wastewater being discharged to the ocean, (2) ocean, (3) brackish water from natural sources or irrigation return flow, (4) inland wastewaters of low TDS, and (5) other inland waters.

The resolution also states that fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. Since adopting Resolution 75-58 in 1976, the SWRCB has more recently confirmed the ongoing applicability of its policy for cooling of modern power plants and clarified a basic principle by stating, "The policy requires that the lowest quality cooling water reasonably available from both a technical and economic standpoint should be utilized as the source water for any evaporative cooling process utilized at these facilities" (SWRCB 2002a).

The SWRCB resolution also calls for water availability studies for projects to be constructed in the Central Valley to consider potential impacts of Delta outflow, groundwater pumping and water quality objectives. The San Joaquin Valley is currently experiencing drought conditions and reduced Delta outflows that have triggered increased agricultural pumping. This could become a concern in the future, particularly in drought years; however, with a trend towards the reduction of farmland in the area, groundwater use is expected to decrease also.

Based, in part, on the State Constitution and SWRCB Policy 75-58, the Energy Commission adopted its own policy for water conservation in the cooling of power plants. The Energy Commission's Integrated Energy Policy Report, 2003 ("IEPR") specifies that "the Energy Commission would approve the use of fresh water for cooling purposes by power plants which it licenses only where alternative water supply sources and alternative cooling technologies are shown to be 'environmentally undesirable' or 'economically unsound'."

Semi-confined Aquifer Water

Staff believes that groundwater from the semi-confined aquifer as the applicant has proposed would comply with Resolution 75-58 because it is the lowest quality cooling water reasonably available from both a technical and economic standpoint. As noted in the section above, the semi-confined aquifer is not considered "fresh inland water" within the meaning of Resolution 75-58 because it is not a suitable source of domestic, municipal, or agricultural water supply due to its high TDS.

According to Resolution 75-58, it would fall within the 3rd tier of priority of waters that should be used for cooling, as 'brackish water from natural sources'. Because neither the 1st or 2nd tier priorities of degraded waters are available consisting of either 'wastewater being discharged to the ocean', or 'ocean' water respectively, and groundwater from the semi-confined aquifer is the lowest quality of water reasonably available, SPP's use would conform to Resolution 75-58. SPP's use of groundwater from the semi-confined aquifer would also conform to the 2003 IEPR because it is not fresh water, and is the most degraded water supply reasonably available as defined under Resolution 75-58.

Baker Farm Irrigation Water Filter Backwash (Alternative 1)

The applicant has considered use of Baker Farms irrigation water filter backwash as an alternative to groundwater from the semi-confined aquifer. In general, the backwash does not meet the overall intent of Resolution 75-58 to use the most degraded water source reasonably available. The Baker Farm irrigation water filter backwash does not fit into the category of degraded water as "brackish water from natural sources or irrigation return flow" because with a TDS of 170 mg/l, it is not brackish under any criteria. In fact it is high quality freshwater. Further, the backwash cannot be classified as irrigation return flow since it is backwash from the filtering of irrigation water that occurs prior to the water being applied for irrigation. Irrigation return flow consists of the drainage from fields after water is applied for irrigation that is typically degraded by the presence of residual nutrients and salts in the soil. The backwash may fit into the "inland wastewaters of low TDS" category, but according to Resolution 75-58, it would fall within the 4th tier of the prioritized sources of water for power plant cooling. In

comparison, the semi-confined aquifer falls into the 3rd tier of prioritized sources of water for power plant cooling. Therefore, SPP's use of the backwash would not conform to Resolution 75-58 because it is a lower priority for use in cooling and it is not the most degraded source of water reasonably available compared to the proposed project of using groundwater from the semi-confined aquifer.

The Baker Farm irrigation water filter backwash would not comply with the Energy Commission's 2003 IEPR water policy because its quality is still characterized as fresh water. The 2003 IEPR states that fresh water should be used only where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound. The 2003 IEPR relies on Resolution 75-58 to define alternative water supplies to fresh water. Staff does not believe the Baker Farm irrigation water filter backwash would conform to either Resolution 75-58 or the 2003 IEPR.

Confined Aquifer Water (Alternative 2)

The applicant has also considered use of groundwater from the confined aquifer as an alternative to groundwater from the semi-confined aquifer. In total, the confined aquifer does not meet the overall intent of Resolution 75-58 to use the most degraded water source reasonably available. The confined aquifer could be considered to sometimes meet one test of Resolution 75-58 by fitting into the same 3rd tier category 'brackish water from natural sources' as the semi-confined aquifer when considering the prioritized sources of water for power plant cooling. With a TDS of 820 – 1,100 mg/l, the confined aquifer could be considered brackish when its TDS is $\geq$ 1,000 mg/l. In comparison, the semi-confined aquifer falls into the 3rd tier of prioritized sources of water for power plant cooling all of the time with its corresponding TDS of 3,400 mg/l. While Resolution 75-58 defines brackish waters as including all waters with a salinity range (TDS) of 1,000 to 30,000 mg/l, it also states that the term brackish is not intended to imply that such water is no longer suitable for industrial or agricultural purposes. The confined aquifer is used for agricultural purposes, and according to the definition of fresh inland water under Resolution 75-58 as 'waters suitable for use as domestic, municipal or agricultural supply', it is indeed fresh inland water. Therefore, SPP's use of groundwater from the confined aquifer would not conform to Resolution 75-58 because it is not the most degraded source of water reasonably available compared to the proposed project of using groundwater from the semi-confined aquifer.

The confined aquifer would not comply with the Energy Commission's 2003 IEPR water policy because its quality is still characterized as fresh water. The 2003 IEPR states that fresh water should be used only where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound. The 2003 IEPR relies on Resolution 75-58 to define alternative water supplies to fresh water. Staff does not believe the confined aquifer would conform to either Resolution 75-58 or the 2003 IEPR.

LORS Compliance: Alternative Water Supply Conclusions

The semi-confined aquifer is the most degraded water reasonably available to the project and is not used for domestic, municipal or agricultural purposes in the SPP project area. SPP's use of the semi-confined aquifer would accomplish utilization for

process needs of the most degraded source of water reasonably available to SPP consistent with SWRCB's Policy 75-58, Energy Commission's IEPR Water Conservation Policy and California Constitution Article X, Section 2, and would preserve higher quality water such as the Baker Farm irrigation water filter backwash (Alternative 1) and the confined aquifer (Alternative 2) for higher beneficial uses such as for agriculture.

The use of Baker Farm irrigation water filter backwash (Alternative 1) does not comply with SWRCB's Policy 75-58, Energy Commission's IEPR Water Conservation Policy and California Constitution Article X, Section 2, and is considered fresh inland water.

The use of the confined aquifer water (Alternative 2), does not comply with SWRCB's Policy 75-58, Energy Commission's IEPR Water Conservation Policy and California Constitution Article X, Section 2, and is considered fresh inland water.

In consideration of state water policy, staff recommends approval of semi-confined aquifer water for the SPP project, but does not recommend approval of the other two proposed alternative water supplies.

Condition of Certification **SOIL & WATER-4** requires that the project owner use the semi-confined aquifer groundwater for landscape irrigation and all process uses including fire protection, plant service water, combustion turbine NOx injection and combustion turbine inlet air fogging.

WARREN-ALQUIST ACT

The Warren-Alquist Act promotes all feasible means of water conservation. The proposed project will conserve water as much as possible through design features. The project will use 136 acre-feet of low-quality groundwater per year; that is a relatively small amount of water. Therefore, staff has determined that the SPP would be consistent with terms of the Warren-Alquist Act.

NOTEWORTHY PUBLIC BENEFITS

Neither the applicant nor staff has identified any noteworthy benefits to soil or water resources that would be provided by the project.

CONCLUSIONS

Based on its assessment of the proposed Starwood Power Project (SPP) project, staff concludes the following:

- Implementation of Best Management Practices (BMPs) during SPP construction and operation in accordance with effective Storm Water Pollution Prevention Plans and a Drainage, Erosion and Sedimentation Control Plan would avoid significant adverse effects that could be caused by transport of sediments or contaminants from the SPP site by wind or water erosion.
- The proposed water supply for the project, groundwater from the semi-confined aquifer, would not cause a significant adverse environmental impact or affect current or future users of the semi-confined groundwater aquifer. The semi-confined aquifer

is the lowest quality water supply reasonably available to the project and is not considered fresh inland water. Staff considers it to be consistent with state water use and conservation policies.

- The applicant's alternatives it considered to its proposed water supply consisting of Baker Farm irrigation water filter backwash (Alternative 1) and the confined aquifer (Alternative 2) would not cause significant impacts to water supply or water quality. However, both are considered fresh inland water under all criterion including Title 22 of the California Code of Regulations, and State Water Resources Control Board (SWRCB) Policies: Resolutions 75-58 and 88-63. Neither complies with state water policy found in the California Constitution, SWRCB Resolution 75-58, and the Energy Commission's 2003 Integrated Energy Policy Report (IEPR) water policy.
- The proposed project would be constructed to comply with 100-year flood requirements and would not exacerbate flood conditions in the vicinity of the project.
- The discharge of wastewater to an on-site evaporation pond would not degrade surface or groundwater quality of waters used for other beneficial purposes.
- The proposed project would comply with all applicable federal, state and local laws, ordinances, regulations and standards with the adoption of the recommended conditions of certification.
- The SPP project will not result in any unmitigated project-specific or cumulative significant adverse impacts to soil or water resources with adoption of the conditions of certifications.

Based on these findings, staff concludes that the SPP will not result in any unmitigated project-specific or cumulative significant adverse impacts to soil or water resources and will comply with all applicable LORS if all of the recommended conditions of certification are adopted by the Commission and implemented by the applicant.

PROPOSED CONDITIONS OF CERTIFICATION

SOIL&WATER-1: The project owner shall comply with the requirements of the General National Pollutant Discharge Elimination System (NPDES) permit for discharges of storm water associated with construction activity. The project owner shall develop and implement a storm water pollution prevention plan for the construction of the entire Starwood Power Project (SPP).

Verification: The project owner shall submit copies to the compliance project manager (CPM) of all correspondence between the project owner and the Central Valley Regional Water Quality Control Board (RWQCB) regarding the General NPDES permit for the discharge of storm water associated with construction activities within 10 days of its receipt (when the project owner receives correspondence from the RWQCB) or within 10 days of its mailing (when the project owner sends correspondence to the RWQCB). This information shall include copies of the notice of intent sent to the State Water Resources Control Board, and the notice of termination for the project.

SOIL&WATER-2: Prior to site mobilization, the project owner shall obtain CPM approval for a site-specific drainage, erosion, and sedimentation control plan (DESCP) that ensures protection of water quality and soil resources of the

project site and all linear facilities for both the construction and operation phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, meet local requirements, and identify all monitoring and maintenance activities. Monitoring activities shall include routine measurement of the volume of accumulated sediment in the stormwater retention basin. Maintenance activities must include removal of accumulated sediment from the retention basin when an average depth of 0.5 feet of sediment has accumulated in the retention basin. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification CIVIL-1 and may incorporate by reference any storm water pollution prevention plan developed in conjunction with any NPDES permit. The DESCP shall contain the following elements.

- ***Vicinity Map*** – A map shall be provided indicating the location of all project elements with depictions of all significant geographic features to include watercourses, washes, irrigation and drainage canals, and sensitive areas.
- ***Site Delineation*** – The site and all project elements shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.
- ***Watercourses and Critical Areas*** – The DESCP shall show the location of all nearby watercourses including washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the construction site.
- ***Drainage*** – The DESCP shall provide a topographic site map showing all existing, interim, and proposed drainage systems. drainage area boundaries and watershed sizes in acres, and the hydraulic analysis to support the selection of best management practices (BMPs) to divert off-site drainage around or through the site and laydown areas. Spot elevations shall be required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet in flat terrain.
- ***Clearing and Grading*** – The plan shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections, or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography tying in proposed contours with existing topography shall be illustrated. The DESCP shall include a statement of the quantities of material excavated or filled for each element of the project (for example, project site, transmission corridors, and pipeline corridors), whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there will be no clearing and/or grading conducted for each element of the project.

- ***Project Schedule*** – The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each project element for each phase of construction.
- ***Best Management Practices*** – The DESCP shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas following construction.
- ***Erosion Control Drawings*** -- The erosion-control drawings and narrative shall be designed and sealed by a professional engineer or erosion-control specialist.

Verification: No later than 90 days prior to start of site mobilization, the project owner shall submit a copy of the plan to Fresno County for review and comment. A copy shall be submitted to the CPM no later than 60 days prior to the start of site mobilization for review and approval. The CPM shall consider comments received from Fresno County. During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage-, erosion- and sediment-control measures and the results of monitoring and maintenance activities. Once operational, the project owner shall provide in the annual compliance report information on the results of monitoring and maintenance activities.

SOIL&WATER-3: The project owner shall comply with the requirements of the general NPDES permit for discharges of storm water associated with industrial activity. The project owner shall develop and implement a storm water pollution prevention plan for the operation of the site.

Verification: At least 30 days prior to commercial operation, the project owner shall submit copies to the CPM of the operational storm water pollution prevention plan for the entire SPP site. Within 10 days of its mailing or receipt, the project owner shall submit to the CPM any correspondence between the project owner and the RWQCB about the general NPDES permit for discharge of storm water associated with industrial activity. This information shall include a copy of the notice of intent sent by the project owner to the State Water Resources Control Board and the notice of termination. A letter from the RWQCB indicating that there is no requirement for a general NPDES permit for discharges of storm water associated with industrial activity will satisfy this condition.

SOIL&WATER-4: Water used for project operation for process, sanitary and landscape irrigation purposes shall be groundwater from the upper semi-confined aquifer obtained from the adjacent CalPeak well. Water use shall not exceed the annual water-use limit of 136 acre-feet without prior approval by

the CPM. The project owner shall monitor and record the total water used on a monthly basis.

Verification: The project owner, in the annual compliance report, shall provide a water-accounting summary that states the source and quantity of water used on a monthly basis in units of gallons and on an annual basis in units of acre-feet. If the amount of water that is to be used will exceed 136 acre-feet per year during any single annual reporting period, the project owner shall provide a written request and explanation for the anticipated water-use increase to the CPM 60 days prior to the date when the water-use limit is expected to be exceeded. The CPM shall review the request and may approve an increase in the water-use limit for the period requested.

SOIL&WATER-5: Prior to operation, the project owner shall comply with the waste discharge requirements issued by the Central Valley Regional Water Quality Control Board regarding the evaporation pond facility. The project owner shall report to the CPM any notice of violation, cease and desist order, clean-up and abatement order, or other enforcement action taken by the RWQCB related to the waste-discharge requirements. The project owner shall describe all actions taken to correct violations and operate the project in compliance with waste-discharge requirement permit conditions. The project owner shall provide confirmation from the RWCQB that any violations have been resolved to the satisfaction of the RWQCB.

Verification: The project owner shall submit copies to the CPM of all correspondence between the project owner and the RWQCB regarding the waste discharge requirements within 10 days of its receipt (when the project owner receives correspondence from the RWQCB) or within 10 days of its mailing (when the project owner sends correspondence to the RWQCB). This information shall include copies of the report of waste discharge sent to the State Water Resources Control Board and copies of the waste discharge requirements and final approval of the evaporation pond design. Final RWQCB waste-discharge requirements and evidence of an approved constructed evaporation pond must be received by the CPM prior to start of commercial operation and/or discharge of waste to the ponds. The project owner shall report violations and the final resolution of the violation within 10 days of notice by the RWQCB. A letter from the RWQCB in which it is stated that waste discharge requirements are not needed will satisfy this condition.

SOIL&WATER-6: The project owner shall shut down the reverse osmosis system if the evaporation pond reaches maximum capacity to avoid any evaporation pond overflow.

Verification: The project owner, in the annual compliance report, shall provide a wastewater-accounting summary that states the amount of waste water in acre-feet discharged into the evaporation pond and the quantity of residue in pounds or tons removed and disposed of for each year. The project owner shall provide a written description within 30 days of any incident where the evaporation pond fills and the reverse osmosis system had to be shut down.

SOIL&WATER-7: The project owner shall comply with chapter 15.48 of title 15 of the Fresno County Ordinance Code, regarding flood hazard and base flood elevation.

Verification: The project owner will submit a letter in which it is stated that the project has complied with the county's flood-elevation requirements. Proof of compliance must be provided to the CPM prior to the start of site mobilization.

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TRAFFIC AND TRANSPORTATION

Testimony of James Adams

SUMMARY OF CONCLUSIONS

The Starwood Power Project (SPP or project) as proposed would be consistent with the Circulation Element in the Fresno County General Plan and all other applicable laws, ordinances, regulations, and standards (LORS). The project would not have a significant adverse impact on the local and regional road/highway network. During the construction and operation phases, local roadway and highway demand resulting from the daily movement of workers and materials would not increase beyond significance thresholds established by Fresno County. During the operational phase, the project would not adversely affect aircraft operations associated with any airport flight traffic or agricultural spraying operations.

INTRODUCTION

In the Traffic and Transportation analysis, staff addresses the extent to which the project may impact the transportation system in the local area. This analysis includes the identification of: (1) the roads and routings that are proposed to be used for construction and operation; (2) potential traffic-related problems associated with the use of those routes by construction workers and truck deliveries; (3) the anticipated encroachment upon public rights-of-way during the construction of the proposed project and associated facilities; (4) the frequency of trips and probable routes associated with the delivery of hazardous materials; and (5) the possible effect of project operations on local airport flight traffic.

In addition to assessing potential project related impacts, staff has reviewed the applicable LORS to determine compliance. The LORS that govern the project are listed below in **Traffic and Transportation Table 1**, followed by a discussion of the potential impacts related to traffic operations and safety hazards resulting from the construction and operation of the SPP.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

TRAFFIC & TRANSPORTATION Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Code of Federal Regulations (CFR) Title 14, Chapter 1, Part 77	Includes standards for determining obstructions in navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alteration. Also, provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace.
CFR Title 49, Subtitle B.	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures), and provides safety measures for motor carriers and motor vehicles who operate on public highways.
State	
California Vehicle Code, Division 2, Chapter. 2.5, Div. 6, Chap. 7, Div. 13, Chap. 5, Div. 14.1, Chap. 1 & 2, Div. 14.8, Div. 15	Includes regulations pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials.
California Streets and Highway Code, Division 1 & 2, Chapter 3 & Chapter 5.5	Includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.
Local	
Fresno County General Plan – Transportation and Circulation Element.	Reflects the urban and rural nature of Fresno County and establishes standards that guide the development of the transportation system, and management of access to the highway system by new development, throughout the unincorporated areas of the county. Roadways are classified in this system based on the linkages they provide, their function in the hierarchy of roadways, and the importance of the route's service to the residents and businesses of Fresno County.

SETTING

The SPP site is located at 43627 West Panoche Road about two miles east of Interstate 5 (I-5) in western Fresno County. The facility would be located east and adjacent to an existing PG&E substation and the Wellhead and Calpeak generating station. **Traffic and Transportation Figure 1, Regional Transportation System** (transportation figures are located at the end of this analysis) shows the region surrounding the project site.

Plant construction and operation traffic would use the existing roadways, which would include I-5 and West Panoche Road. I-5 is the principal highway in the area and has Level of Service (LOS) B for daily traffic levels. Access to the site would be via West

Panoche Road, which is operating at LOS A with free flowing traffic. The local roadways that could be affected by the project are shown in **Traffic and Transportation Figure 2, Local Transportation Network.** There are no bicycle lanes or trails in the immediate vicinity of the SPP site. The critical roads, highways, and transit modes in the area of the project are identified below (URS 2006a, pp. 5.11-3 through 11-5).

CRITICAL HIGHWAYS AND ROADS

I-5 is a north-south four-lane freeway that connects the Central Valley with Northern and Southern California. Caltrans records show average daily traffic volume on I-5 in the vicinity of the project area (between Russell and Manning Avenues) is about 35,400 vehicles per day (Caltrans 2007). Approximately 25 to 30 percent of the daily traffic involves truck movement. There are three interchanges in the area at Manning Avenue, West Panoche Road, and Russell Avenue. Russell and Manning Avenues are the roads immediately north and south of West Panoche Road, respectively. Russell is a north-south oriented two-lane road and Manning is an east-west road with two lanes as well.

West Panoche Road is a two-lane east-west road that provides access to the project site from I-5. It also connects with the local circulation network to the east that accesses communities such as Mendota (north), Kerman (east), and further east to Fresno via State Route (SR)-33 and SR-180. West Panoche Road has unimproved shoulders 10-15 feet wide before one encounters transmission towers, telephone poles and agricultural fields. It carries about 1,060 vehicles per day with 15 percent truck traffic.

LEVEL OF SERVICE

"Level of Service" (LOS) is a qualitative measure describing operational conditions within a traffic stream. The LOS is a term used to describe and quantify the congestion level on a particular roadway or intersection, and generally describes these conditions in terms of such factors as speed, travel time, and delay. The Highway Capacity Manual[1] defines six levels of service for roadways or intersections ranging from LOS A representing the best operating conditions and LOS F the worst.

Traffic and Transportation Table 2 provides existing daily and peak traffic volume and LOS in the project area. It demonstrates that roadways in the project vicinity operate at LOS A and B. As noted below, West Panoche Road has free flowing traffic as exemplified by the LOS A both east and west of the proposed PEC site. The Manning to Russell Avenue section of I-5 has a LOS B. Fresno County tries to maintain LOS C as a general goal (Fresno County 2000) and LOS B on I-5 is acceptable to Caltrans (Caltrans 2007).

[1] National Research Council, Highway Capacity Manual, Third Edition, 1994.

TRAFFIC AND TRANSPORTATION Table 2
Roadway Segment Traffic Volume and LOS

Roadway Segment	Volume	LOS (AM/PM)
I-5 - Manning Avenue to Russell Avenue	35,398[2]	B
West Panoche Road – I-5 to PEC site	41/73 (AM/PM Peak Hour) 1,057[3]	A/A
West Panoche Road – East of PEC site	52/69	A/A

Source: URS 2006a, Table 5.11-2, Pg. 5.11-4

AIRPORTS

Eagle Field Airport, a private facility, is located about fourteen miles north of the project site. Additional aviation facilities include Fresno Chandler Airport (thirty five miles east), and Lemoore Naval Air Station (forty miles southeast). The project site is not in the landing or take-off pattern of any of these facilities. However, the project would be located within the Military Operational Airspace of the Lemoore facility. There are no agricultural airstrips in the project area.

PUBLIC TRANSPORTATION

There is no rail or bus service in the general area around the project. However, there is a school bus that takes 18-25 children who live in the local area to and from school in the City of Mendota, which is about 18 miles northeast of the project site (CEC 2007a). The pick-up and drop-off point is in front of an existing 5-plex residence on West Panoche Road adjacent to the northern boundary of the proposed SPP project, about 200 feet east of the primary entrance to the site.

RAILROADS

The major rail line in the vicinity of project site is the Union Pacific Railroad which provides freight service to numerous markets in Central California and beyond. The rail line is about twelve miles east of the project site and connects communities from Volta to the north and Helm to the south (See **Traffic and Transportation Figure 1**). The Atchison & Topeka Railroad has a rail line that parallels SR-99 about thirty five miles east of the project.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

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

- cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the

[2] Caltrans 2007 – Average Daily Traffic (ADT) for 2006.

[3] ADT, Starwood 2006a, pg. 5.11-3

number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections);

- exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;
- result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- result in inadequate emergency access; or
- result in inadequate parking capacity; or conflict with adopted policies, plans, or programs.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Construction Impacts and Mitigation

When evaluating a project's potential impact on the local transportation system, staff uses LOS determinations as the foundation on which to base its analysis. The following discussion identifies potential traffic impacts associated with the construction of the proposed project, and provides an explanation of the impact conclusion.

The AFC provides an analysis of projected traffic conditions with the addition of project construction traffic trips. Project construction would be completed in 10 months and is expected to commence in Summer 2008, with commercial operation scheduled to begin by May 1, 2009 (URS 2006a, pg. 1-4). All plant construction workers would park within the 5.6 acre project site boundaries (URS 2006a, pg. 3-42). Staff has determined that the project site is adequate for the number of construction workers involved in the project. The SPP site would also serve as a laydown area for materials and equipment (URS 2006a, pg. 1-2).

Construction Workforce Traffic

To determine the amount of vehicle trips to the project site during average and peak construction, the applicant assumed that workers would commute alone during the morning and afternoon peak (7 to 9 AM and 4 to 6 PM). The average number of construction workers would be approximately 75, while the peak workforce would consist of 110 workers during a three month period. Given the experience with previous projects, staff believes that the estimated construction traffic trips and assumptions about peak hour activity are reasonable. Based on regional demographics and the availability of skilled workers, the construction workers would probably come from Fresno County, though staff believes they could also come from Tulare, Madera, and Kings counties.

To reach the project site, the applicant assumes that most of the construction workers coming from Fresno County would use I-5 and exit onto West Panoche Road. They would then go east until reaching the project site entrance. Staff believes that SPP construction workers could also travel on several other state highways to reach the SPP site via I-5, such as SR-152 (north of Fresno), and SR-198 (south of Fresno). Workers

living in or near the City of Fresno could travel east on SR-180 to reach SR-33 and then proceed south on SR-33 to Panoche Road. Staff has reviewed Caltrans information and has determined that the LOS for these state routes were between LOS A to C (acceptable) when last rated. Staff does not anticipate that construction traffic would degrade LOS on these roads.

Construction Truck Traffic

Construction of the generating plant would require the use and installation of heavy equipment and associated systems and structures. Heavy equipment would be used throughout the construction period, including trenching and earthmoving equipment, forklifts, cranes, cement mixers and drilling equipment. A passenger car equivalent (PCE) factor of three cars per truck was used to determine the traffic impacts of trucks and heavy equipment deliveries (National Research Council 1994). Project construction is expected to require two trucks on average and 24 trucks during peak construction (PCE of 6 and 72, respectively) per day (URS 2007a). There would also be one equipment delivery on average and 18 equipment deliveries during peak construction (PCE of 3 and 54, respectively) per day (URS 2007c). In-bound and out-bound truck traffic would arrive and depart the project site using the same route as construction workers.

Total Construction Traffic

Total average construction traffic impact (workforce and trucks) would be 84 vehicle trips (75 workers plus 9 PCE for trucks and deliveries), or 168 one-way vehicle trips. Total peak construction traffic impact would be 236 vehicle trips (110 workers plus 126 PCE for trucks and deliveries), or 472 one-way vehicle trips. Project-related traffic would not cause a deterioration of LOS on West Panoche Road during construction (URS 2006a, Table 5.11-9, pg. 5.11-12), though there would be some delay (3-6 seconds) at the I-5 north and south bound ramps at West Panoche Road (URS 2006a, Table 5.11-10, pg. 5.11-12). The small increase of construction traffic would not degrade the LOS on I-5 between Russell and Manning Avenues and would not cause a significant adverse impact on current traffic flow.

The applicant has agreed that if required, a traffic and transportation control plan will be prepared in coordination with Fresno County and Caltrans (URS 2006a, pg. 5.11-16). The average construction total is about a 16 percent increase in traffic (peak construction total is about a 45 percent increase) on West Panoche Road when compared to 2005 average daily traffic counts (1,060). However, the LOS (A) on West Panoche Road would not degrade during construction and therefore staff is not proposing a construction traffic control plan at this time. Staff is proposing Condition of Certification **TRANS-1** to repair any damage to West Panoche Road from construction traffic, particularly heavy trucks.

Linear Facilities

Approximately 800 feet of new 6-inch diameter pipeline would deliver natural gas to the project site. The pipeline would connect to PG&E's line east of the existing substation (Starwood 2006a, pg. 1-3). Water for all the project needs would be supplied by existing wells at the Calpeak plant. About 300 feet of new 115-kV transmission line for interconnection to the adjacent substation would be constructed within the project site

boundaries. Because the linear facilities would not be constructed within public rights-of-way, there would be no traffic and transportation impact.

Construction Phase Transport of Hazardous Materials and Waste

Deliveries to the SPP site would include small quantities of hazardous materials to be used during project construction. The applicant has stated that the deliveries of hazardous materials to and from the site (one to three times per month [URS 2007c]), and materials handling on site would be conducted in accordance with all applicable federal and state statutes (see the **Hazardous Materials Management** section of this FSA for more information). The preferred transportation route for hazardous materials delivery would be via I-5, West Panoche Road, and the SPP access road. Staff believes this is a reasonable route to access the site since it is the shortest and most direct route to the site from I-5.

School Bus Route

As noted earlier, a bus from the Mendota Unified School District picks up and drops off children on the south side of West Panoche Road in front of the 5-plex residence adjacent to the north boundary of the SPP site. There is a big enough shoulder on the south side of West Panoche Road to allow the bus to get off the road completely. Morning pick-up is 7:15 AM and afternoon drop-off is 3:45 PM. Other than the children who live in the 5-plex residence, the remaining 15-20 children from the local area are driven to, or picked up at, the bus stop by parents or friends, who wait for the bus to arrive (Mendota Unified School District 2006). The children are bussed to school in the City of Mendota. In addition, the school bus also travels west to two other pick-up and drop-off locations on the west side of I-5 (URS 2007b).

Workers using I-5 would travel east until reaching the entrance to the SPP site near the school bus stop. The school bus could encounter construction worker traffic when it travels east or west on West Panoche Road on its route to the stops west of I-5. In addition, workers accessing the site from the east via SR-33 and SR-180 would pass by the bus stop adjacent to the Starwood access road, and could encounter the school bus on its route on West Panoche Road to and from I-5.

Staff has been advised by Mendota Unified School District staff that, based on previous experience with another large construction project, there could be a potential hazard to the school bus en route to the 5-plex residential bus stop and the I-5 stops (Mendota Unified School District 2007). However, the previous construction project involved widening SR-180 east of Mendota which required lane closures, and is therefore distinguishable from the construction of the SPP which would not require road closures. Given the LOS A on West Panoche Road, the wide shoulder allowing the bus to pull completely off the roadway, and the fact that the project would not involve roadwork or lane closures, staff believes that project construction traffic would not pose a safety hazard to the children waiting at the school bus stop near the SPP site, or to the school bus as it passes the site.

Operation Impacts and Mitigation

Employee and Truck Traffic

Operation of the power plant would only require one full-time employee that would monitor the project on a daily basis. Other project-related trips (i.e. delivery trucks, visitors, and other business-related trips) are expected to be on a non-recurring basis, and would occur during off-peak hours (URS 2006a, pg. 5.11-10). Staff assumes that the operational worker would follow the same route used during construction. This minor trip addition to surrounding local streets and highways would not affect the LOS of these roads.

Transport of Hazardous Materials and Waste

The transportation and handling of hazardous substances associated with the project can increase roadway hazard potential. Impacts associated with hazardous material transport to the facility can be mitigated to a level of insignificance by compliance with existing federal and state standards established to regulate the transportation of hazardous substances. The applicant intends to comply with all federal and state regulations related to the transportation of hazardous materials (URS 2006a, pp. 5.11-16 & 17).

The California Department of Motor Vehicles specifically licenses all drivers who transport hazardous materials. Drivers are also required to check for weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are also required to take instruction in first aid and procedures on handling hazardous waste spills. Drivers transporting hazardous waste are required to carry a manifest, which is available for review in the event of a spill, and is reviewed by the California Highway Patrol at inspection stations along major highways and interstates. The California Vehicle Code and the Streets and Highways Code (Sections 31600 through 34510) ensure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol.

Project operation would require use of hazardous substances including sulfuric acid and cleaning and water treatment chemicals. It is estimated that there would be an average of two trucks every three months (URS 2007b). Operation would also require a maximum of three deliveries per year of aqueous ammonia (URS 2007a). Hazardous materials would be transported on I-5 and West Panoche Road to the Starwood site, which staff believes is a reasonable route to access the site since it is the shortest and most direct route. A licensed hazardous waste transporter would haul any hazardous waste from the project site to one of two Class 1 hazardous waste landfills in western Kern County near the communities of Buttonwillow and Kettleman City, or one in Imperial County near the community of Westmoreland. The handling and disposal of hazardous substances are also addressed in the **Waste Management, Worker Safety and Fire Protection** and **Hazardous Materials** sections of this assessment.

Airport Operations

The closest major airport is Eagle Field Airport which is fourteen miles north of the project site. The existing flight pattern does not bring aircraft at low altitude over the

project site. The two combustion turbine generator (CTG) units would be 33 feet high, the generator/transformer would be 50 feet high, and the exhaust stack would be 50 feet high (URS 2006a, Table 3.4-1, pg.3-7). These structures would not penetrate navigable airspace for any airport.

The project does not include a cooling tower that could emit visible water vapor plumes. Because of the high exhaust temperature (750ºF), the project would not emit any visible plumes from its CTG exhaust stacks (Aspen 2007) that could affect local aircraft operations. The hot exhaust generated by a power plant can disturb atmospheric stability above the facility up to 1,000 above ground level, resulting in turbulence with the potential to affect aircraft maneuverability. However, staff has been advised that the agricultural fields near the project area are not sprayed by crop-dusting aircraft (URS 2007c). In addition, there are few (if any) aircraft that fly over or near I-5 in the project area (FAA 2007). Staff has been advised that the California Highway Patrol monitors traffic from the air and the aircraft fly within a quarter mile of I-5 to maintain visibility of vehicles, and would not fly east toward the project site (California Highway Patrol 2007).

The project is located within Lemoore Naval Air Station's Military Operational Airspace. Representatives from the military have reviewed the project and have concluded that it would not have any impact on the military mission in the area (NAVAIR 2007).

Staff concludes that the operation of the proposed project would not cause a significant adverse impact on aircraft operations.

Emergency Services Vehicle Access

The Fresno County Fire Department would provide 24-hour fire protection and emergency medical services to the SPP site. The nearest fire station is in the City of Mendota (Fresno County 2007). Emergency service vehicles would reach the project site via West Panoche Road. For a more detailed discussion of emergency services concerning adequate ingress/egress serving the facility, see the **Worker Safety and Fire Protection** section in this assessment.

In summary, staff believes that the operation of the SPP would not have a significant adverse traffic and transportation impact on the local road or highway network.

CUMULATIVE IMPACTS

In addition to the SPP, staff is analyzing the Panoche Energy Center (PEC) project that would be located south of, and adjacent to, the existing PG&E Panoche substation. It is staff's understanding that PEC construction would commence in early 2008, which is about six months prior to the start of Starwood's construction. Therefore, there would be a significant overlap during the construction of both projects. The PEC project would involve an average of 180 workers and seven truck trips per day. Corresponding peak construction numbers are 383 workers and 15 trucks per day (URS 2007a). With LOS A and B for West Panoche Road and I-5, the combination of workers and trucks for both projects arriving and departing during peak traffic periods (7 to 9 AM and 4 to 6 PM) would not degrade LOS to an unacceptable level. Thus, there would be no significant cumulative impact on West Panoche Road and I-5.

A Federal Bureau of Prisons medium security Federal Correctional Institution (FCI) is slated to be built near Mendota, about 12 miles from the project site. Major construction of the new FCI was scheduled to begin in 2005 and completion was expected in 2008. Phase I was completed in March 2007 but the construction status of Phase II is unknown (CEC 2007y). There are no additional planned construction projects in this part of Fresno County.

Staff has considered the minority populations (as identified in **Socioeconomics Figure 1**) and low income populations in its impact analysis. There would be no significant direct or cumulative traffic and transportation impacts, and therefore, no environmental justice issues.

COMPLIANCE WITH LORS

The applicant has stated its intention to comply with all applicable LORS (URS 2006a, pg. 5.11-16). Staff has concluded that the project as proposed would comply with relevant LORS. **Traffic and Transportation Table 3** presents the projects conformance with all applicable LORS.

TRAFFIC & TRANSPORTATION Table 3
Project Compliance With Adopted Traffic and Transportation LORS

Applicable LORS	Description
Federal	
Code of Federal Regulations (CFR) Title 14, Chapter 1, Part 77	Includes standards for determining obstructions in navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alteration. Also, provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace.
	Consistent: The project is not located within 20,000 feet of any airport and its structures would not penetrate any navigable airspace. The applicant is not required to file a "Notice of Proposed Construction or Alteration" with the FAA. In addition the project does not have any structure exceeding 200 feet in height which also triggers a notification to the FAA.
CFR Title 49, Subtitle B.	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures), and provides safety measures for motor carriers and motor vehicles who operate on public highways.
	Consistent: Enforcement is conducted by state and local law enforcement agencies, and through state agency licensing and ministerial permitting (e.g., California Department of Motor Vehicles licensing, Caltrans permits), and/or local agency permitting (e.g., Fresno County Department of Public Works).
State	
California Vehicle Code, Division 2, Chapter. 2.5, Div. 6, Chap. 7, Div. 13, Chap. 5, Div. 14.1, Chap. 1 & 2, Div. 14.8, Div. 15	Includes regulations pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials.
	Consistent: Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting, and/or local agency permitting.
California Streets and Highway Code, Division 1 & 2, Chapter 3 & Chapter 5.5	Includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.
	Consistent: Enforcement is provided by state and local law enforcement, and through ministerial state agency licensing and permitting, and/or local agency permitting.
Local	
Fresno County General Plan – Transportation and Circulation Element.	Reflects the urban and rural nature of Fresno County and establishes standards that guide the development of the transportation system, and management of access to the highway system by new development, throughout the unincorporated areas of the county. Roadways are classified in this system based on the linkages they provide, their function in the hierarchy of roadways, and the importance of the route's service to the residents and businesses of Fresno County.
	Consistent: The Fresno County General Plan's Circulation Element acknowledges that the road system in the project area should operate at LOS C or better. The local roads would meet the LOS standard with the addition of project related traffic.

CONCLUSIONS

1. The project as proposed would comply with all applicable LORS related to traffic and transportation, and would not degrade the LOS A and B on West Panoche Road and I-5.

2. Because of the distance from the nearest airports and no impact on the Lemoore Naval Air Station Military Operational Airspace, the project would not impact aviation safety.

3. Staff is proposing Condition of Certification **TRANS-1** which would require a mitigation plan to repair West Panoche Road if it is damaged by project related traffic.

4. There would be no significant direct or cumulative traffic and transportation impacts and therefore no environmental justice issues.

PROPOSED CONDITION OF CERTIFICATION

TRANS-1 Prior to site mobilization activities, the project owner shall prepare a mitigation plan for West Panoche Road should it be damaged by project construction. The intent of this plan is to ensure that if West Panoche Road is damaged by project construction it will be repaired and reconstructed to original or as near original condition as possible. This plan shall include:

- Documentation of the pre-construction condition of West Panoche Road from I-5 to the access road to the site. Prior to the start of site mobilization, the project owner shall provide to the CPM photographs or videotape of West Panoche Road.
- Documentation of any portions of West Panoche Road that may be inadequate to accommodate oversize or large construction vehicles, and identify necessary remediation measures;
- Provide for appropriate bonding or other assurances to ensure that any damage to West Panoche Road due to construction activity will be remedied by the project owner; and
- Reconstruction of portions of West Panoche Road that are damaged by project construction.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit a mitigation plan focused on restoring West Panoche Road to their pre-project condition to the Fresno County Planning Department for review and comment, and to the CPM for review and approval.

Within 90 days following the completion of construction, the project owner shall provide photo/videotape documentation to the Fresno County Planning Department, and the CPM that the damaged sections of West Panoche Road have been restored to their pre-project condition.

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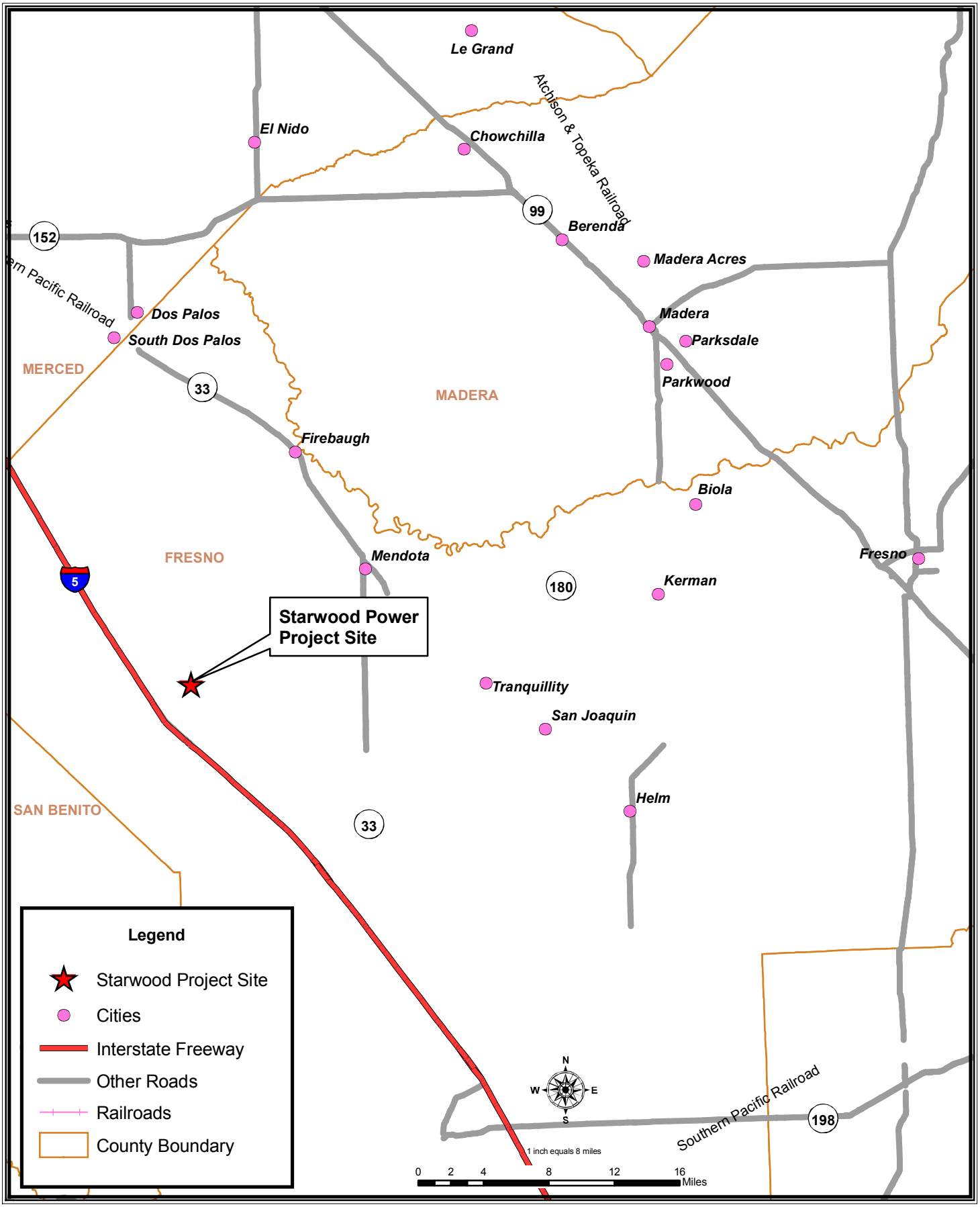
TRAFFIC AND TRANSPORTATION - FIGURE 1

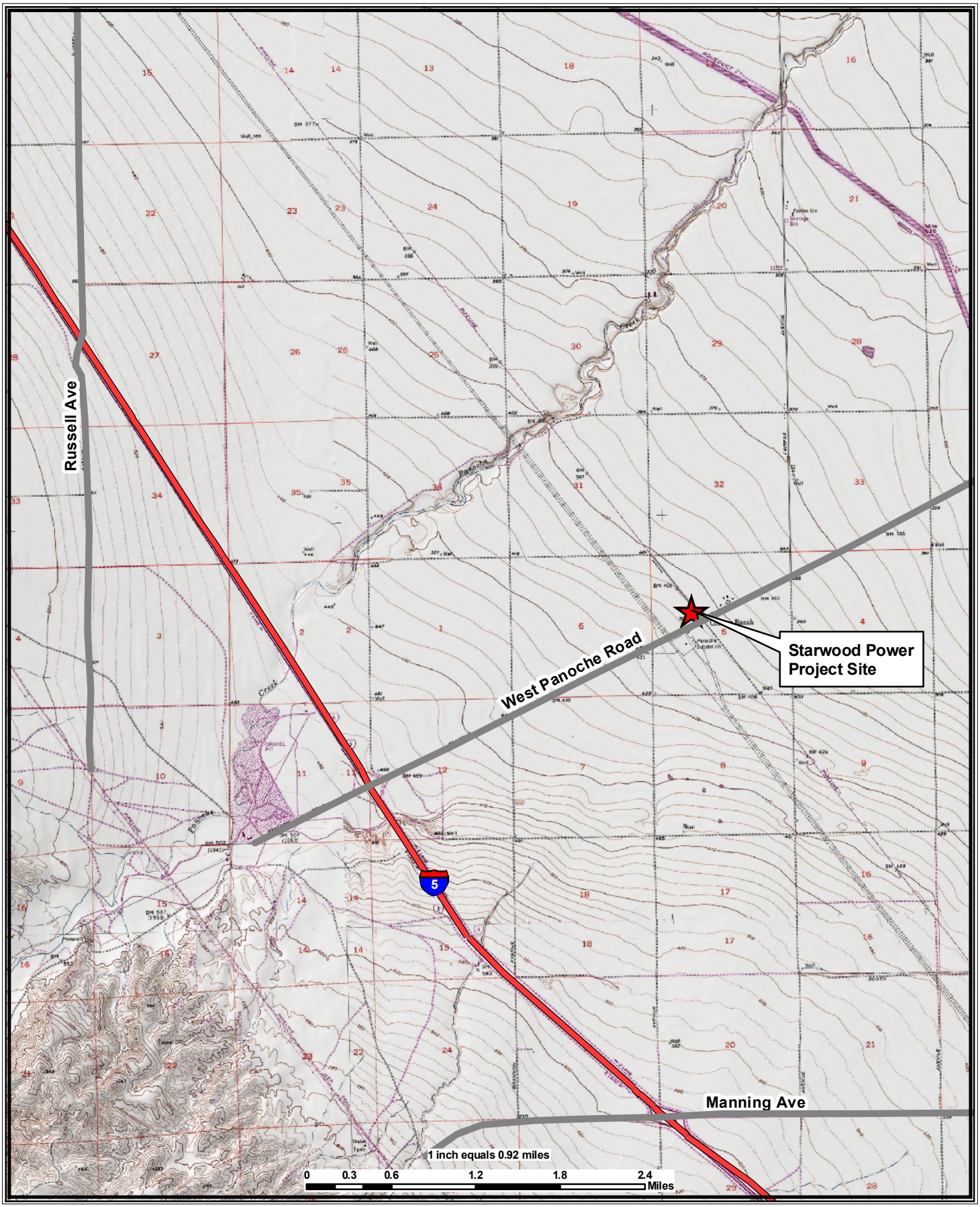
Starwood Power Project - Regional Transportation



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: California Energy Commission and TIGER Files

TRAFFIC AND TRANSPORTATION - FIGURE 2
Starwood Power Project - Local Transportation



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, OCTOBER 2007
SOURCE: California Energy Commission and TOPO Map

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The applicant, Starwood Power-Midway, LLC proposes to transmit the power produced by the proposed Starwood Power project (SP or Starwood Power) to the Pacific Gas and Electric (PG&E) electric transmission grid through a new tie-in 300-foot, overhead, 115-kilovolt (kV) transmission line connecting the existing CalPeak Panoche plant to the adjacent PG&E Panoche Substation. The proposed line would traverse a mostly agricultural area with two nearby power generating facilities and related lines and in which there would be no nearby residences during operations, thereby eliminating the potential for residential electric and magnetic field exposures that in recent years have raised concern about human health effects. The proposed line's design, erection, operation, and maintenance plan would be according to standard PG&E practices, which conform to applicable laws, ordinances, regulations and standards (LORS). With the five proposed conditions of certification, any line-related safety and nuisance impacts would be less than significant.

INTRODUCTION

The purpose of this analysis is to assess the proposed line design and operational plan to determine whether its related field and non-field impacts would constitute a significant environmental hazard in the area around the proposed route. All related health and safety laws LORS are currently aimed at minimizing such hazards. Staff's analysis focuses on the following issues as related primarily to the physical presence of the line, or secondarily to the physical interactions of its electric and magnetic fields:

- aviation safety;
- interference with radio-frequency communication;
- audible noise;
- fire hazards;
- hazardous shocks;
- nuisance shocks; and
- electric and magnetic field (EMF) exposure.

The following federal, state, and local laws and policies apply to the control of the field and non-field impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

TRANSMISSION LINE SAFETY AND NUISANCE (TLSN) TABLE 1
Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Aviation Safety	
Federal	
Title 14, Part 77 of the Code of Federal Regulations (CFR),"Objects Affecting the Navigable Air Space"	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, " Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space"	Addresses the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA in cases of potential for an obstruction hazard.
FAA Advisory Circular 70/460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.
Interference with Radio Frequency Communication	
Federal	
Title 47, CFR, Section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication.
State	
California Public Utilities Commission (CPUC) General Order 52 (GO-52)	Governs the construction and operation of power and communications lines to prevent or mitigate interference.
Audible Noise	Not to exceed applicable local noise ordinances – (no design-specific federal or state regulations for noise from transmission lines).
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
Title 8, California Code of Regulations (CCR) Section 2700 et seq. "High Voltage Safety Orders"	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.

Applicable LORS	Description
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC "Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California"	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR Sections 1250-1258, "Fire Prevention Standards for Electric Utilities"	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

SETTING

As noted in the **Project Description** section, the site for the proposed project is a 5.6-acre portion of a 128-acre land parcel approximately 16 miles southwest of the City of Mendota and approximately 300 feet east of PG&E's Panoche Substation (SPP 2006a, page 5.9-1). The line would be located within the SP and the Panoche Substation's property boundaries that are in an agricultural area. The nearest residence is a 5-unit building complex approximately 100 feet from the northern boundary. However, the occupants would be relocated before the start of construction as a noise mitigation measure, meaning that there would be no residences in the immediate vicinity at the time of operations (SPP 2006a, pages 5.9-9 and 5.15-2). Such absence of residences means that there would not be the types of long-term human EMF exposures mostly responsible for the health concern of recent years. The only project-related EMF

exposures of potential significance are the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the immediate vicinity of the line. These types of exposures are short term and well understood as not significantly related to the health concern. The proposed project line would cross the paths of lines from the other nearby power plants (CalPeak Panoche and Wellhead Peaker) as it extends to the Panoche Substation. The fields from these existing lines are part of the background field levels to which would be added the fields from SP. Any post-energization field measurements would reflect these existing levels together with the contribution from the proposed line.

PROJECT DESCRIPTION

The proposed SP transmission line will consist of the segments listed below:

- An overhead 115-kV line extending approximately 300 feet from the project's 115-kV switchyard to the point where it would connect to the existing line between the CalPeak Panoche plant and the PG&E Panoche Substation; and
- The project's on-site 115-kV switchyard from which the conductors would originate.

The proposed line's conductors would be standard low-corona aluminum cables or equivalent to be erected on wooden support poles. The line would be built to accommodate the added power and the presence of several area lines some of which would be raised or re-conductored according to PG&E requirements regarding clearance, field strength reduction, efficiency, reliability, safety, and maintainability (SPP 2006a, pp. 3-32 through 3-35).

The line would exit from the northwest end of the project site and run west for approximately 300 feet to tie into the existing line between the Calpeak Panoche power plant and the PG&E Panoche Substation. There would be no public access to the proposed line or related switchyard since the line would run within the property boundaries of SPP and the Panoche Substation, which connects other area115-kV and 230-kV lines to the PG&E transmission grid.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The potential magnitude of the line impacts of concern in this staff analysis depends on compliance with the listed LORS whose related mitigation measures have been established as adequate to maintain such impacts below levels of potential significance. Thus, if staff determines that the project would comply with applicable LORS, we would conclude that any transmission line-related safety and nuisance impacts would be less than significant. The nature of these individual impacts is discussed below together with the potential for compliance with the LORS that apply.

DIRECT IMPACTS AND MITIGATION

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace and the need to file a “Notice of Proposed Construction or Alteration” (Form 7640) with the FAA as noted in the LORS section. The need for such a notice depends on factors related to the height of the structure, the slope of an imaginary surface from the end of nearby runways to the top of the structure, and the length of the runway involved.

As noted by the applicant (SPP 2006a, pp. 3-32, and 3-54), the height of the proposed line support would, at 65 feet, be much less than the 200 feet regarded by the FAA as triggering the concern about aviation safety. Furthermore, the line would be in an area with several other PG&E lines (from the CalPeak Panoche and the Wellhead Peaker) some of which are of similar voltage and structural dimensions. The nearest public airport is in Fresno approximately 50 miles away and thus, farther than the 20,000 feet that triggers FAA notification. A small general aviation airport, in Firebaugh (Firebaugh Airport) is located approximately 24 miles away. Given these conditions, staff considers the proposed line structures as not posing an obstruction-related aviation hazard to area aircraft as defined using current FAA criteria. Therefore, no FAA “Notice of Construction or Alteration” would be required for the line.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge, but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is, therefore, minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed line would be built and maintained in keeping with standard PG&E practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345-kV and above, and not the proposed 115-kV line. The proposed low-corona designs are used for all PG&E lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Since these existing lines do not currently cause the corona-related complaints along their existing routes, staff does not expect any corona-related radio-frequency interference or related complaints in the general project area.

However, staff recommends Condition of Certification **TLSN-2** to ensure mitigation as required by the FCC in the unlikely event of complaints.

Audible Noise

The noise-reducing designs related to electric field intensity are not specifically mandated by federal or state regulations in terms of specific noise limits. As with radio noise, such noise is limited instead through design, construction or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345-V or higher. It is, therefore, not generally expected at significant levels from lines of less than 345-kV as proposed for SPP. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the low-corona designs are also aimed at minimizing field strengths, staff does not expect the proposed line operation to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed line and related facilities, please refer to staff's analysis in the **Noise and Vibration** section.

Fire Hazards

The fire hazards addressed through the related LORS in **TLSN Table 1** are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

Standard fire prevention and suppression measures for similar PG&E lines would be implemented for the proposed project line (SPP 2006a, pp. 3-47 and Appendix F). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. **TLSN-4** is recommended to ensure compliance with important aspects of the fire prevention measures.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

The applicant's stated intention to implement the GO-95-related measures against direct contact with the energized line (SPP 2006a, p. 3-36) would serve to minimize the

risk of hazardous shocks. Staff's recommended Condition of Certification **TLSN-1** would be adequate to ensure implementation of the necessary mitigation measures.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). For the proposed project line, the applicant will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

The potential for nuisance shocks around the proposed line would be minimized through standard industry grounding practices (SPP 2006a, p. 3-36). Staff recommends Condition of Certification **TLSN-5** to ensure such grounding.

Electric and Magnetic Field Exposure

The possibility of deleterious health effects from EMF exposure has increased public concern in recent years about living near high-voltage lines. Both electric and magnetic fields occur together whenever electricity flows, hence the general practice of describing exposure to them together as EMF exposure. The available evidence as evaluated by the CPUC, other regulatory agencies, and staff, has not established that such fields pose a significant health hazard to exposed humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate in light of present uncertainty, to recommend reduction of such fields as feasible without affecting safety, efficiency, reliability and maintainability.

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

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.

- The measures employed for such field reduction can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State

In California, the CPUC (which regulates the installation and operation of high-voltage lines) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local factors bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on line operation and safety. The extent of such applications would be reflected by ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess the effectiveness of the applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since each new line in California is currently required by the CPUC to be designed according to the EMF-reducing guidelines of the electric utility in the service area involved, its fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the proposed project line according to existing PG&E field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management.

The CPUC has finished revisiting the EMF management issue to assess the need for policy changes to reflect the available information on possible health impacts. The findings did not point to a need for significant changes to existing field management policies.

Industrial Standards

The present focus is on the magnetic field because only it can penetrate the soil, buildings and other materials to potentially produce the types of health impacts at the root of the health concern of recent years. As one focuses on the strong magnetic fields from the more visible overhead transmission and other high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed to much stronger fields while using some common household appliances (National Institute of Environmental Health Services and the U.S. Department of Energy, 1995). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short-term, while the exposure from power lines are lower level, but long-term. Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

As with similar PG&E lines, specific field strength-reducing measures would be incorporated into the design of the proposed line to ensure the field strength minimization currently required by the CPUC in light of the concern over EMF exposure and health.

The field reduction measures to be applied include the following:

1. Increasing the distance between the conductors and the ground;

2. Reducing the spacing between the conductors;

3. Minimizing the current in the line; and

4. Arranging current flow to maximize the cancellation effects from interacting of conductor fields.

Since optimum field-reducing measures would be incorporated into the proposed line design, staff considers further mitigation to be unnecessary, but would seek to validate the applicant's assumed reduction efficiency from the field strength measurements recommended in Condition of Certification, **TLSN-3**.

CUMULATIVE IMPACTS AND MITIGATION

Since the proposed project transmission line and switchyard would be designed according to applicable field-reducing PG&E guidelines (as currently required by the CPUC for effective field management), staff expects the resulting fields to be of the same intensity as fields from well designed PG&E lines of the same voltage and current-carrying capacity. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. Any cumulative exposures in the operational phase should be seen as reflecting the contribution of lines from the existing area power plants (CalPeak Panoche and Wellhead Peaker plant) and the proposed project line. The line's maximum contribution would be obtained through measurements at the locations of maximum impacts, away from the other lines as required by TLSN-3. The cumulative exposure levels would be obtained from measurements at the point of maximum interaction with the existing lines as also required by **TLSN-3.** This should be

the point of connection with the CalPeak Panoche line that extends to the Panoche Substation.

COMPLIANCE WITH LORS

As previously noted, current CPUC policy on safe EMF management requires that any high-voltage line within a given area be designed to incorporate the field strength-reducing guidelines of the main area utility lines to be interconnected. The utility in this case is PG&E. Since the proposed project line and related switchyard would be designed according to the respective requirements of GO-95, GO-52, GO-131-D, and Title 8, Section 2700 et seq. of the California Code of Regulations, and operated and maintained according to current PG&E guidelines on line safety and field strength management, staff considers the presented design and operational plan to be in compliance with the health and safety LORS of concern in this analysis. The actual contribution to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-3**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no public or agency comments on the transmission line safety and nuisance aspects of the proposed project.

CONCLUSIONS

Since the proposed lines and related facilities are not close enough to the nearest airport to pose an aviation hazard according to current FAA criteria, staff does not consider it necessary to recommend location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures to be implemented in keeping with current PG&E guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise. The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of PUC's General Order 95. Compliance with Title 14, California Code of Regulations, Section 1250, will minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the proposed route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed SPP and similar transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed line's design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential magnetic exposure of

health concern in recent years would be insignificant for the proposed line given the general absence of residences along the proposed route. On-site worker or public exposure would be short term and at levels expected for PG&E lines of similar design and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern to staff while located along a route without nearby residences, staff considers the proposed design, maintenance, and construction plan as complying with the applicable laws. With the conditions of certification proposed below, any such impacts would be less than significant.

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed transmission lines according to the requirements of California Public Utility Commission's GO-95, GO-52, GO-131-D, Title 8, and Group 2. High Voltage Electrical Safety Orders, Sections 2700 through 2974 of the California Code of Regulations, and Pacific Gas and Electric's EMF-reduction guidelines.

Verification: At least thirty days before starting construction of the transmission line or related structures and facilities, the project owner shall submit to the Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the lines will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall ensure that every reasonable effort will be made to identify and correct, on a case-specific basis, any complaints of interference with radio or television signals from operation of the project-related lines and associated switchyards. The project owner shall maintain written records for a period of five years, of all complaints of radio or television interference attributable to plant 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 for the project-related lines and included during the first five years of plant operation in the Annual Compliance Report.

TLSN-3 The project owner shall hire a qualified consultant to measure the strengths of the electric and magnetic fields from the line before and after it is energized. The measurements shall be made according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures at the locations of maximum field strengths along the proposed route and at the point of connection with the line connecting the existing CalPeak Panoche line with PG&E's Panoche Substation. These

measurements shall be completed not later than six months after the start of operations.

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

TLSN-4 The project owner shall ensure that the rights-of-way of the proposed transmission line are kept free of combustible material, as required under the provisions of Section 4292 of the Public Resources Code and Section 1250 of Title 14 of the California Code of Regulations.

Verification: During the first five years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way and provide such summaries in the Annual Compliance Report.

TLSN-5 The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards regardless of ownership. In the event of a refusal by any property owner to permit such grounding, the project owner shall so notify the CPM. Such notification shall include, when possible, the owner's written objection. Upon receipt of such notice, the CPM may waive the requirement for grounding the object involved.

Verification: At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this Condition.

REFERENCES

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

Starwood Power Project (SPP) 2006a. Application for Certification. Volumes I and II. Submitted to the California Energy Commission on November 17, 2006.

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

VISUAL RESOURCES

Testimony of Mark R. Hamblin

SUMMARY OF CONCLUSIONS

Staff analyzed visual resources related information for the Starwood Power Project (SPP), and has concluded that with the effective implementation of the mitigation measure(s) identified by the applicant and staff's recommended condition(s) of certification this project would not cause any direct and cumulative adverse visual resource impact, and would comply with applicable laws, ordinances, regulations, and standards (LORS) pertaining to visual resources.

INTRODUCTION

Visual resources are the viewable natural and man-made features of the environment. In this section, staff evaluates the proposed project's construction and operation using the "Aesthetic" checklist criteria in the California Environmental Quality Act and Guidelines (CEQA), and if the project would comply with applicable state and local LORS pertaining to aesthetics, or preservation and protection of sensitive visual resources.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Visual Resources Table 1 provides a general description of identified adopted federal, state, and local LORS pertaining to maintenance and protection of visual resources relevant to the proposed project.

VISUAL RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	The project site does not involve federal managed lands, a recognized National Scenic Byway or All-American Road, or a designated State Scenic Highway.
State	
Local	
County of Fresno	No adopted policies or ordinances applicable to the proposed project or site have been identified.

SETTING

The SPP would be built on the valley floor in western Fresno County, California in an expanse of agriculture. To the north, east, and south is a mosaic of irrigated farmland, orchards (pomegranates and other fruits, nuts), and open space with scattered single family residences. To the west are U.S. Interstate 5 (I-5), a small area of highway service commercial related operations, farmland, rangeland, the Panoche Hills and Panoche Mountain (elevation 2,300 feet). Major concentrations of population are

relatively isolated in the region. The closest population center is the City of Mendota which is approximately 12 miles east.

The proposed project site would be constructed on an approximate 5.6-acre (project site) portion of a 128-acre parcel (subject property).The subject property consists of a producing pomegranate orchard, approximately 6 to 8 feet in height, and operating electric generation facilities and infrastructure. The proposed project site is currently used as an open air storage area that contains quantities of construction materials and debris, and several large pieces of equipment (see **Visual Resources Figure 1** – Aerial View of Site and Vicinity).

On the adjoining property to the west of the project site is Pacific Gas & Electric Company's Panoche Substation, a 230 kilovolt (kV) electric substation, and the CalPeak Power Panoche No. 2, a 49.5 megawatt (MW) peaking plant. To the south is the Wellhead Power Panoche, a 49.9 MW peaking plant. The proposed 400 MW Panoche Energy Center (PEC) is to be constructed about 1,500 feet west of the project site. The PEC proponent filed an application for a power plant license from the California Energy Commission in August 2006.

The Panoche Hills Wilderness Study Area is the nearest recognized public use recreational area or facility to the SPP site. The wilderness study area is managed by the U.S. Department of the Interior, Bureau of Land Management. The wilderness study area consists of hilly rangeland and is primarily used for grazing. Hiking and backpacking also take place. The 11,229-acre area is about 5 miles west of the project site on the west side of I-5.

PROJECT

The most publicly visible components for the SPP would include: two 50-foot tall combustion turbine generator exhaust stacks, a 50-foot tall dead-end structure, and two 41-foot tall combustion turbine generator enclosures (see **Visual Resources Figure 2** – Plant Elevations Looking East).

The proposed project would interconnect to the Panoche Substation by a 300-foot long 115-kV overhead electric transmission line tie into the Panoche Substation.

Natural gas would be supplied to the site by means of a new 800-foot long underground pipeline connecting to a Pacific Gas and Electric Company main gas line (Line 2) that runs north-south along the east side of the Panoche Substation.

Production water would be supplied from one of three sources: water from a well at the adjacent CalPeak Panoche plant; irrigation return flow water from the local farming operation's agricultural backwash pond; or water from a new onsite deep well. Potable water is to be supplied by a bottle water company.

During the construction period a 0.25-acre portion of the 5.6 acre project site would be used for vehicle parking, and the storage of construction equipment and materials. Vehicle access to the construction laydown area would be from West Panoche Road by a private road.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant visual resources impact generated by a project, staff reviews the project using the 2006 CEQA Guidelines Appendix G Environmental Checklist pertaining to "Aesthetics." The checklist questions include the following:

1. Would the project have a substantial adverse effect on a scenic vista?

2. Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

4. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Staff evaluates the existing visible physical environmental setting from a fixed vantage point (called a "Key Observation Point" [KOP]), and the visual change introduced by the proposed project to the view from that KOP. The view as seen from the KOP is referred to as the viewshed. Staff uses a KOP[1] to represent a location(s) from which to conduct detailed analyses of the proposed project and to obtain existing condition photographs and prepare visual simulations. KOPs are selected to be representative of the most critical viewshed locations from which the project would be seen. Because it is not feasible to analyze all the views in which a proposed project would be seen, it is necessary to select KOPs that would most clearly display the visual effects of the proposed project. KOPs may also represent primary viewer groups that would potentially be affected by the project. In addition to KOP photo(s), staff reviews landscape character photos that help provide a visual overview of a project site, its vicinity, and the selected KOP area.

Staff also reviews federal, state, and local LORS and their policies or guidelines for the protection or preservation of visual resources that may be applicable to the project site and surrounding area; these LORS include local government land-use planning documents (e.g., General Plan, zoning ordinance).

Please refer to **APPENDIX VR-1** for a complete description of staff's Visual Resources evaluation process.

Visual Resources Figure 3 - KOP Locations **-** shows the locations and view direction of the three selected KOPs for the proposed project and accompanying photo simulations of the proposed power plant structures after construction. Staff's analysis of each of the applicant's submitted KOPs is presented under Direct/Indirect Impacts and Mitigation section below.

[1]The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The impact discussion is presented under the following topics: scenic vista, scenic resources, visual character or quality, and light or glare.

A. SCENIC VISTA

CEQA checklist question: “Would the project have a substantial adverse effect on a scenic vista?”

A scenic vista for the purpose of this analysis is defined as a distant view through and along a corridor or opening that exhibits a high degree of pictorial quality. There are no scenic vistas in the KOP 1, KOP 2 and KOP 3 viewsheds. The proposed project would not cause a significant visual impact to a scenic vista.

B. SCENIC RESOURCES

CEQA checklist question: “Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?”

A scenic resource for the purpose of this analysis includes a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or a designated federal scenic byway or state scenic highway corridor.

In the KOP 1, KOP 2, and KOP 3 viewsheds there are no identified scenic resources. The proposed project would not cause a significant visual impact to a scenic resource.

C. VISUAL CHARACTER OR QUALITY

CEQA checklist question: “Would the project substantially degrade the existing visual character or quality of the site and its surroundings?”

Construction Impacts

Construction activities for the project would occur during an approximate 12-month period. Main activities that would be ongoing on the power plant construction site during the construction period include: the installation of the combustion turbine generators (CTGs) and power train foundations, erecting of the CTGs, the installing of pipe supports, liner plates and baffles and aboveground electrical, exhaust stack fabrication and condenser work, the installing of aboveground tanks and prefabricated buildings. In addition, during the construction period, construction materials, heavy equipment, trucks, modular offices, and parked vehicles would be publicly visible on the construction laydown area.

The public visibility of the construction site and activities on it would be unobstructed from the five unit residential building located on the south side of West Panoche Road, approximately 100 feet north of the construction site (see KOP 1), and to motorists on

West Panoche Road. Residents at the five-plex building currently experience unimpeded backyard views of the two operating peaking plants, the substation, piping, and other materials and equipment stored on the open fenced property in between them.

Residents at the five-plex building would be exposed for a temporary duration to an unobstructed view of on going construction activities taking place on the site. Typically screening of onsite construction site activities is accomplished by attaching a fabric or adding wooden slats to a perimeter fence. This screening is effective in limiting ground level visual exposure of the construction site. A condition to require construction site screening at the KOP 1 location has not been proposed by staff given the existing highly visually disturbed backyard view (see **Visual Resources Figure 4**).

Construction of the new 300-foot overhead transmission line would require use of a mobile crane and several trucks to install: a 50-foot tall deadend structure on the project site, the CalPeak, Panoche/PG&E tie-line, and a deadend structure at the PG&E substation. The installation of the overhead transmission line and associated structures would visual blend with the congestion of existing transmission structures and wires connected to the substation, and also would be visually disrupted by the view of the substation structure. The view of the project's transmission line is considered to be barely noticeable.

During pipeline construction, the ground surface along the proposed alignments would be temporarily disrupted by the presence of construction equipment, excavated piles of dirt, concrete and pavement, and construction personnel and vehicles. After construction, the ground surfaces would be restored. The restored ground surfaces and buried pipelines would not create a change to the existing visual condition.

Construction activities would not result in a long-term visual degradation. Overall, the project's construction activities are considered to generate a less than significant visual effect.

Operation Impacts

Analysis From Key Observation Points

KOP 1 – Five Unit Residential Building East Of Panoche Electric Substation

Visual Resources Figure 4 represents the existing view from the backyard of a residential five-unit building along the south side of West Panoche Road, approximately 100 feet north of the proposed power plant site. The residential building is the closest residential unit to the project site.

Visual Sensitivity

The view from KOP 1 towards the proposed project site includes exposed arid soil that has annual, ruderal weeds and grasses, the 60-foot tall tubular steel skeleton structure of the Panoche Substation, several 110-foot tall tubular steel electric overhead transmission line towers and wires, several 50-75-foot tall metal and wood vertical poles, and six miles to the south a portion of the grass covered Ciervo Hills (3,391 elevation). Typically, a view of a ridgeline within five miles is considered to be visually

sensitive. Construction materials, and electric generation and transmission components and equipment are stored within an open fenced area (**Visual Resources Figure 5** – Landscape Character Photo of The Open Storage Area). The power generation blocks for the Wellhead Peaker plant and the CalPeak Peaker plant are in view. The KOP 1 viewshed does not include a scenic resource or vista. The estimated public appeal of the visual impression (quality) of the KOP 1 viewshed is considered to be low.

Residential viewers are typically considered to be highly sensitive to modifications of a viewshed. However, from this KOP, a residential viewer is accustomed to a backyard view visually described as industrial in appearance. The backyard has no ornamental landscaping, or existing visual screening of the project site, the Wellhead Peaker and CalPeak Peaker plants, the Panoche Substation, and other structures. There is no focal point in the viewshed that draws the viewer's eye to a unique feature (e.g., rock outcropping, waterfall, historic building). The various structures introduce forms, lines, colors, and textures that contrast in the view. The estimated level of residential viewer concern towards preserving the existing KOP 1 viewshed is considered to be low.

The KOP 1 view is visually unobstructed towards the proposed project site from the residential building. The view of the proposed project site is not obstructed by manmade or natural elements. The degree of visibility from the KOP is considered to be a high. The KOP represents the view from the backyard of a five unit residential building. This number of potentially affected residences is considered to be low. The duration of view to an exposure of power plant structures from a viewer in the backyard of the residential units would be considered high (extended). Overall, residential viewer exposure is considered high.

West Panoche Road is an east-west two-lane road that provides highway ramp connections to I-5 to the west, and primary access to the cities of Mendota and Firebaugh to the east. The road lies approximately 250 feet north of the project site. The road is not shown as a scenic highway, scenic drive, or landscaped drive on the Fresno County-Designated Scenic Roadways (Fresno County General Plan, Open Space and Conservation Element, page 5-36). Motorists who are area residents traveling at normal speed typically have an increased awareness of views from local roads, particularly at points of entry to a community and along designated scenic roadways. The estimated level of viewer concern of motorists of the project site along this rural roadway is considered to be moderate.

The AFC states that the Average Daily Traffic (ADT) count of vehicle trips along the road segment of West Panoche Road between I-5 and the project site is 1,057 (URS 2006a, pg. 5.11-3). If at least one individual per vehicle trip was exposed to a view of the project site with potential power plant structures, the estimated number of motorist exposures would be considered to be moderately low. Staff visited the project site and estimates the duration of view for motorists traveling west on West Panoche Road at the legal speed limit through the KOP 1 viewshed to a potential exposure of the power plant site to be 10 to 20 seconds which is considered to be low to moderate. The residential building, which fronts West Panoche Road, blocks a motorist ground level view of the front of the project site, and a neighboring fuel tank farm disrupts a view of it. Surrounding orchards also disrupt the continuity of a motorist ground level view of the project site along this segment of West Panoche Road. The taller power plant structures

would be visible from a greater distance. The visibility of the project site is considered to be moderate to high. Overall exposure for motorist is considered to be moderate.

The overall visual sensitivity for residential viewers would be considered moderately low from the KOP 1 location. This assessment is the result of a low visual quality, low viewer concern, and a high overall viewer exposure.

The overall visual sensitivity for a motorist would be considered moderately low from the KOP 1 location. This assessment is the result of a low visual quality, moderate viewer concern, and a moderate overall viewer exposure.

Visual Change

Visual Resources Figure 6 represents a photo simulation of the proposed project's publicly visible structures after the completion of construction in the KOP 1 viewshed.

The proposed non-reflective neutral gray color and smooth steel flat finished surface of project structures as shown in the photo simulation would be unobstructed in the view. The potential contrast introduced by project structures is considered to be visible or perceived from this KOP. The degree of contrast introduced by the project's structures is diffused by other contrasting structures, and considered moderately high when compared to other manmade and natural elements in the KOP viewshed. The potential contrast of the structures would be seen and attract attention (strong).

The applicant shows in their photo simulations and architectural rendering that the exteriors of major project structures would be treated with a gray finish intended to optimize its visual integration with the surrounding agricultural setting (**Visual Resources Figure 7** – Appearance of Project Site After Completion).

The photo simulation of the project structures shows the proportionate size relationship to other manmade and natural elements would occupy a large portion of the total field-of-view of KOP 1. In addition the structures would visually appear dominate when compared to other elements in the KOP view. The relative visual scale of the structures as simulated in the KOP 1 viewshed is considered to be high.

The project would introduce publicly visible structures to the KOP viewshed, the degree of view disruption introduced by the structures is considered to be moderately low. There is no identified or designated scenic resource or vista in the KOP viewshed that would be blocked from view by project structures. A view of the Wellhead Power peaking plant would be partially disrupted by the project from the KOP location.

Staff concludes the introduction of the Starwood project structures would not substantially degrade the existing viewshed at KOP 1. When considering the overall visual sensitivity of the various viewing groups at KOP 1 (residential viewer [moderately low]; motorist views [moderately low), and overall visual change of moderately high, the introduction of the proposed project's publicly visible structures would generate a less than significant visual effect at this KOP.

KOP 2 – Three Residences On North Side Of West Panoche Road

Visual Resources Figure 8 represents the existing view from the front yard of one residence of a cluster of three single family residences on the north side of West Panoche Road, approximately 1,500 feet west of the proposed power plant site.

Visual Sensitivity

The view from KOP 2 towards the proposed project site includes a portion of West Panoche Road and its soft road shoulder, a portion of maintained pomegranate orchard, a portion of the three banks of 60-foot tall tubular steel skeleton structures of the Panoche Substation and overhead transmission wires, vertical metal and wood poles. Also in the view, down the street are the white colored diesel tanks of a fuel farm. The KOP 2 viewshed does not include a scenic resource or vista. The estimated public appeal of the visual quality of the KOP 2 viewshed is considered to be low.

From this KOP, a residential viewer is accustomed to a view of a pomegranate orchard and the electric substation. There is no focal point in the viewshed that draws the viewer's eye to a unique feature. A portion of the viewshed is partially disrupted by existing tall tubular steel structures. The steel structures introduce forms, lines, colors, and textures that do not conform to the agricultural setting. The estimated level of viewer concern towards preserving the existing KOP 2 viewshed is considered to be moderately low.

The KOP 2 view shows a visually obstructed ground level view of the proposed project site. Currently, there is an orchard that buffers a portion of the view angle of the project site. The substation provides additional buffering at the angle of view to the project site. The visibility of the project site is considered low. This KOP location represents the view from three single family residences that may have a view of structures on the project site. This number of potentially affected residences is considered to be low. The duration of view of power plant structures from a residence(s) would be considered low. Overall, residential view exposure is considered low.

As previously noted the AFC states that the ADT count of vehicle trips along the road segment of West Panoche Road between I-5 and the proposed project site is 1,057. The estimated number of motorist view exposures is considered to be moderately low. Staff visited the project site and estimates the duration of view for motorists traveling west on West Panoche Road in the KOP 2 viewshed to an exposure of potential power plant structures on the site to be 10 to 20 seconds which is considered to be moderately low. Overall, view exposure for motorists is considered to be moderate.

The overall visual sensitivity for residential viewers would be considered low from the KOP 2 location. This assessment is the result of a low visual quality, moderately low viewer concern, and a low overall viewer exposure.

The overall visual sensitivity for a motorist would be considered moderately low from the KOP 2 location. This assessment is the result of a low visual quality, moderately low viewer concern, and a moderately low overall viewer exposure.

Visual Change

The applicant prepared a photo simulation of the publicly visible project structures after the completion of construction in the KOP 2 viewshed. It was provided in the AFC. The photo simulation shows that the project's publicly visible structures are unnoticeable from the KOP 2 location (the same view as shown in **Visual Resources Figure 8**). Therefore, staff did not include the photo simulation as an attachment. The project structures would not attract attention and does not change the KOP 2 viewshed.

Staff concludes the introduction of the SPP structures would not substantially degrade the existing viewshed at KOP 2. When considering the overall visual sensitivity of the various viewing groups at KOP 2 (residential viewer [low]; motorist views [moderately low]), and overall visual change of low, the introduction of the proposed project's structures would generate a less than significant visual effect at this KOP.

KOP 3 – I-5 Overpass On West Panoche Road

Visual Resources Figure 9 represents the view for motorists near the northbound I-5 on and off-ramps, near the top of an elevated overpass of I-5 on West Panoche Road, two-miles west of the proposed project site. There are no residences at the KOP location.

Visual Sensitivity

The view from KOP 3 towards the proposed project site includes West Panoche Road, a highway off-ramp, a line of 110-foot tall tubular steel electric overhead transmission towers and wires, a windbreak consisting of a single row of 20 to 30-foot tall cypress trees, a variety of orchards, and a distant view of the skeleton structure of the Panoche Substation. The KOP 3 viewshed does not include a scenic resource or vista. The estimated public appeal of the visual quality of the KOP 3 viewshed is considered to be moderately low.

Interstate 5 is shown as a scenic highway within Fresno County by the County of Fresno. As a result of this county designation, intensive land development proposals along I-5 are required to be designed to blend into the natural landscape and minimize visual scarring of vegetation and terrain. In addition, the design of a proposed development is required to provide and maintain a natural open space area two hundred (200) feet in depth parallel to the right-of-way along the scenic roadway. The project site is approximately two miles away from I-5, therefore the county's scenic designation does not apply to the project site. Interstate 5 is not shown as an officially designated State scenic highway or, as a recognized County scenic highway by the State of California (d.b.a. Caltrans) on the California Scenic Highway System Mapping System.

Typically motorists on a freeway system such as I-5, have a moderate to low sensitivity to the visual environment due to their concentration on driving and their focus on their destination. From this KOP, a motorist coming off of I-5 would have an obstructed view of the project site by orchard. The existing 110-foot tall transmission towers provide a focal point in the viewshed that draws the viewer's eye to it coming off the highway. The estimated level of viewer concern towards preserving the existing KOP 3 viewshed is considered to be moderately low.

The KOP 3 view is visually obstructed towards the proposed project site from the West Panoche Road overpass. A view of the proposed project site is obstructed by orchard and non-native vegetation to the degree of having what is considered a moderately low visibility from the KOP. The AFC states that the ADT count of vehicle trips along the segment of I-5 near West Panoche Road is 51,500 (URS 2006a, pg 5.11-3). The estimated number of potential motorist exposures is considered to be high. A view of the project site from I-5 would be interrupted due to agricultural operations adjacent to and along the highway (**Visual Resources Figure 10** – Landscape Character Photo of Proposed Project Site from Southbound Interstate 5, 2 miles west of the Project Site). Overall viewer exposure is considered moderately low.

The ADT count of vehicle trips along the road segment of West Panoche Road between I-5 and the project site is 1,057 (URS 2006a, pg. 5.11-3). The estimated number of potential motorist exposures is considered moderately low. The estimated duration of view for a motorist traveling east on West Panoche Road from I-5 to an exposure of potential power plant structures on the site to be less than 2 minutes which is considered to be high. Overall viewer exposure is considered moderate.

The overall visual sensitivity for I-5 motorists would be considered moderately low from the KOP 3 location. This assessment is the result of a moderately low visual quality, moderately low viewer concern, and a moderately low overall viewer exposure.

The overall visual sensitivity for West Panoche Road motorists would be considered moderately low from the KOP 3. This assessment is the result of a moderately low visual quality, moderately low viewer concern, and a moderately low overall viewer exposure.

Visual Change

Visual Resources Figure 11 represents a photo simulation of the proposed project's publicly visible project structures after the completion of construction in the KOP 3 viewshed.

Barely visible from the KOP 3 location is the vertical, cylindrical form of the proposed project's 90-foot tall Units 1 and 2 exhaust stacks. The degree of contrast introduced by the project's structures is considered low when compared to existing manmade and natural elements in the KOP viewshed.

The photo simulation of the project's structures shows the proportionate size relationship to other manmade and natural elements in the view. The project structures would occupy a very small portion of the total field-of-view of KOP 3. In addition, the structures would visually appear subordinate when compared to other elements in the KOP view. The relative visual scale of the structures as simulated in the KOP 3 viewshed is considered to be low.

Although the project would introduce publicly visible structures to the KOP viewshed, the degree of view disruption introduced by the structures is considered to be low. There is no identified or designated scenic resource or vista in the KOP viewshed that would be blocked from view by project structures. A small view of the Panoche Substation would be partially disrupted by the project from the KOP location.

Staff concludes the introduction of the SPP structures would not substantially degrade the existing viewshed at KOP 3. When considering the overall visual sensitivity of the various viewing groups at KOP 3 (motorist views [moderately low]) for I-5 and West Panoche Road), and overall visual change of low, the introduction of the proposed project's structures would generate a less than significant visual effect at this KOP.

PUBLICLY VISIBLE WATER VAPOR PLUMES

Although not specifically identified in the Appendix G Environmental Checklist under Aesthetics, staff includes a separate analysis of the potential visual impact of water vapor plumes generated by proposed power plants during operation.

The SPP would not have a wet cooling tower; a common source of visible water vapor plumes from power plants. The SPP is expected to have a very high exhaust temperature (750 degrees Fahrenheit) from its gas turbines. Staff has determined that under normal weather conditions there is no potential for visible water vapor plumes to form from its exhaust stacks. Therefore, the project would result in no visual effect related to publicly visible water vapor plumes.

D. LIGHT OR GLARE

CEQA checklist question: "Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?"

The project during construction and operation has the potential to generate offsite lighting impacts to surrounding properties. The backyard of the five-unit residential building is approximately 100 feet north of the proposed power plant site.

The applicant states in the AFC "lighting will be required for safe and efficient operation in a number of areas. These include: outdoor equipment platforms and walkways, [and] transformer areas. To avoid intrusion on sensitive areas, outdoor lighting will be directed downwards and towards the interior or the plant" (URS 2006, pg. 5.13-17). Staff believes that the applicant's general description of light mitigation would reduce offsite light impacts; however, the description does not specifically describe what the mitigations may consist of during the project's construction and at operation. Staff has proposed condition of certification **VIS-2** which limits lighting during construction, and **VIS-3** which limits lighting during operation and requires submittal of a lighting control plan. With the effective implementation of the proposed light mitigation measures, staff believes that the SPP would not result in a substantial new source of light that could adversely affect existing nighttime views.

A lighting system for the project's exhaust stacks to address Federal Aviation Administration regulations is not necessary because the exhaust stacks (the tallest structures) would not exceed 200 feet in height, and the project site is in excess of 20,000 feet (3.8-miles) from an airport runway that is at least 3,200 feet in actual length.

The photo simulations of the power plant provided by the applicant show the use of a surface treatment on major project structures and buildings consisting of a neutral gray color and a flat finish. This finish would limit excessive glare. Staff concurs with the applicant's proposed surface treatment. With effective implementation of the

applicant's proposed surface treatment, project structures would not be a source of substantial glare that could adversely affect existing daytime views. Staff has proposed condition of certification **VIS-1** which requires submittal of a surface treatment plan for the power plant structures and electric transmission line poles.

CUMULATIVE IMPACTS AND MITIGATION

As defined in Section 15355 of the CEQA Guidelines (California Code of Regulations, Title 14), a cumulative impact is created as a result of the combination of the project under consideration together with other existing or reasonably foreseeable projects causing related impacts. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. In other words, while any one project may not create a significant impact to visual resources including visible water vapor plumes, the combination of the new project with all existing or planned projects in an area may create significant impacts. The significance of the cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) views of a scenic resource is impaired; or (3) visual quality is diminished.

The proposed SPP would be built in western Fresno County, 12 miles east of the City of Mendota within an expanse of irrigated farmland, orchard, and open space with scattered residences. There is no identified scenic resource or vista in the KOP 1, KOP 2 and KOP 3 viewsheds that would be disrupted by the built project.

On adjoining properties to the west of the project site is the Panoche Substation, the CalPeak Power Panoche No. 2 generation facility and to the south the Wellhead Power Panoche generation facility. A potential development project, 1,500 feet west of the project site is the Panoche Energy Center. The CalPeak, Wellhead and SPP do not use cooling towers. Also the plants do not operate around the clock. The cumulative visual impact from publicly visible water vapor plumes introduced by the proposed peaking plants and generated by the operating peaking plants is considered to be low.

The addition of publicly visible structures by the proposed Starwood and Panoche electric generation projects would add to the existing congregation of industrial structures next to the Panoche Substation. The Panoche Substation would continue to be dominate in the landscape. A noticeable change would occur. The existing and planned projects are visually limited to an existing small industrial looking area surrounding the substation (an industrial island) in an expanse of agriculture. A visual change to the existing agricultural character and quality of the surrounding area is not expected to happen due to existing agricultural land use regulations.

While project-related nighttime light and daytime glare impacts of the SPP would be mitigated to a level that would be less than significant, existing light and glare levels in the vicinity of the project would increase cumulatively as a result of the project and, existing and planned land uses. Light and glare impacts generated by these projects are not anticipated to be cumulatively considerable if mitigated according to CEQA.

The Federal Correctional Institution – Mendota, California is to be built southwest of the City of Mendota, approximately 12 miles from the SPP site. The Federal Bureau of Prisons is building a medium-security federal correctional institution to house

approximately 1,152 adult male inmates, and a satellite prison camp to house 128 minimum-security inmates on a 960 acre property located near the corner of the intersection of California Avenue and State Route 33. The correctional facility would not be visible from the SPP site.

The SPP and Panoche projects would introduce to the KOP 1, KOP 2, and KOP 3 viewsheds publicly visible structures that are industrial in nature to an agricultural area. The view of the publicly visible structures would be compacted around the existing electric substation. The structures would be visually noticeable but would not be so great as to constitute a substantial degradation of the existing visual setting. The SPP in combination with existing and planned projects would generate a less than significant cumulative visual effect to the KOP 1, KOP 2, and KOP 3 viewsheds.

Staff has reviewed Census 2000 information (maps) that shows a minority population greater than 50% within a six-mile radius of the proposed power plant, and a low income population less than 50% within the same radius (see the **Socioeconomics** section of this PSA, and **Socioeconomics Figure 1**).

Socioeconomics Figure 1 shows that an identified minority population may potentially have a limited exposure to the project's publicly visible structures. These structures would be surface treated to help soften their visual presence (see condition of certification **VIS-1**). In addition, the continued maintenance and operation of the orchard bordering the project site would help limit ground level views of the project site.

Staff has determined that all significant direct or cumulative impacts specific to visual resources resulting from the construction or operation of the project will be mitigated. Therefore, the proposed project would not introduce a significant visual resources related environmental justice issue(s).

COMPLIANCE WITH LORS

No adopted policies or ordinances pertaining to maintenance and protection of visual resources relevant to the proposed project at this location have been identified.

NOTEWORTHY PUBLIC BENEFITS

Noteworthy public visual benefits introduced to area by the proposed project have not been identified.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments have been received pertaining to visual resources.

CONCLUSIONS

The visual analysis focused on two main issues; (1) would construction and operation of the project cause visual impacts; and (2) would the project comply with applicable local LORS.

1. The proposed SPP is to be built in an area designated “Agriculture” by the Fresno County General Plan. Land uses surrounding the project site are visually described as industrial and agricultural/open space.

2. The power plant site does not use or have frontage on a segment of road recognized as a National Scenic Byway or All American Road, or designated as a State Scenic Highway.

3. The introduction of proposed SPP structures including its associated linear facilities would generate a less than significant visual effect at the three selected Key Observation Points.

4. The introduction of the proposed SPP including its associated linear facilities would generate a less than significant new source of light or glare to nighttime or daytime views.

5. The SPP will not have a wet cooling tower. The SPP is expected to have a very high exhaust temperature (750 degrees Fahrenheit) from its gas turbines. Under normal weather conditions no visible water vapor plumes would form from its exhaust stacks. Therefore, the project would result in a less than significant visual effect related to publicly visible water vapor plumes

6. The proposed project’s publicly visible project structures may potentially be seen by an identified minority population of greater than 50%. Staff has determined that all significant direct or cumulative impacts specific to visual resources resulting from the operation of the project will be mitigated. Therefore, the proposed project does not introduce a significant visual resource related environmental justice issue(s).

7. With mitigation, the construction and operation of the SPP would not cause any significant visual impacts to adjacent land uses, or contribute considerably to a cumulative visual impact.

The construction and operation of the SPP as proposed, with the effective implementation of the applicant’s proposed design measure and staff’s recommended conditions of certification (below) would ensure that visual impacts generated by the project are less than significant, and ensure that the project complies with all applicable LORS regarding visual resources.

PROPOSED CONDITIONS OF CERTIFCATION

Surface Treatment of Project Structures and Buildings

VIS-1 The project owner shall color and finish the surfaces of all project structures and buildings visible to the public to ensure that they: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances. The transmission line conductors shall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive.

The project owner shall submit a surface treatment plan to the Compliance Project Manager (CPM) for review and approval. The treatment plan shall include:

A. A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes;

B. A list of each major project structure, building, tank, pipe, and wall; transmission line towers and/or poles; and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system;

C. One set of color brochures or color chips showing each proposed color and finish;

D. One set of 11" x 17" color photo simulations at life size scale of the proposed treatment for project structures, including structures treated during manufacture, from the Key Observation Points;

E. A specific schedule for completing the treatment; and

F. A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not request vendor treatment of any buildings or structures during their manufacture, or perform final field treatment on any buildings or structures, until the project owner has received treatment plan approval by the CPM.

Verification: At least 90 days prior to specifying vendor color(s) and finish(es) for structures or buildings to be surface treated during manufacture, the project owner shall submit the proposed treatment plan to the CPM for review and approval and simultaneously to the County of Fresno Department of Public Works and Planning, Development Services Division for review and comment. The project owner shall provide the CPM with the County's comments at least 30 days prior to the estimated date of providing paint specification to vendors.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a plan with the specified revision(s) for review and approval by the CPM before any treatment is applied. Any modifications to the treatment plan must be submitted to the CPM for review and approval.

Within ninety (90) days after the start of commercial operation, the project owner shall notify the CPM that surface treatment of all listed structures and buildings has been completed and is ready for inspection; and shall submit one set of electronic color photographs from the Key Observation Points.

The project owner shall provide a status report regarding surface treatment maintenance in the Annual Compliance Report. The report shall specify a): the condition of the surfaces of all structures and buildings at the end of the reporting year; b) major

maintenance activities that occurred during the reporting year; and c) the schedule of major maintenance activities for the next year.

Construction Lighting

VIS-2 The project owner shall ensure that lighting for construction of the power plant is used in a manner that minimizes potential night lighting impacts, as follows:

A. All lighting shall be of minimum necessary brightness consistent with worker safety and security;

B. All fixed position lighting shall be shielded/hooded, and directed downward and toward the area to be illuminated to prevent direct illumination of the night sky and obtrusive spill light beyond the boundaries of the power plant site or the site of construction of ancillary facilities, including any security related boundaries;

C. Wherever feasible and safe and not needed for security, lighting shall be kept off when not in use; and

D. Complaints concerning adverse lighting impacts will be promptly addressed and mitigated.

Verification: Within seven days after the first use of construction lighting, the project owner shall notify the CPM that the lighting is ready for inspection. If the CPM requires modifications to the lighting, the project owner shall implement the necessary modifications within 15 days of the CPM's request and notify the CPM that the modifications have been completed.

Within 10 days of receiving a lighting complaint, the project owner shall provide the CPM with a complaint resolution form report as specified in the compliance General Conditions including a proposal to resolve the complaint, and a schedule for implementation. The project owner shall notify the CPM within 10 days after completing implementation of the proposal. A copy of the complaint resolution form report shall be included in the subsequent Monthly Compliance Report following complaint resolution.

Permanent Exterior Lighting

VIS-3 To the extent feasible, consistent with safety and security considerations and commercial availability, the project owner shall design and install all permanent exterior lighting such that a) light fixtures do not cause obtrusive spill light beyond the project site; b) lighting does not cause excessive reflected glare; c) direct lighting does not illuminate the nighttime sky; d) illumination of the project and its immediate vicinity is minimized, and e) lighting complies with local policies and ordinances.

The project owner shall submit to the CPM for review and approval and simultaneously to the County of Fresno Department of Public Works and Planning, Development Services Division for review and comment a lighting mitigation plan that includes the following:

A. A process for addressing and mitigating complaints received about potential lighting impacts;

B. Lighting shall incorporate commercially available fixture hoods/shielding, with light directed downward or toward the area to be illuminated;

C. Light fixtures shall not cause obtrusive spill light beyond the project boundary;

D. All lighting shall be of minimum necessary brightness consistent with operational safety and security; and

E. Lights in high illumination areas not occupied on a continuous basis (such as maintenance platforms) shall have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied.

Verification: At least 90 days prior to ordering any permanent exterior lighting, the project owner shall contact the CPM to determine the required documentation for the lighting mitigation plan.

At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to the CPM for review and approval and simultaneously to the County of Fresno Department of Public Works and Planning, Development Services Division for review and comment a lighting mitigation plan. The project owner shall provide the County's comments to the CPM at least 10 days prior to the date lighting materials are ordered.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a revised plan for review and approval by the CPM.

The project owner shall not order any exterior lighting until receiving CPM approval of the lighting mitigation plan.

Prior to commercial operation, the project owner shall notify the CPM that the lighting has been installed and is ready for inspection. If after inspection the CPM notifies the project owner that modifications to the lighting are needed, within 30 days of receiving that notification the project owner shall implement the modifications and notify the CPM that the modifications have been completed and are ready for inspection.

Within 10 days of receiving a lighting complaint, the project owner shall provide the CPM with a complaint resolution form report as specified in the Compliance General Conditions including a proposal to resolve the complaint, and a schedule for implementation. A copy of the complaint resolution form report shall be submitted to the CPM within 30 days of complaint resolution.

REFERENCES

CDOT - California Department of Transportation. The California Scenic Highway System Mapping System, http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm

COF 2000 - County of Fresno. Fresno County General Plan Open Space and Conservation Element, October 2000.

COF 2004 - County of Fresno. Ordinance Code of the County of Fresno, Chapter 4, March 2, 2004.

EPA 1990 - Environmental Protection Agency. Emission Measurement Technical Information Center NSP Test Method, Method 9-Visual Determination of the Opacity of Emissions fro Stationary Sources. October 25, 1990.

Smardon, Richard C., James E. Palmer, and John P. Felleman. 1986. *Foundations for* Visual *Project Analysis.* John Wiley & Sons. New York.

USDOJFBF 2006 - U.S. Department of Justice Federal Bureau of Prisons. Federal Correction Institution Mendota, California, Project Description and Employment and Business Opportunities, 2006.

URS 2006a - URS Corporation/ R. Watkins (tn 38405) Application for Certification with Cover Letter for Starwood Power-Midway, LLC Peaking Project. 11/17/2006 Rec'd 1/17/2006.

APPENDIX VR-1

STAFF'S VISUAL RESOURCES EVALUATION METHODOLOGY

Visual resources analysis has an inherent subjective aspect. Use of generally accepted criteria for determining environmental impact significance and a clearly described analytical approach aid in developing an analysis that can be readily understood.

Staff's methodology is based on the California Environmental Quality Act and Guidelines (CEQA). The methodology includes an evaluation of the visual characteristics of the existing setting, the visual characteristics of the proposed project, the circumstances affecting the viewer, and the degree of visual impact that the proposed project would cause.

ELEMENTS OF THE METHODOLOGY

Key Observation Points

Staff evaluates the existing visible physical environmental setting from a fixed vantage point (called a "Key Observation Point" [KOP]), and the visual change introduced by the proposed project to the view from that KOP. The view as seen from the KOP is referred to as the viewshed. Staff uses a KOP[2] to represent a location(s) from which to conduct detailed analyses of the proposed project and to obtain existing condition photographs and prepare photo simulations. KOPs are selected to be representative of the most critical viewshed locations from which the project would be seen. Because it is not feasible to analyze all the views in which a proposed project would be seen, it is necessary to select a KOP that would most clearly display the visual effects of the proposed project. A KOP may also represent a primary viewer groups that would potentially be affected by the project. In addition to KOP photo(s), staff reviews landscape character photos that help provide a visual overview of a project site, its vicinity, and the selected KOP area, as appropriate. Prior to application submittal, staff participates in the selection of appropriate KOP(s) for the analysis.

LORS Consistency

Energy Commission staff consider federal, state, and local laws, ordinances, regulations, and standards (LORS) relevant to aesthetics, or protection and preservation of visual sensitive resources. Conflicts with such LORS can constitute significant visual impacts. For example visual staff examines land use planning documents, such as a local government's General Plan, Specific Plan, and zoning ordinances applicable to the project site and surrounding area to gain insight as to the type of land uses intended for the area, and the guidelines given for aesthetics, or protection and preservation of visual sensitive resources.

[2]The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

Visible Water Vapor Plume Frequency

When a proposed power plant is operated at times of low temperature and high humidity, the potential exists for the exhaust from its cooling towers to condense and form visible water vapor plumes (steam plume). The formed plume potentially could have an adverse effect on visual sensitive resources in the vicinity of the project.

The severity of the visual impacts created by a project's visible plumes depends on five factors: 1) the frequency of the plumes, 2) the physical size of the plumes (dimensions), 3) the sensitivity of the viewers who would see the plumes, 4) the distance between the plumes and the viewers, 5) the visual quality of the existing viewshed; and, 6) whether a scenic resource or vista would be blocked by the plumes.

Staff completes water vapor plume modeling of the proposed project's cooling towers using design parameters provided by the applicant. Staff models the estimated plume frequency and dimensions for the cooling tower and turbine exhaust using the Combustion Stack Visible Plume (CSVP) model, and a multi-year meteorological data set obtained for the area where the project is proposed.

Staff considers the 20th percentile plume to be the reasonable worst case plume dimensions on which to base its visual impact analysis. The 20th percentile plume is the smallest of the plumes that are predicted to occur zero to 20% of the time. Eighty (80) percent of the time the dimensions of the clear hour plumes would be smaller than the 20th percentile plume dimensions. A one percentile clear hour plume would be extremely large, very noticeable to a wide area, but would occur very infrequently.

Staff focuses its frequency of the plumes analysis on the portion of the year when the ambient conditions (i.e., cool/cold temperatures and high relative humidity) are such that plumes are most likely to occur (typically from November through April) and when "clear" sky conditions exist because this is when the plumes would cause the most visual contrast with the sky and have the greatest potential to cause adverse visual impacts. Staff eliminates from consideration plumes that occur at night or during rain or fog conditions because plume visibility, and overall visual quality, is typically low during those conditions. In addition, plumes that occur during specific cloudy conditions are also eliminated because under these conditions, plumes have less contrast with the background sky. A plume frequency of 20% of seasonal daylight no rain/fog high visual contrast (i.e. "clear") hours is used to determine potential plume impact significance. If it is determined that the seasonal daylight clear hour plume frequency is greater than 20%, then plume dimensions are determined and a significance analysis is included in the Visual Resources section of the Staff Assessment for the proposed project.

Plume frequencies of less than 20% have been determined to generally have a less than significant impact. If the modeling predicts seasonal daylight clear plume frequencies greater than 20%, staff calculates the dimensions of the clear hour plumes and then conduct an assessment of the visual change (in terms of contrast, dominance and view blockage) that would be caused by the 20th percentile plume dimensions. Staff also analyzes the predicted plume's potential luminescence (light refraction resulting in a glare or glow) and color contrast, and opacity (the degree to which light is prevented from passing through an emission plume) that may be introduced to the KOP

viewsheds. Considering the visual sensitivity of the existing landscape and viewing characteristics, the degree of visual change caused by the plumes may result in a significant visual impact.

California Environmental Quality Act Guidelines

The CEQA Guidelines define a “significant effect on the environment” to mean a “substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance” (California Code of Regulations, Title 14, Section 15382).

Appendix G Environmental Checklist Form of the CEQA Guidelines, under “Aesthetics,” lists the following four questions to be addressed regarding whether the potential impacts of a project are significant:

A. Would the project have a substantial adverse effect on a scenic vista?

B. Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

D. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Staff answers each of the four checklist questions for the proposed project, including any related facility such as a transmission line or gas pipeline; and for both construction and operation phases.

VISUAL RESOURCES - FIGURE 1

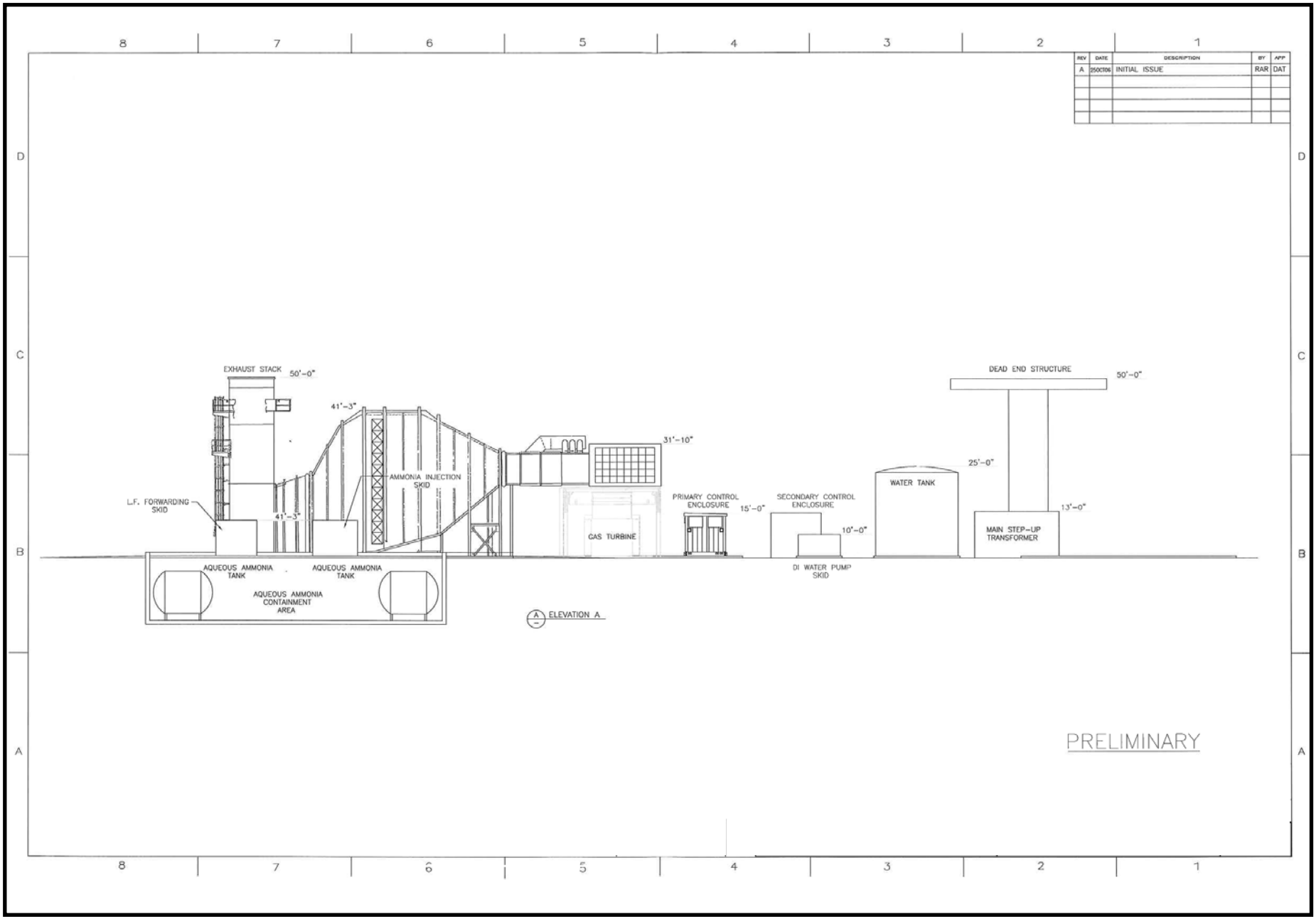
Starwood Power Project - Aerial View Of Site And Vicinity

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: Google Earth

VISUAL RESOURCES - FIGURE 2

Starwood Power Project - Plant Elevations Looking East

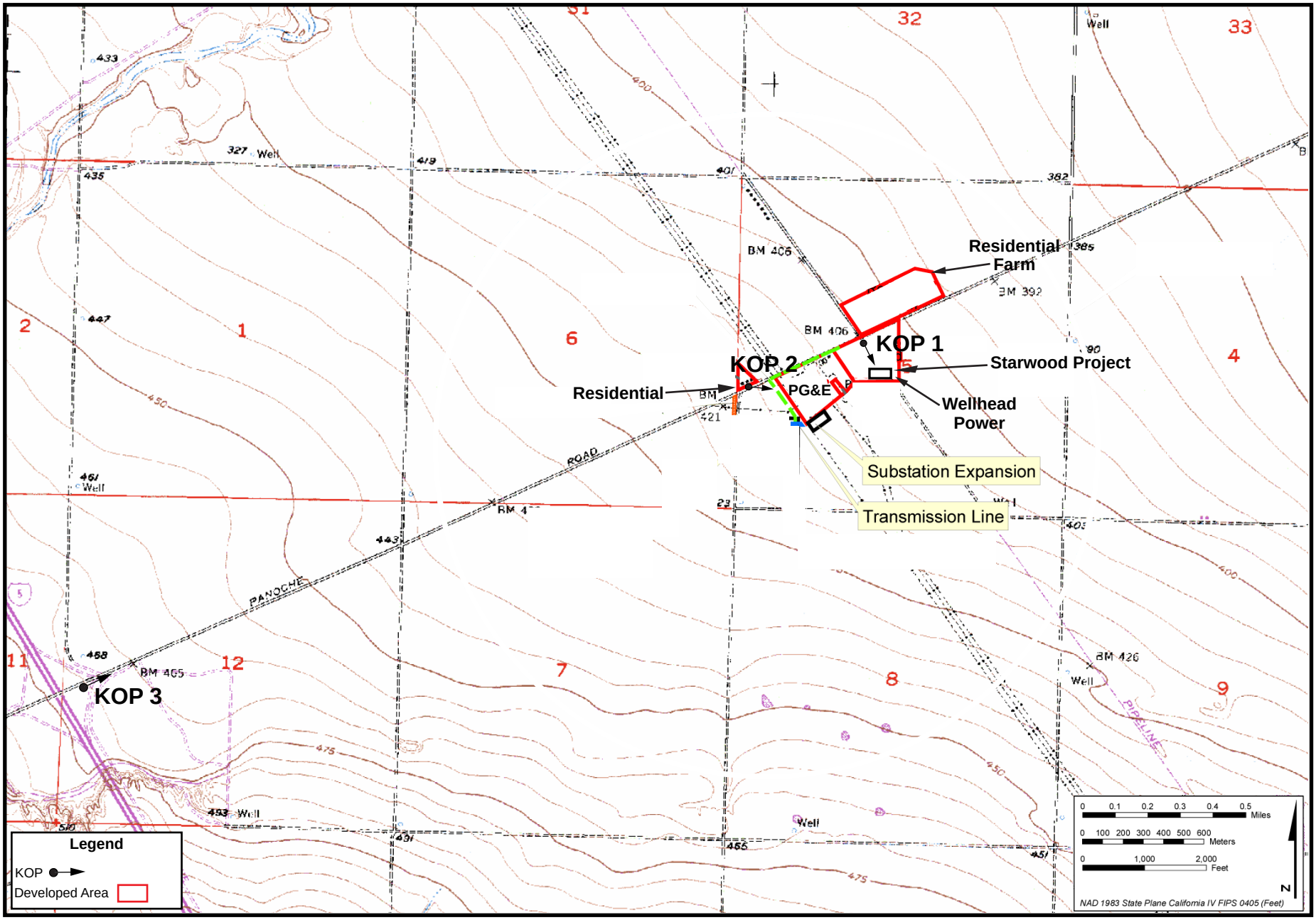


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 3.4-2

VISUAL RESOURCES - FIGURE 3

Starwood Power Project - KOP Locations and Existing Land Use Surrounding Project Site



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: Panoche AFC Figure 5.4-2

VISUAL RESOURCES - FIGURE 4 - KOP 1

Starwood Power Project - Existing Backyard View From One Of Five Residences On West Panoche Road

OCTOBER 2007

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 5.13-13

VISUAL RESOURCES - FIGURE 5 - KOP 1

Starwood Power Project - Landscape Character Photo of Open Storage Area

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: Photo taken by CEC Staff - May 3rd, 2007

VISUAL RESOURCES - FIGURE 6 - KOP 1

Starwood Power Project - Photo Simulation Of Backyard View From One Of Five Residences On West Panoche Road

OCTOBER 2007

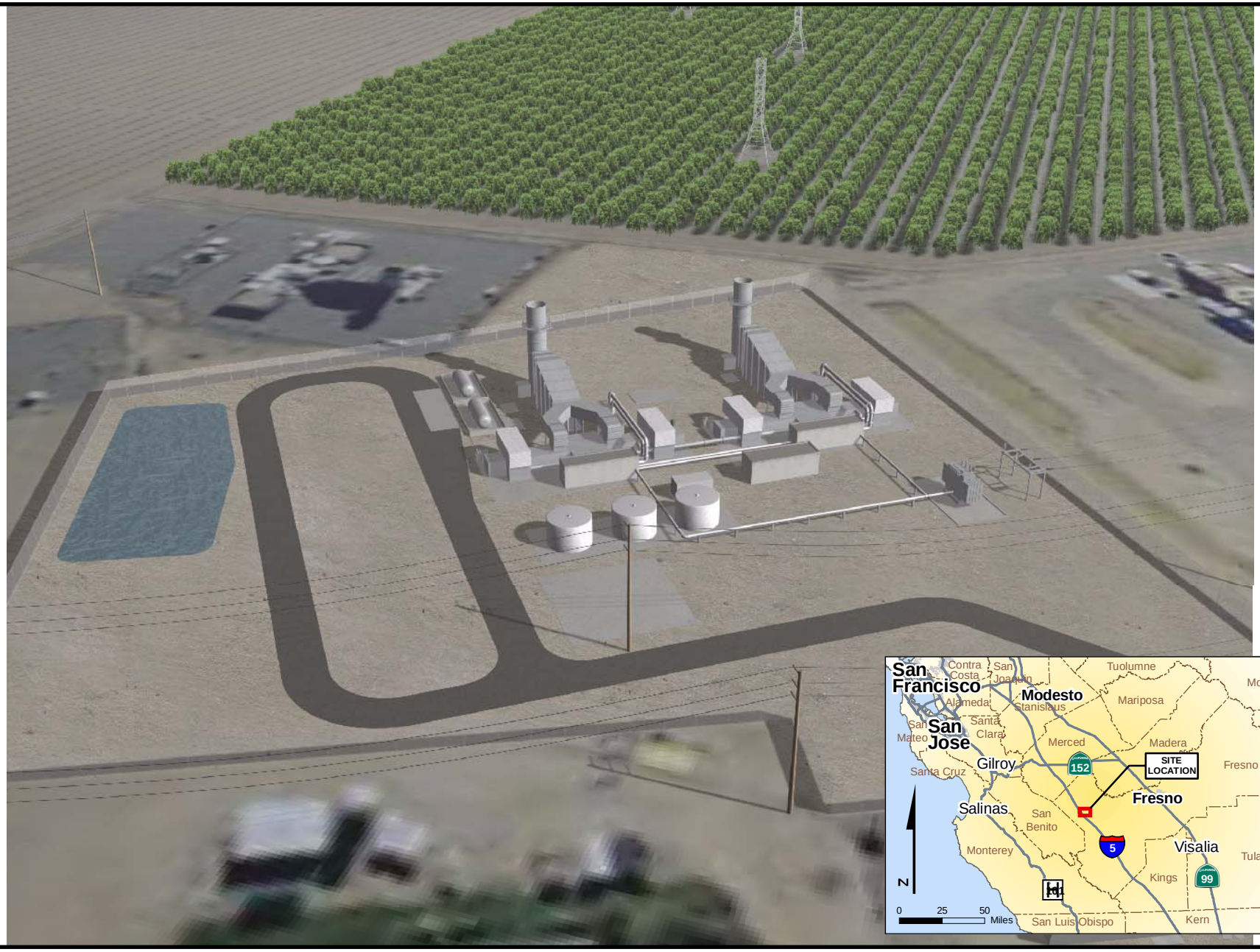
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 5.13-13

VISUAL RESOURCES - FIGURE 7

Starwood Power Project - Appearance Of Project Site After Completion



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 5.13-2

VISUAL RESOURCES - FIGURE 8 - KOP 2

Starwood Power Project - Existing Front Yard View From One Of Three Residences On West Panoche Road

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 5.13-14

VISUAL RESOURCES - FIGURE 9 - KOP 3

Starwood Power Project - Existing Motorist View From The Overpass Of Interstate 5 And West Panoche Road

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 5.13-15

VISUAL RESOURCES - FIGURE 10

Starwood Power Project - Landscape Character Photo Of Proposed Project Site From Southbound Interstate 5, 2 Miles West Of The Project Site

OCTOBER 2007

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 5.13-9

VISUAL RESOURCES - FIGURE 11 - KOP 3

Starwood Power Project - Photo Simulation Of Motorist View From The Overpass Of Interstate 5 And West Panoche Road

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2007

SOURCE: AFC Figure 5.13-15

WASTE MANAGEMENT

Testimony of Ellie Townsend-Hough

SUMMARY OF CONCLUSIONS

Management of the waste generated during construction and operation of the Starwood Power Project (SPP) would not result in any significant adverse impacts if the measures and remediation proposed in the Application for Certification (AFC) and Staff's proposed conditions of certification are implemented.

INTRODUCTION

This Final Staff Assessment (FSA) presents an analysis of issues associated with managing wastes generated from constructing and operating the proposed SPP and with managing any hazardous wastes already existing on-site because of past activities. Staff has evaluated the proposed waste management plans and mitigation measures designed to reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and nonhazardous wastes. Staff also evaluated the potential for site remediation. The technical scope of this analysis encompasses solid wastes existing on-site and those generated during facility construction and operation. Wastewater is more fully discussed in the **Soil and Water Resources** section of this document.

Energy Commission staff's objectives in its waste management analysis are to ensure that:

- The management of the wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner.
- The disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities.
- Upon project completion, the site is managed such that contaminants would not pose a significant risk to humans or the environment.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The following framework of federal, state, and local environmental laws, ordinances, regulations and standards (LORS) exists to ensure the safe and proper management of hazardous waste from generation to disposal to reduce the risks of accidents that might impact worker and public health and the environment. The provisions of these LORS have established the basis for staff's determination regarding the significance and acceptability of SPP with respect to management of waste.

WASTE MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 42 United States Code § 6922 Resource Conservation and Recovery Act (RCRA)	Establishes requirements for the management of hazardous wastes from the time of generation to the point of ultimate treatment or disposal. Section 6922 requires generators of hazardous waste to comply with requirements regarding: • Record keeping practices which identify quantities of hazardous wastes generated and their disposition, • Labeling practices and use of appropriate containers, • Use of a manifest system for transportation, and • Submission of periodic reports to the U.S. Environmental Protection Agency (EPA) or authorized state agency.
RCRA Subtitle C	Controls storage, treatment, and disposal of hazardous waste.
RCRA Subtitle D	Regulates design and operation of solid waste landfills.
RCRA 3008(h)	The corrective action program designed to ensure the remediation of hazardous releases and contamination associated with RCRA-regulated facilities.
Title 40, Code of Federal Regulations, part 260	Regulations promulgated by the EPA to implement the requirements of RCRA as described above. Characteristics of hazardous waste are described in terms of ignitability, corrosivity, reactivity, and toxicity, and specific types of wastes are listed.
State	
California Health and Safety Code §25100 et seq. Hazardous Waste Control Act of 1972, as amended	Creates the framework under which hazardous wastes must be managed in California. This act mandates that the State Department of Health Services (now the Department of Toxic Substances Control (DTSC) under the California Environmental Protection Agency (Cal/EPA)) to develop and publish a list of hazardous and extremely hazardous wastes, and to develop and adopt criteria and guidelines for the identification of such wastes. It also requires hazardous waste generators to file notification statements with Cal/EPA and creates a manifest system to be used when transporting such wastes.
Title 14, California Code of Regulations (CCR), §17200 et seq. (Minimum Standards for Solid Waste Handling and Disposal)	Set forth minimum standards for solid waste handling and disposal, and guidelines to ensure conformance of solid waste facilities with county solid waste management plans, as well as enforcement and administration provisions.
Title 22, California Code of Regulations, §66262.10 et seq. (Generator Standards)	Establish requirements for generators of hazardous waste. Under these sections, waste generators must determine if their wastes are hazardous according to either specified characteristics or lists of wastes. As in the federal program, hazardous waste generators must obtain EPA identification numbers, prepare manifests before transporting the waste off-site, and use only permitted treatment, storage, and disposal facilities. Additionally, hazardous waste must only be handled by registered hazardous waste transporters. Generator requirements for record keeping, reporting, packaging, and labeling are also established and are enforced by the Cal-EPA Department of Toxic Substances Control.

Title 22, California Code of Regulations, §67100.1 et seq. (Hazardous Waste Source Reduction and Management Review)	Establish reporting requirements for generators of certain hazardous and extremely hazardous wastes in excess of specified limits. The required reports must indicate the generator's waste management plans and performance over the reporting period.
The Asbestos Airborne Toxic Control Measure	Adopted by the California Air Resources Board (CARB) for Construction, Grading, Quarrying, and Surface Mining Operations. The Asbestos Airborne Toxic Control Measure (ATCM) requires specific mitigation measures to prevent off-site migration of asbestos-containing dust.
Title 8 California Code of Regulations §1529 and §5208	Requires the proper removal of asbestos containing materials and are enforced by California Occupational Safety and Health Administration (Cal-OSHA).
Local	
Fresno County Department of Community Health (FCDCH), Environmental Health Division	Regulates enforcement responsibility for the implementation of Title 23, Division 3, Chapters 16 and 18 of the CCR, as it relates to hazardous material storage and petroleum underground storage tank cleanup.
FCDCH, Environmental Health Division	Regulates hazardous waste generator permitting, and hazardous waste handling and storage.
Fresno County General Plan Public Facilities Element	Will ensure all new development complies with applicable provisions of County Integrated Solid Waste Management Plan.

SETTING

The proposed SPP property consists of approximately 5.6 acres of land located within western Fresno County adjacent to the Panoche Hills and east of the San Benito County line. The SPP is located in an area zoned for agriculture use. The surrounding land use includes agricultural land, residential property, and other power plant facilities (URS 2006a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are addressed in this Waste Management section: 1) potential existing site contamination, and 2) the methods used to handle wastes (Class I hazardous wastes, Class II designated wastes, and Class III municipal solid wastes) during construction and operations. The methods staff uses and the thresholds for determining significance of impacts are different for these two issues.

For any site proposed for the construction of a power plant in California, the applicant must provide sufficient documentation about the nature of any existing contamination on

the site. Staff requires that a Phase I Environmental Site Assessment (ESA) be prepared and submitted to the Energy Commission for staff's review and evaluation. A Phase I ESA provides a history of use of the site, often as far back as the mid-1800s, and a list of any hazardous waste release within a certain distance of the site. If there were a reasonable potential that the site contains hazardous waste, soil or groundwater would be sampled and analyzed as part of a Phase II ESA. The Phase II ESA verifies the level of contamination and the potential for remediation.

Staff may utilize either of two approaches or both for determining if hazardous waste present on the site would pose a risk to on-site workers (construction or operations) or the public. The first approach follows standards promulgated by Cal/EPA, principally by the Department of Toxic Substances Control (DTSC), the Office of Environmental Health Hazard Assessment (OEHHA), and the Regional Water Quality Control Boards (RWQCB). Staff would compare the levels of contaminants found on-site with established standards, such as OEHHA California Human Health Screening Levels. If metals were suspected of being present at unsafe levels, staff would compare those levels to levels that occur naturally in soil or water as tabulated by DTSC or other federal agencies.

The second approach involves the preparation of a site-specific Human Health Risk Assessment and/or Ecological Risk Assessment. The human health risk assessment would follow Cal/EPA guidelines and must address all affected populations including the most burdened and compromised receptors. Staff would require the applicant to prepare such an assessment and would require some form of remediation if the human health cancer risk exceeded one-in-one million or the non-cancer hazard index exceeded 1.0, per 42 U.S.C. Section 6922 (Resource Conservation and Recovery Act), and per the California Health and Safety Code Section 25100 et seq. (Hazardous Waste Control Act of 1972, as amended). An ecological risk screening evaluation or risk assessment would be required if contaminants might pose a risk to biological receptors. The applicant also would follow Cal/EPA and Regional Water Quality Control Board (RWQCB) guidelines and if the ecological risks were significant, appropriate mitigation would be required.

Regarding the management of wastes generated during construction and operation, staff reviews the applicant's proposed solid and hazardous waste management methods and determines if the methods meet the state standards for waste reduction and recycling. Staff then reviews the available off-site treatment and disposal sites and determines whether or not the proposed power plant's waste would have a significant impact on the disposal sites' allotted daily, yearly, or lifetime volume of waste it is allowed to receive. Staff uses a threshold of less than 10% impact on a waste disposal facility to determine if the impact would be significant.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Contamination

The 5.6 acre parcel is currently unimproved and is used as an equipment laydown yard by CalPeak Power-Midway. The project site has been graded, and is disturbed and has served as a storage-yard for the past five years (URS 2006b).

A Phase I ESA of the proposed project dated August 2006 was prepared in accordance with ASTM practice E 1527-00 (URS 2006a Appendix O). The Phase I ESA did not identify any Recognized Environmental Conditions on the proposed SPP site thereby, eliminating the need for a Phase II ESA.

The Phase I ESA, however, mentions that the property has been used for agricultural purposes in the past, which probably included the use of pesticides and herbicides. Thus, indicating the potential for pesticide and/or herbicide contamination presence on the property at low levels (URS 2006a Appendix O). Staff Data Request Number 65 requested that SPP sample the site for hazardous concentrations of contaminants. SPP provided test results for arsenic and selenium, which were found to be non-hazardous. Staff also compared the soil chemical testing results from the Panoche Project, which is adjacent to SPP and located on an orchard. The maximum concentrations of each chemical detected in the Panoche soil samples were less than California Human Health Screening Levels for commercial/industrial land use established by the California Environmental Protection Agency (PEC 2006).

Construction Impacts and Mitigation

Site preparation and construction of the proposed generating plant and associated facilities would last approximately 10 months, and would generate both non-hazardous and hazardous wastes in solid and liquid forms (URS 2006a Section 3.4.10). Before construction can begin, the project owner would be required to develop and implement a Construction Waste Management Plan per proposed condition of certification **Waste-5**.

Non-hazardous solid wastes generated during construction would include up to 10 tons of wood, paper, glass, and plastic waste products comprised of excess lumber, packing materials, insulation, and empty non-hazardous chemical containers (URS 2006a Table 5.14-2). All non-hazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed of in a solid waste disposal facility, per Title 14, California Code of Regulations, §17200 et seq.

Non-hazardous liquid wastes would be generated during construction, and are discussed in the **Soil and Water Resources** section of this document. Storm water runoff would be managed in accordance with a Drainage, Erosion and Sediment Control Plan that would be prepared for the project and approved prior to construction. Other wastewaters would be sampled to determine their disposal.

Since excavation activities and trenching during construction of the proposed project may encounter potentially contaminated soils specific handling, disposal, and other precautions may be necessary per 22 CCR 66262.10. Staff concludes that proposed conditions of certification **Waste-1** and **Waste-2** would be required to adequately address any soil contamination contingency that may be encountered during construction of the project and would ensure compliance with 22 CCR 66262.10.

For hazardous waste, the designated Certified Unified Program Agency for SPP is the FCDCH, Environmental Health Division. The FCDCH, Environmental Health Division, assumes enforcement for the implementation of Title 23 of the CCR and regulates the generation, and storage of hazardous waste for the proposed project area. Hazardous

wastes anticipated to be generated during construction include hazardous material containers, spent batteries, waste oil, transmission fluid, hydraulic fluid, waste paint, oil absorbents, and lubricants (oil and grease). These amounts of hazardous wastes would be minor during construction and operation and would be handled and disposed of in accordance with applicable LORS and present an insignificant risk to workers and the public (URS 2006a Table 5.14-2).

The construction contractor would be considered the generator of hazardous wastes at this site during the construction period and therefore, prior to construction, the project owner would be required to obtain a unique hazardous waste generator identification number from DTSC in accordance with DTSC regulatory authority, pursuant to proposed condition of certification **Waste-3** in accordance with Title 22 CCR Section 66262.12. Wastes would be accumulated at satellite locations on the proposed project site and then transported daily to the construction contractor's 90-day hazardous waste storage area located in the construction laydown area in response to California Code of Regulations, Title 22, et seq. 66262.34. The wastes thus accumulated would be properly manifested, transported and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Staff reviewed the disposal methods described in AFC Section 5.14.2.1 and concluded that all wastes would be disposed in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed condition of certification **Waste-4** to notify the Compliance Project Manager (CPM) whenever the owner becomes aware of this action.

Operation Impacts and Mitigation

The proposed SPP would generate both non-hazardous and hazardous wastes in solid and liquid forms under normal operating conditions. Before operations can begin, the project owner would be required to develop and implement an Operations Waste Management Plan pursuant to proposed condition of certification **Waste-5** in order to ensure that all work is handled in the manner required by applicable LORS.

Non-hazardous Solid Wastes

Non-hazardous solid wastes anticipated to be generated during operation include maintenance wastes and office wastes. Non-recyclable wastes would be regularly transported offsite to a solid waste disposal facility (URS 2006a Section 5.14.2.2 Table 5.14-3).

Nonhazardous Liquid Wastes

Nonhazardous liquid wastes would be generated during facility operation, and are discussed in the **Soil and Water Resources** section of this document. Storm water runoff would be managed in accordance with a Drainage, Erosion and Sediment Control Plan. General facility drainage will consist of area washdown, sample drains, equipment leakage and drainage from facility equipment areas and would be discharged to the waste water collection system.

Area drains will be located by mechanical equipment where it is determined that oil could mix with rainwater or other water sources. The water collected by these drains will

go to the oil-water separator, which separates out any oil before the effluent goes to the collection tank via an underground drain line. The oil-contaminated fluid will be pumped out by a vacuum truck on an as-needed basis and disposed of at a facility specifically qualified to handle each waste (URS 2006a Section 5.14.2.2).

Hazardous Wastes

The applicant or contractor would be the generator of hazardous wastes at this site during operations and thus the project owner's unique hazardous waste generator identification number obtained during construction would still be required for generation of hazardous waste, pursuant to proposed condition of certification **Waste-3**. Hazardous wastes anticipated to be generated during routine project operation include waste lubricating oil, lubrication oil filters from the combustion turbines, spent Selective Catalytic Reduction catalyst, oily rags, laboratory analysis waste, oil sorbents, and chemical feed area drainage. Table 5.14-3 of the AFC provides a list of wastes, the amounts expected to be generated, and their disposal methods. The SCR catalysts would require regeneration every four to five years resulting in the generation of a total of 35,000 pounds of catalyst material (48,000 pounds including steel of catalyst module) per unit. That could require disposal in a Class I facility if recycling or regeneration proves not to be feasible (CEC 2007z2).

The amounts of hazardous wastes generated during the operation of SPP would be minimal, and recycling methods would be used to the extent possible. The potential for accidental hazardous material release to the environment is extremely small (see **Hazardous Materials** section). The existing LORS ensure that the environment is protected. Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed condition of certification **Waste-4** to notify the CPM as soon as the owner becomes aware of this action.

Impact on Existing Waste Disposal Facilities

Non-hazardous Solid Wastes

Non-hazardous waste disposal sites suitable for discarding project-related construction and operation wastes are identified in Section 5.14.1 of the AFC (URS 2006a Table 5.14-1). During construction of the proposed project, 10 cubic yards per week of solid waste will be generated and disposed of in solid waste management landfills. The operational non-hazardous solid wastes generated yearly at SPP would be recycled if possible, or disposed of in a Class III landfill.

Listed in Table 5.14-1 of the AFC are six landfills located in Fresno, Los Angeles and San Bernardino counties with a combined remaining capacity of over 33 million cubic yards. The total amount of nonhazardous waste generated from project construction and operation will contribute less than 1% of available landfill capacity. Staff finds that disposal of the solid wastes generated by SPP can occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

Section 5.14.1.2 of the AFC discusses the two Class I landfills located in the Central Valley: Clean Harbors' Buttonwillow Landfill in Kern County, and Chemical Waste Management's Kettleman Hills Landfill in Kings County. The Kettleman Hills facility also accepts Class II and Class III wastes. In total, there is an excess of 16 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with up to 16 years of remaining operating lifetimes. In addition, the Kettleman Hills facility is in the process of permitting an additional 15 million cubic yards of disposal capacity, and the Buttonwillow facility is not expected to reach its capacity until 2030 at current disposal rates (URS 2006a Section 5.14.1.2). The amount of hazardous waste transported to these landfills has decreased in recent years due to source reduction efforts by generators and the transport of waste out of state that is hazardous under California law, but not federal law.

The Selective Catalytic Reduction catalysts would require regeneration every three to five years resulting in the generation of a total of 500 pounds of waste material that could require disposal in a Class I facility if recycling or regeneration proves not to be feasible. All hazardous wastes generated during both construction and operation would be transported offsite to a permitted treatment, storage, or disposal (TSD) facility for appropriate disposition, preferably recycling. The volume of hazardous waste from the SPP requiring off-site disposal would be far less than staff's threshold of significance (10% of the existing combined capacity of the three Class I landfills) and would therefore not significantly impact the capacity or remaining life of any of these facilities.

In the **Socioeconomics** section of this staff analysis, staff presents census tract information that shows that there are minority populations within one mile and six miles of the project. Since staff has added conditions of certification that would reduce the risk associated with hazardous waste to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the power plant on minority populations. Therefore, there are no environmental justice issues for Waste Management.

CUMULATIVE IMPACTS AND MITIGATION

Staff has considered the proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. (Pub Resources Code, § 21083.2; Cal Code of Regs, tit. 14, §§ 15064(h), 15065(c), 15130, and 15355).

One proposed industrial project and three existing industrial facilities are nearby the proposed SPP. These are:

1. The CalPeak Peaker Plant, an existing natural-gas-fired power plant;

2. The Wellhead Power Generation facility, an existing natural-gas-fired power plant;

3. The proposed PEC (06-AFC-5), a proposed, natural-gas-fired power plant currently under Energy Commission review; and

4. The PG&E Panoche Substation, an existing facility for which an expansion is planned in connection with the construction of the PEC."

The proposed are to be located in Fresno County. The projects propose to use the same Class III, Solid Waste Landfills for non-hazardous waste disposal for construction and operation of the projects. The facilities are located in Fresno, Los Angeles, Kings, and San Bernardino counties. The combined capacity per year of the landfills total 2,324,010 tons per year of available operating capacity. The combined waste generated for the proposed projects would require less than 1% of the capacity of any one of the solid waste landfills.

As proposed, the quantities of hazardous waste generated during construction and operation of all three projects would add a very small amount to the total quantities of waste generated in the State of California. Overall, non-hazardous and hazardous wastes would be generated in minimal quantities, recycling efforts would be prioritized wherever practical, and capacity is available in a variety of treatment and disposal facilities. Therefore, staff concludes that these added waste quantities generated by the three projects would not result in significant cumulative waste management impacts.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the SPP would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during facility demolition, construction and operation. The applicant is required to dispose of hazardous and non-hazardous wastes at facilities approved by the various departments within Cal/EPA. Because hazardous wastes would be produced during both project construction and operation, the SPP project would be required to obtain a hazardous waste generator identification number from DTSC. Accordingly, SPP would be required to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records, and appropriately train employees. Pursuant to California Code of Regulations, the SPP must adhere to Title 22, section 67100.1 et seq., which requires a hazardous waste Source Reduction, Evaluation Review, and Plan. The applicant has agreed to comply with all waste-related LORS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received comments from DTSC or the public, which apply to waste management.

CONCLUSIONS

Staff has proposed conditions of certification **Waste-1** through **5** which require: **1)** the project owner have an experienced Registered Professional Engineer or Geologist available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered; **2**) if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling nature, file a written report, and seek guidance from the Compliance Project

Manager (CPM) and the appropriate regulatory agencies; **3)** the project owner shall obtain a unique hazardous waste generator identification number from the DTSC in accordance with DTSC regulatory authority; **4)** the project owner shall notify the CPM whenever the owner becomes aware of any impending waste management-related enforcement action; and **5**) the project owner shall prepare and submit waste management plans for all wastes generated during construction and operation of the facility and submit them to the CPM.

Management of the waste generated during construction and operation of the SPP or waste associated with remediation of existing on-site contamination would not result in any significant adverse impacts if the measures and remediation proposed in the AFC and Staff's proposed conditions of certification were implemented. With staff's proposed mitigation, potential waste management impacts have been reduced to less than significant for all people within the affected area, including the minority population.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall provide the resume of a Registered Professional Engineer or Geologist, who shall be available for consultation during soil excavation and grading activities, to the Compliance Project Manager (CPM) for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The Registered Professional Engineer or Geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit the resume to the CPM for review and approval.

WASTE-2 If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and file a written report to the project owner representatives of Department of Toxic Substances Control, and CPM stating the recommended course of action and obtain approvals from the Department of Toxic Substances Control.

Depending on the nature and extent of contamination, the Registered Professional Engineer or Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the Registered Professional Engineer or Geologist, significant remediation may be required, the project owner shall contact representatives of the Department of Toxic Substances Control for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the Registered Professional Engineer or Geologist to the CPM within 5 days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-3 The project owner shall obtain a hazardous waste generator identification number from the Department of Toxic Substances Control prior to generating any hazardous waste during construction and operations.

Verification: The project owner shall keep its copy of the identification number on file at the project site and notify the CPM via the relevant Monthly Compliance Report of its receipt.

WASTE-4 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the manner in which project-related wastes are managed.

WASTE-5 The project owner shall prepare a Construction Waste Management Plan and an Operation Waste Management Plan for all wastes generated during construction and operation of the facility, respectively, and shall submit both plans to the CPM for review and approval. The plans shall contain, at a minimum, the following:

- A description of all waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Methods of managing each waste, including temporary onsite storage, treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

Verification: No less than 30 days prior to the start of site mobilization, the project owner shall submit the Construction Waste Management Plan to the CPM for approval. The project owner shall submit any required revisions within 20 days of notification by the CPM.

In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year and provide a comparison of the actual methods used to those management methods proposed in the original Operation Waste Management Plan.

REFERENCES

CEC 2007z2 - California Energy Commission/ C. McFarlin (tn 40467) Email - reply - Spent SCR catalyst. 5/7/07 Rec'd 5/17/07

PEC 2006. Panoche Energy Center Project. Data, Responses to Data Requests 1-60 for the Panoche Energy Center Project. Submitted to the California Energy Commission, January 9, 2007.

URS 2006a – URS Corporation/R. Watkins (tn 38405) Application for Certification with Cover Letter for SPP Power-Midway, LLC Peaking Project. 11/17/2006 Rec'd 11/17/2006

URS 2007b – URS Corporation/A. Leiba (tn 39567) SPP responses to data requests (no. 1-67). 03/09/2007 rec'd 3/12/2007

WORKER SAFETY AND FIRE PROTECTION

Testimony of Alvin J. Greenberg, Ph.D. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff concluded that if the applicant for the proposed Starwood Power-Midway, LLC Starwood Peaking Project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY -1**, and **-2**; and fulfils the requirements of **WORKER SAFETY-3** through**-6**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the proposed project would not have significant impacts on local fire protection services.

INTRODUCTION

Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment and procedural controls.

The purpose of this Final Staff Assessment (FSA) is to assess the worker safety and fire protection measures proposed by the Starwood Peaking Project (SPP) and 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.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

WORKER SAFETY AND FIRE PROTECTION Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
29 U.S. Code sections 651 et seq (Occupational Safety and Health Act of 1970)	This Act mandates safety requirements in the workplace with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
29 CFR sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide Federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the federal requirements found in 29 CFR §1910.1 to 1910.1500.
State	
8 CCR all applicable sections (Cal/OSHA regulations)	Requires that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operations of power plants, as well as safety around electrical components, fire safety, and hazardous materials use, storage, and handling.
24 CCR section 3, et seq.	Incorporates the current addition of the Uniform Building Code.
Health and Safety Code section 25500, et seq.	Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	Requires a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility

Applicable Law	Description
Local (or locally enforced)	
Fresno County Zoning Ordinance	Provides safety setbacks as required by the Fresno County Fire Protection Division
Fresno County Department of Community Health, Environmental Health Division (CUPA)	Provide implementation of the Hazardous Materials Business Plan and Risk Management Plan
1998 Edition of California Fire Code and all applicable NFPA standards (24 CCR Part 9)	National Fire Protection Association (NFPA) standards are incorporated into the California Uniform Fire Code. The fire code contains general provisions for fire safety, including road and building access, water supplies, fire protection and life safety systems, fire-resistive construction, storage of combustible materials, exits and emergency escapes, and fire alarm systems.
Uniform Fire Code, 1997	Contains standards of the American Society for Testing and Materials and the NFPA. It is the United State's premier model fire code, incorporating the most updated standards.

SETTING

Fire support services to the site will be under the jurisdiction of the Fresno County Fire Protection Division (FCFPD). The closest FCFPD station is Fire Station #96, located approximately 12 miles away at 101 McCabe, Mendota, with a response time of 15 to 20 minutes. This station will provide the first response for fire fighting and emergency services (URS 2006a, Section 3.11.1.2.1 and URS 2007b, Response to DR #67). The second responder would be FCFPD's Station #95 (Tranquility), with a response time of about 20 minutes (or about three minutes behind Station #96). Both stations are staffed with two paid firefighters per engine and one "sleeper" during weekdays (a sleeper is a paid firefighter who is present at the station 24 hours a day). Station #96 has two engines and a water tender, and Station #95 has a super engine (an engine capable of carrying 2000 gallons of water). All firefighters at both stations are trained to Emergency Medical Technician (EMT) -1 level, and have basic hazmat training (Gomez 2007). In addition to off-site support, a first-aid station with adequate staff and supplies will be available onsite, and employees will be trained to respond to fires, spills, and other emergencies (URS 2006a, Section 3.11.1.2.2).

In the event of a hazardous materials related incident, the CalPeak Power Local Emergency Response Team will be available, with a response time that may vary from immediate arrival to 1 hour (URS 2007b, Response to DR #67). The CalPeak Emergency Response Team is adequately staffed and equipped to handle any hazardous materials incidents at the proposed Starwood facility, including an ammonia spill (see URS 2007b, Response to DR #67 for a list of equipment).

The FCFPD has indicated that their department is adequately equipped and manned to deal with any incident at the proposed facility, as long as one fire hydrant with water supplied at 1500 gallons per minute (gpm) is installed at the site (Gomez 2007). This topic is more fully discussed under the heading “Fire Hazards” in the impacts section of this analysis. Staff determined that the response times for the fire department and the CalPeak Hazmat team are adequate and consistent with the UFC and the NFPA.

In addition to construction and operations worker safety issues, workers may be exposed to soil contamination during construction. A Phase I Environmental Site Assessment conducted for this site in 2006 identified no “Recognized Environmental Conditions” (URS 2006a, Section 5.14.1). To address the possibility of encountering contaminated soil and to ensure protection of workers, proposed conditions of certification **WASTE-1** and **WASTE-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. See the staff assessment section on **Waste Management** for a more detailed analysis of this topic.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are assessed in Worker Safety-Fire Protection:

1. The potential for impacts on the safety of workers during demolition, construction, and operations activities, and

2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are a matter of adhering to the spirit and intent of the Cal-OSHA regulations. This is essentially a LORS compliance matter, and if all LORS are followed, workers will be adequately protected. Thus, the standard for staff’s review and determination of significant impacts on workers is whether or not the applicant has demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal-OSHA standards.

Regarding fire prevention matters, staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates the local fire department capabilities in each area, the response time, and interviews the local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff will recommend that the applicant mitigate this impact by providing increased resources to the fire department.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Worker Safety

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed project will be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution (see Table 5.17-1 of the AFC for a list of potential hazards). It is important for the SPP to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

A Safety and Health Program will be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase “Safety and Health Program” to refer to the measures that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

The SPP encompasses construction and operation of a natural gas fired-facility. Workers will be exposed to hazards typical of construction and operation of a gas-fired simple cycle facility.

Construction Safety Orders are published at 8 CCR sections 1502, et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The Construction Safety and Health Program will include the following:

- Construction Injury and Illness Prevention Program (8 CCR § 1509)
- Construction Fire Prevention Plan (8 CCR § 1920)
- Personal Protective Equipment Program (8 CCR §§ 1514 - 1522)
- Emergency Action Program and Plan

The AFC includes adequate outlines of each of the above programs (URS 2006a, Section 5.17.2.1.1). Prior to the start of construction of the SPP, detailed programs and plans will be provided pursuant to the Condition of Certification **WORKER SAFETY-1**.

Written components of the Construction Safety and Health Program will include:

- Accident/incident Reporting Procedures;
- Blood-borne Pathogens Exposure Control Program;
- Compressed Air Systems;
- Confined Space Entry Procedures;
- Contractor Safety Program;

- Electrical Safety Program;
- Emergency Action Plan;
- Emergency Response Procedures;
- Excavation/Trenching Program;
- Motor Vehicle and Heavy Equipment Safety Program;
- Fall Protection Program;
- Fire Protection and Prevention Plan;
- Hand Tools and Equipment Guarding Safety Procedures;
- Hazard Communication Program;
- Hazardous Materials Handling Procedures;
- Hazardous Waste Awareness Training;
- Hearing Conservation Program;
- Heat and Cold Stress Monitoring and Control Program;
- Heavy Equipment Procedures;
- Hoist/Chain/Wire Rope/Webs/Rope Slings/Crane Procedures;
- Hot Work Safety Program;
- Industrial Hygiene Program;
- Industrial Truck (Forklifts) Safety;
- Ladders, Scaffolds, and Work Platforms;
- Lock Out/Tag Out Procedures;
- Motor Vehicle Safety'
- PPE Program;
- Portable Electric and Pneumatic Tools;
- Preventing Slips, Trips, and Falls;
- Repetitive Stress Injuries/Ergonomics/Lifting Hazards;
- Respiratory Protection Program;
- Safety and Housekeeping Inspection Program;
- Safety Committee and Toolbox/Tailgate Safety Meetings;
- Security Program;
- Signs, Tags, and Barricades; and
- Tools, Power – and Hand-operated.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at the SPP, the Operations and Maintenance Safety and Health Program will be prepared. This operational safety program will include the following programs and plans:

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

In addition, the requirements under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) will be applicable to the project. Written safety programs for the SPP, which the applicant will develop, will ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment Program (URS 2006a, Section 5.17.2.1.2). Prior to operation of the SPP, all detailed programs and plans will be provided pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. The major items required in both Safety and Health Programs are as follows:

Injury and Illness Prevention Program (IIPP)

The IIPP will include the following components as presented in the AFC (URS 2006a, Section 5.17.2.1.2):

- identity of person(s) with authority and responsibility for implementing the program;
- system for ensuring that employees comply with safe and healthy work practices;
- system for facilitating employer-employee communications;
- procedures for identifying and evaluating workplace hazards and developing necessary program(s);
- methods for correcting unhealthy/unsafe conditions in a timely manner;
- training and instruction; and
- methods of documenting inspection and training and maintaining records for 3 years.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 CCR § 3221), which includes the following topics:

- determine fire hazard inventory, including ignition sources and mitigation;
- develop good housekeeping practices and proper materials storage;
- establish employee alarm and/or communication system(s);
- provide portable fire extinguishers at appropriate site locations;
- locate fixed fire fighting equipment in suitable areas;
- specify fire control requirements and procedures;
- names and/or job titles responsible for maintaining equipment and accumulation of flammable or combustible material control; and
- establish and determine training and instruction requirements and programs.

The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff (URS 2006a, Pages 5.17-13/14). Staff proposes that the applicant submit a final Fire Prevention Plan to the California Energy Commission Compliance Project Manager (CPM) for review and approval and to the FCFPD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are present that due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation or physical contact (8 CCR sections 3380 to 3400). The Starwood operational environment will require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and will carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee will be provided with the following information pertaining to the protective clothing and equipment (URS 2006a, Pages 5.17-10/11):

- proper use, maintenance, and storage;
- when the protective clothing and equipment are to be used;
- benefits and limitations; and
- when and how the protective clothing and equipment are to be replaced; and
- each employee is checked for proper fit and to see if they are medically capable of wearing the equipment.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 CCR § 3220). The AFC contains a satisfactory outline for an emergency action plan (URS 2006a, Table 5.17-4).

An acceptable Emergency Action Plan will include the following:

- establish emergency escape procedures and emergency escape route for the facility;
- determine procedures to be followed by employees who remain to operate critical plant operations before they evacuate;
- provide procedures to account for all employees and visitors after emergency evacuation of the plant has been completed;
- specify rescue and medical duties for assigned employees;
- identify fire and emergency reporting procedures to regulatory agencies;
- develop alarm and communication system for the facility;
- establish a list of personnel to contact for information on the plan contents;
- provide emergency response procedures for ammonia release; and
- determine and establish training and instruction requirements and programs.

Written Safety Program

In addition to the specific plans listed above, additional LORS apply to the project, called "safe work practices." Both the Construction and the Operations Safety Programs will address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs listed in pages 5 and 6 of this section of the staff assessment.

Contaminated Soils

If contaminated soil or groundwater is encountered during soil excavation and grading, the project owner would be required to provide personnel protective equipment and exposure monitoring for workers involved. In addition, staff's proposed conditions of certification found in the **Waste Management** section of this staff assessment would require:

- the project owner to have an experienced Registered Professional Engineer or Geologist available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered, and
- if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling and analysis, file a written report, and seek guidance from the CPM and the appropriate regulatory agencies.

These proposed Conditions of Certification would ensure that workers are properly protected from any hazardous wastes that may be encountered at the site.

Safety Training Programs

Employees will be trained in the safe work practices described in the above-referenced safety programs, as per staff's proposed conditions of certification **WORKER SAFETY-1** and **2**.

Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than 7 million persons work in the construction industry, representing 6% of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90% employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980-1993, an average of 1,079 construction workers were killed on the job each year, more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6%) between 1980 and 1993.
- 15% of workers' compensation costs are spent on construction injuries.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large complex industrial type projects such as the construction of gas-fired power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. This has been evident in the audits of power plants under construction recently conducted by the staff. The Federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors to improve their safety and health performance; to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections; to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and to recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal-OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal-OSHA regulations do,

however, require that safety be provided by an employer and the term “Competent Person” is used in many OSHA and Cal-OSHA standards, documents, and directives. A “Competent Person” is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

As discussed above, the hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large complex industrial type projects such as the construction of gas-fired power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- Lack of posted confined space warning placards/signs;
- Confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;
- Confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- Dangerous placement of hydraulic elevated platforms under each other;
- Inappropriate placement of fire extinguishers near hotwork;
- Dangerous placement of numerous power cords in standing water on the site thus increasing the risk of electrocution;
- Construction of an unsafe aqueous ammonia unloading pad; and
- Inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility but too close to the perimeter fence.
- Lack of adequate employee or contractor written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on- or off-site.

In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a safety professional monitor on-site compliance with Cal-OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to operational status. These requirements are outlined in condition of certification **WORKER SAFETY-4**. A monitor, hired by the

project owner yet reporting to the Chief Building Official (CBO) and Compliance Project Manager (CPM), will serve as an “extra set of eyes” to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged them in questions about the team’s findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a “fresh perspective” of the site.

Fire Hazards

During construction and operation of the proposed SPP there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, insulating fluid at the power plant switchyard or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely to develop at power plants. Fires and explosions of natural gas or other flammable gasses or liquids are rare. Compliance with all LORS will be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and spoke to representatives of the County’s Fire Department to determine if available fire protection services and equipment would adequately protect workers, and to determine the project’s impact on fire protection services in the area. The project will rely on both onsite fire protection systems and local fire protection services. The onsite fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the FCFPD (URS 2006a, Sections 7.17.2.1.2 and 3.11.1.2.1).

Construction

During construction, an interim fire protection system will be available onsite, and the permanent systems will be installed as soon as practical. Safety procedures and training will be implemented, and a fire watch with fire suppression equipment will be present during hot work. Any combustible or flammable materials will be stored appropriately to minimize the risk of fire. Portable fire extinguishers and small hose lines will be located throughout the site and periodically inspected and maintained (URS 2006a, Page 5.17-6).

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal-OSHA requirements. Fire suppression elements in the proposed plant will include both fixed and portable fire extinguishing systems.

A carbon dioxide fire protection system will be provided for the combustion turbine generators and accessory equipment. The system will have a shut-off valve on each CTG that will close the fuel line in response to a fire. Smoke detectors, gas sensors, automatic audible and visual alarms and fire extinguishers will be placed in all locations

with a potential fire hazard. Carbon dioxide and dry chemical extinguishers will be located throughout the site at code-approved intervals (URS 2006a Section 3.4.13).

The applicant has stated that a single fire hydrant with a minimal flow of 1500 gpm would fulfill the fire protection requirements for this facility. The applicant also stated that connecting a hydrant to the Westland Water District system would be sufficient to maintain the required water pressure without fire pumps or other systems (URS 2007b, Response to DR #66). Captain Gomez from FCFPD's Station #96 has confirmed this statement (Gomez 2007). Staff agrees that one hydrant would be sufficient for fire protection purposes, and requests that this detail be added to the facility design.

The applicant would be required by **WORKER SAFETY-1** and**-2** to provide the final Fire Protection and Prevention Program to staff and to the FCFPD prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures. In addition, the County Fire Marshall will inspect the site after completion of construction and periodically thereafter, and the FCFPD will be invited to visit the site and become familiar with it prior to beginning of operations (URS 2006a Section 3.11.1.2.1).

Emergency Medical Services (EMS) Response

A state-wide survey was conducted by staff to determine the frequency of emergency medical services (EMS) response and off-site fire-fighter response for natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants may have on local emergency services. Staff has concluded that incidents at power plants that require fire or EMS response are infrequent and represent an insignificant impact on the local fire departments, except for rare instances where a rural fire department has mostly volunteer fire-fighting staff. However, staff has determined that the potential for both work-related and non-work related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work related incidences, including visitors. The need for prompt response within a few minutes is well documented in the medical literature.

Staff believes that the quickest medical intervention can only be achieved with the use of an on-site defibrillator; the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a devise on-site in order to convert cardiac arrythmias resulting from industrial accidents or other non-work related causes. Therefore, an additional COC (**WORKER SAFETY-5**) is proposed which would require that a portable automatic cardiac defibrillator be located on site.

Other Hazards

A diesel fuel tank farm owned by Baker Farming is located immediately adjacent (approximately 2 meters) to the north of the project site. This tank farm consists of eleven (11) 10,000 gallon diesel fuel tanks and one propane tank (see **Worker Safety**

Figure-1). The main access road to the SPP will be placed immediately to the west of the tank farm. Staff noted that the tank farm is not graded, has a gravel surface, lacks containment should diesel fuel leak from the tanks, lacks fire detection and suppression, does not comply with NFPA standards or the Uniform Fire Code, and lacks adequate security to even prevent vandalism. Therefore, staff believes that this tank farm poses a very high risk of a diesel fire and propane tank explosion. In order to protect the SPP from the impact of fire and/or explosion, staff believes it is necessary to either provide proof that the surface gradient is such that even large volumes of spilled diesel fuel could not migrate onto the power plant site or provide a protective berm at the SPP northwest fenceline to prevent any spilled diesel fuel from flowing onto the project site. Furthermore, a second access/egress route must be established and always available for workers should a fire occur at the diesel fuel tank farm and workers need to either gain access to the power plant or leave the site. The Emergency Action Plan should also describe the steps site worker shall take in the event of a fire at the tank farm. Accordingly, staff proposes Condition of Certification **WORKER SAFETY-6** that will require the project owner to provide either proof that the gradient is adequate to protect the site from spilled diesel fuel or a berm on the northwest fenceline adjacent to the tank farm and provide a secondary access gate away from the tank farm.

Finally, staff was concerned that a fire or explosion at the tank farm would impact or damage the SPP. This power plant should always be available when needed and thus staff assessed the need for additional protective measures such as fire or blast walls to protect critical power plant components from a fire or explosion at the tank farm. Staff reviewed several models that agencies and the private sector use to assess the potential for thermal radiation from diesel fuel fires and explosions of pressurized liquid petroleum gas cylinders to impact structures and people. Staff relied on methodology published by the U.S. Department of Commerce National Institute of Standards and Technology (NIST 2000) to assess the thermal radiation impacts from a diesel fuel fire and the model from the U.S. Department of Housing and Urban Development standard (49 CFR 51.200 et seq.) to determine an Acceptable Separation Distance from an explosion of the propane tank. Both NIST and HUD utilize an acceptable thermal radiation exposure level of 31.5 kW/m^2 (10,000$Btu/h/f^2$) for structures and 1.4 kW/m^2 (450 $Btu/h/ft^2$) for people. HUD uses an overpressure of 0.5 psi as criteria for impacts from an explosion. The structures protected by this standard are assumed to be wood and thus this standard affords a large safety margin for more sturdy power plant equipment.

In the case of a diesel fuel fire at the adjoining tank farm, staff assumed that either the gradient is sufficient to prevent a large spill from migrating onto the Starwood site or that a berm is placed on the power plant site such that it would prevent migration onto the site. Thus, staff assumed that the spilled diesel would remain on the tank farm site and form a pool. Table 1 of the NIST report states that the “Screen Acceptable Separation Distance” for a fire of No. 2 diesel fuel “is the distance beyond which the thermal radiation flux criteria is satisfied, regardless of fire size.” This report found that this would not be exceeded at a separation distance of 39 feet for structures and 1050 feet for people. Since the distance from the closest diesel fuel tank to the nearest power plant structure (the switch yard/main step-up transformer) is estimated by staff to be 180 feet, staff concludes that a fire at the diesel tank farm would not pose a significant risk of impact to critical components of the power plant. And since the applicant has agreed to

place an emergency entrance/exit for workers to evacuate the power plant should that become necessary, staff concludes that workers would not be at significant risk if a diesel fuel fire were to occur at the tank farm.

The presence of the propane tank at the tank farm presents another problem. A diesel fuel spill could migrate under the propane tank, ignite, burn, and cause a BLEVE (boiling liquid evaporating vapor explosion) of the propane tank. This type of explosion is very serious and has the potential to cause damage at a distance. To assess this risk, staff utilized the HUD procedure that specifically assessed as an example a propane tank explosion. Based on the dimensions of the propane tank (estimated as 42" diameter and 105" length), staff estimated that the volume of the propane tank at the tank farm to be no more than 575 gallons. Using Figure 1 from the HUD standard, staff determined that the minimum acceptable separation distance for structures and people would be 220 feet for a 1000 gallon propane tank. Since the volume is less than the minimum, and the distance from the propane tank to the nearest power plant structure is ~220 feet, staff concludes that an explosion of the propane tank does not present a significant risk to critical power plant components. Staff therefore concludes that no additional safeguards are required. However, staff encourages the SPP owner to discuss staff's concerns about the safety of the tank farm with Baker Farming and urge Baker to place a proper berm around the diesel fuel tanks to not only protect the environment in the event of a spill but to avoid a possible fire that causes a BLEVE of the propane tank.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the proposed SPP combined with existing nearby energy facilities and expected new facilities, including the PG&E substation, the Wellhead Peaker Plant, the CalPeak Panoche plant, the proposed Panoche Energy Center, and the federal prison currently under construction to result in impacts on the fire and emergency service capabilities of the FCFPD. Staff determined that cumulative impacts were insignificant after discussing the matter with the FCFPD and hearing that they feel adequately staffed and equipped to deal with any incident at the proposed facility (Gomez 2007). Given the rural area where the project is proposed to be built, and the lack of unique fire hazards associated with a modern gas-fired power plant, staff concludes that this project will not have any significant incremental burden on the department's ability to respond to a fire or medical emergency.

WORKER SAFETY FIGURE-1 Diesel fuel tank farm as seen from the project site
(source: A. Greenberg 2-7-07)

CONCLUSIONS

Staff concluded that if the applicant for the proposed SPP provides a Project Construction Safety and Health Program and a Project Operations and **WORKER SAFETY -1, -2, -3, -4, -5**, **and -6** the project would incorporate sufficient measures to ensure adequate levels of industrial safety, and comply with applicable laws, ordinances, regulations, and standards. The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant will be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards.

Staff also concludes that the proposed project would not have significant impacts on local fire protection services. The proposed facility would be located within an area that is currently served by the local fire department. The fire risks of the proposed facility do not pose significant added demands on local fire protection services. Staff also concludes that the existing CalPeak Emergency Response Team is adequately equipped and staffed to respond to more serious hazardous materials incidents at the proposed facility with an adequate response time as described above on page 4.14-3.

PROPOSED CONDITIONS OF CERTIFICATION

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

- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Injury and Illness Prevention Program;
- A Construction Emergency Action Plan; and
- A Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable Safety Orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Fresno County Fire Protection District for review and comment prior to submittal to the CPM for approval.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Fresno County Fire Protection District stating the Fire Department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

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

- An Operation Injury and Illness Prevention Plan;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Program (8 CCR § 3221); and;
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the CPM for review and comment concerning compliance of the program with all applicable Safety Orders. The Operation Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Fresno County Fire Protection District for review and comment.

Verification: At least 30 days prior to the start of first-fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Fresno County Fire Protection District stating the Fire

Department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards, is capable of identifying workplace hazards relating to the construction activities, and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- Have over-all authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- Assure that the safety program for the project complies with Cal/OSHA & federal regulations related to power plant projects;
- Assure that all construction and commissioning workers and supervisors receive adequate safety training;
- Complete accident and safety-related incident investigations, emergency response reports for injuries, and inform the CPM of safety-related incidents; and
- Assure that all the plans identified in Worker Safety 1 and 2 are implemented.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement (CSS) shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- Record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- Summary report of safety management actions and safety-related incidents that occurred during the month;
- Report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- Report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO, and will be responsible for verifying that the Construction Safety Supervisor, as required in Worker Safety 3, implements all appropriate Cal/OSHA and Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: Prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic cardiac defibrillator is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times.

Verification: At least 30 days prior to the start of site mobilization the project owner shall submit to the CPM proof that a portable automatic cardiac defibrillator exists on site and a copy of the training and maintenance program for review and approval.

WORKER SAFETY-6 The project owner shall provide proof to the CPM that the surface gradient is such that spilled diesel fuel could not migrate from the tank farm onto the power plant site or shall construct a berm on the northwest fenceline adjacent to the diesel tank farm that will be adequate to prevent spilled diesel fuel at the tank farm from entering the project site. The project owner shall also provide for a secondary access gate and road a suitable safe distance from the tank farm and include in the Emergency Action Plan measures and procedures for workers to follow if a leak, a fire, or an explosion occurs at the tank farm. The project owner shall provide the proof, design drawings, and a description of the safety measures to the CPM for review and approval.

Verification: At least 30 days prior to the start of site mobilization the project owner shall submit to the CPM for review and approval proof showing that the gradient prevents spilled diesel fuel from migrating from the tank farm to the site, or design drawings of the berm at the northwest fenceline adjacent to the tank farm, plus design drawings of a second access road or walkway with a gate, and the Emergency Action Plan that gives instructions on worker procedures if there is a spill, fire, or explosion at the tank farm.

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ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Shahab Khoshmashrab and Steve Baker

SUMMARY OF CONCLUSIONS

Staff concludes that the design, construction and eventual closure of the project and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations and standards. The proposed conditions of certification, below, would ensure compliance with these laws, ordinances, regulations and standards.

INTRODUCTION

Facility Design encompasses the civil, structural, mechanical and electrical engineering design of the project. The purpose of the Facility Design analysis is to:

- verify that the laws, ordinances, regulations and standards (LORS) applicable to the engineering design and construction of the project have been identified;
- verify that the project and ancillary facilities have been described in sufficient detail, including proposed design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable engineering LORS, and in a manner that assures public health and safety;
- determine whether special design features should be considered during final design to deal with conditions unique to the site which could influence public health and safety; and
- describe the design review and construction inspection process and establish Conditions of Certification that will be used to monitor and ensure compliance with the engineering LORS and any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS applicable to facility design;
- Evaluation of the applicant's proposed design criteria, including the identification of those criteria that are essential to ensuring public health and safety;
- Proposed modifications and additions to the Application for Certification (AFC) that are necessary to comply with applicable engineering LORS; and
- Conditions of Certification proposed by staff to ensure that the project will be designed and constructed to assure public health and safety and comply with all applicable engineering LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical and electrical) are described in the AFC (URS 2006a, Appendices C through H). The key LORS are listed in **Facility Design Table 1** below:

Facility Design Table 1
Key Engineering Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Federal	Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health Standards
State	2001 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	Fresno County, Regulations and Ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

SETTING

The Starwood Power Project (SPP) will be built on a 5.6-acre parcel, located in an unincorporated area of western Fresno County, approximately 15 miles southwest of the city of Mendota. The site will lie in seismic zone 4. For more information on the site and related project description, please see the **Project Description** section of this document. Additional engineering design details are contained in the Application for Certification (AFC), in Appendices C through H (URS 2006a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project is built to the applicable engineering codes in order to ensure public health and life safety. The analysis verifies that the applicable engineering LORS have been identified and that the project and ancillary facilities have been described in sufficient detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes Conditions of Certification to monitor and ensure compliance with the engineering LORS and any special design requirements. These conditions allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will verify compliance with these LORS.

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 natural gas and electric transmission interconnections. The applicant proposes to use accepted industry standards (see URS 2006a, Appendices C through H for a representative list of applicable industry standards), design practices and construction methods in preparing and developing the site. Staff concludes that the project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes Conditions of

Certification (see below and the **Geology and Paleontology** section of this document) to ensure compliance.

MAJOR STRUCTURES, SYSTEMS AND EQUIPMENT

Major structures, systems and equipment are defined as those structures and associated components or equipment that are necessary for power production and are costly or time consuming to repair or replace, that are used for the storage, containment, or handling of hazardous or toxic materials, or may become potential health and safety hazards if not constructed according to the applicable engineering LORS. Major structures and equipment will be identified through compliance with proposed Condition of Certification **GEN-2** (below).

The AFC contains lists of the civil, structural, mechanical and electrical design criteria that demonstrate the likelihood of compliance with applicable engineering LORS, and that staff believes are essential to ensuring that the project is designed in a manner that protects public health and safety.

The project shall be designed and constructed to the 2001 edition of the California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect at the time design and construction of the project actually commences. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 2001 CBSC is in effect, the 2001 CBSC provisions, identified herein, shall be replaced with the applicable successor provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed using the appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1** (below), which in part, requires review and approval by the CBO of the project owner's proposed lateral force procedures prior to the start of construction.

PROJECT QUALITY PROCEDURES

The AFC (URS 2006a, § 3.11.8) describes a project Quality Program that will be used on the SPP to maximize confidence that systems and components will be designed, fabricated, stored, transported, installed and tested in accordance with the technical codes and standards appropriate for a power plant. Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this quality assurance/quality control (QA/QC) program would ensure that the project is actually designed, procured, fabricated, and installed as contemplated in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the building official is authorized and directed to enforce all the provisions of the CBC. For all energy facilities certified by the Energy Commission, the Energy Commission is the building official and has the responsibility to enforce the code. In addition, the Energy Commission has the power to render interpretations of the CBC and to adopt and enforce rules and supplemental regulations to clarify the application of the CBC's provisions.

The Energy Commission's design review and construction inspection process is developed to conform to CBC requirements and to ensure that all facility design Conditions of Certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to carry out the design review and construction inspections and act as delegate CBO on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to provide technical expertise not provided by the local official. The applicant, through permit fees as provided by CBC Sections 107.2 and 107.3, pays the costs of the reviews and inspections. While building permits in addition to the Energy Commission certification are not required for this project, in lieu permit fees are paid by the applicant consistent with CBC Section 107, to cover the costs of reviews and inspections.

Engineering and compliance staff will invite the local building authority, Fresno County, or a third party engineering consultant, to act as CBO for the project. When an entity has been identified to perform the duties of CBO, Energy Commission staff will complete a Memorandum of Understanding (MOU) with that entity that outlines its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed Conditions of Certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities and qualifications of the applicant's engineers responsible for the design and construction of the project (proposed Conditions of Certification **GEN-1** through **GEN-8**). Engineers responsible for the design of the civil, structural, mechanical and electrical portions of the project are required to be registered in California, and to sign and stamp each submittal of design plans, calculations and specifications submitted to the CBO. These conditions require that no element of construction subject to CBO review and approval shall proceed without prior approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written to require that no element of construction of permanent facilities subject to CBO review and approval, which would be difficult to reverse or correct, may proceed without prior approval of plans by the CBO. Those elements of construction that are not difficult to reverse are allowed to proceed without approval of the plans. The applicant shall bear the responsibility to fully modify those elements of construction to comply with all design changes that result from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service, or decommissioning, as a result of the project reaching the end of its useful life, may range from “mothballing” to removal of all equipment and appurtenant facilities and restoration of the site. Future conditions that may affect the decommissioning decision are largely unknown at this time.

In order to assure that decommissioning of the facility will be completed in a manner that is environmentally sound, safe and will protect public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of:

- proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
- all applicable LORS, local/regional plans and the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;
- the activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- decommissioning alternatives, other than complete site restoration.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure plan.

CONCLUSIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents are those applicable to the project.

2. Staff has evaluated the proposed engineering LORS, design criteria and design methods in the record, and concludes that the design, construction and eventual closure of the project are likely to comply with applicable engineering LORS.

3. The Conditions of Certification proposed will ensure that the proposed facilities are designed and constructed in accordance with applicable engineering LORS. This will occur through the use of design review, plan checking and field inspections, which are to be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

4. Whereas future conditions that may affect decommissioning are largely unknown at this time, it can reasonably be concluded that if the project owner submits a decommissioning plan as required in the **General Conditions** portion of this document prior to the commencement of decommissioning, the decommissioning procedure is likely to occur in compliance with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The Conditions of Certification proposed herein be adopted to ensure that the project is designed and constructed to assure public health and safety, and to ensure compliance with all applicable engineering LORS;

2. The project be designed and built to the 2001 CBSC (or successor standard, if such is in effect when the initial project engineering designs are submitted for review); and

3. The CBO shall review the final designs, conduct plan checking and perform field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct and inspect the project in accordance with the 2001 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval. (The CBSC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously.) The project owner shall insure that all the provisions of the above applicable codes be enforced during any construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility [2001 CBC, Section 101.3, Scope]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

In the event that the initial engineering designs are submitted to the CBO when a successor to the 2001 CBSC is in effect, the 2001 CBSC provisions identified herein shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall insure that all contracts with contractors, subcontractors and suppliers shall clearly specify that all work performed and materials supplied on this project comply with the codes listed above.

Verification: Within 30 days after receipt of the Certificate of Occupancy, the project owner shall submit to the Compliance Project Manager (CPM) a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation and inspection requirements of the applicable

LORS and the Energy Commission's Decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the Certificate of Occupancy within 30 days of receipt from the CBO [2001 CBC, Section 109 – Certificate of Occupancy].

Once the Certificate of Occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility which may require CBO approval for the purpose of complying with the above stated codes. The CPM will then determine the necessity of CBO approval on the work to be performed.

GEN-2 Prior to submittal of the initial engineering designs for CBO review, the project owner shall furnish to the CPM and to the CBO a schedule of facility design submittals, a Master Drawing List and a Master Specifications List. The schedule shall contain a list of proposed submittal packages of designs, calculations and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM when requested.

Verification: At least 60 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the Master Drawing List and the Master Specifications List of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 2** below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Facility Design Table 2
Major Structures and Equipment List

Equipment/System	Quantity (Plant)
Combustion Turbine Generator (CT) Unit Foundation and Connections	2
CO/SCR Stack Structure, Foundation and Connections	2
CO/SCR Catalyst Structure, Foundation and Connections	2
CT Step-up Transformer Foundation and Connections	1
Secondary Control Enclosure Foundation and Connections	1
Air Compressor Skid Foundation and Connections	1
CT Inlet Air Filter House Structure, Foundation and Connections	2
Fuel Tank Storage Structure, Foundation and Connections	1
CEMS Enclosure Structure, Foundation and Connections	2
RO/Evaporation Pond Foundation	1
RO Unit Foundation and Connections	1
Waste Water System Collection Sump Foundation	1
Waste Water System Above Ground Storage Tank Structure, Foundation and Connections	1
Ammonia Storage Tank Foundation and Connections	2
Ammonia Forwarding Pump Skid Foundation and Connections	1
Ammonia Injection Control Skid Foundation and Connections	2
Gas Fuel Scrubber Skid Foundation and Connections	1
Raw Water Storage Tank Structure, Foundation and Connections	1
Demineralized Water Storage Tank Structure, Foundation and Connections	2
Demineralized Water Pump Skid Foundation and Connections	1
Dead End Structure Foundation and Connections	1
Control/Administration Building Structure Foundation and Connections	1
Drainage Systems (including sanitary drain and waste)	1 Lot
High Pressure and Large Diameter Piping and Pipe Racks	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot
Switchyard, Buses and Towers	1 Lot
Electrical Duct Banks	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan check and construction inspection based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 2001 CBC [Chapter 1, Section 107 and Table 1-A, Building Permit Fees; Appendix Chapter 33, Section 3310 and Table A-33-A, Grading Plan Review Fees; and Table A-33-B, Grading Permit Fees], adjusted for inflation and other appropriate adjustments; may be based

on the value of the facilities reviewed; may be based on hourly rates; or may be as otherwise agreed by the project owner and the CBO.

Verification: The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next Monthly Compliance Report indicating that the applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California registered architect, structural engineer or civil engineer, as a resident engineer (RE), to be in general responsible charge of the project [Building Standards Administrative Code (Cal. Code Regs., tit. 24, § 4-209, Designation of Responsibilities)]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided each part is clearly defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part.

The RE shall:

1. Monitor construction progress of work requiring CBO design review and inspection to ensure compliance with LORS;

2. Ensure that construction of all the facilities subject to CBO design review and inspection conforms in every material respect to the applicable LORS, these Conditions of Certification, approved plans, and specifications;

3. Prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;

4. Be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) of stamped drawings, plans, specifications and any other required documents;

5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and

6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests as not conforming to the approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work, if the work does not conform to applicable requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) are subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: A) a civil engineer; B) a soils engineer, or a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; and C) an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: D) a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; E) a mechanical engineer; and F) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 requires state registration to practice as a civil engineer or structural engineer in California.] All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all responsible engineers assigned to the project [2001 CBC, Section 104.2, Powers and Duties of Building Official].

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible

engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

1. Review the Foundation Investigations Report, Geotechnical Report or Soils Report prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;

2. Design, or be responsible for design, stamp, and sign all plans, calculations and specifications for proposed site work, civil works and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and

3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes in the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports;

2. Prepare the Foundation Investigations Report, Geotechnical Report or Soils Report containing field exploration reports, laboratory tests and engineering analysis detailing the nature and extent of the soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load [2001 CBC, Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations];

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2001 CBC, Appendix Chapter 33; Section 3317, Grading Inspections (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both); and

4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations [2001 CBC, section 104.2.4, Stop orders].

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare final soils grading report; and

2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2001 CBC, Appendix Chapter 33; Section 3317, Grading Inspections (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both).

D. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;

2. Provide consultation to the RE during design and construction of the project;

3. Monitor construction progress to ensure compliance with engineering LORS;

4. Evaluate and recommend necessary changes in design; and

5. Prepare and sign all major building plans, specifications and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform with all of the mechanical engineering design requirements set forth in the Energy Commission's Decision.

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, the project owner shall assign to the project qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2001 CBC, Chapter 17 [Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection)]; and Section 106.3.5, Inspection and observation program. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

A certified weld inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;

2. Observe the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action [2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]; and

4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable provisions of the applicable edition of the CBC.

Verification: At least 15 days (or project owner and CBO approved alternative timeframe) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next Monthly Compliance Report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend the corrective action required [2001 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this Condition of Certification and, if appropriate, the applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next Monthly Compliance Report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project [2001 CBC, Section 106.4.2, Retention of Plans]. Electronic copies of the approved plans, specifications, calculations and marked-up as-builts shall be provided to the CBO for retention by the CPM.

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next Monthly Compliance Report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing final approved engineering plans, specifications and calculations as described above, the project owner shall submit to the CPM a letter stating that the above documents have been stored and indicate the storage location of such documents.

Within 90 days of the completion of construction, the project owner shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to be provided in the form of "read only" adobe .pdf 6.0 files, with restricted printing privileges (i.e. password protected), on archive quality compact discs.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;

2. An erosion and sedimentation control plan;

3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and

4. Soils Report, Geotechnical Report or Foundation Investigations Report required by the 2001 CBC [Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations].

Verification: At least 15 days (or project owner and CBO approved alternative timeframe) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next Monthly Compliance Report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area [2001 CBC, Section 104.2.4, Stop orders].

Verification: The project owner shall notify the CPM within 24 hours, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the 2001 CBC, Chapter 1, Section 108, Inspections; Chapter 17, Section 1701.6, Continuous and Periodic Special Inspection; and Appendix Chapter 33, Section 3317, Grading Inspection. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO and the CPM [2001 CBC, Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a Non-Conformance Report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the

corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following Monthly Compliance Report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage work, the project owner shall obtain the CBO's approval of the final grading plans (including final changes) for the erosion and sedimentation control work. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans [1998 CBC, Section 3318, Completion of Work].

Verification: Within 30 days (or project owner and CBO approved alternative timeframe) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and 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, with a copy of the transmittal letter to the CPM. The project owner shall submit a copy of the CBO's approval to the CPM in the next Monthly Compliance Report.

STRUC-1 Prior to the start of any increment of construction of any major structure or component listed in **Facility Design Table 2** of Condition of Certification **GEN-2**, above, the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **Table 2**, above):

1. Major project structures;

2. Major foundations, equipment supports and anchorage; and

3. Large field fabricated tanks.

Construction of any structure or component shall not commence until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;

2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (i.e., highest loads, or lowest allowable stresses shall govern). All plans, calculations and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations and specifications [2001 CBC, Section 108.4, Approval Required];

3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation [2001 CBC, Section 106.4.2, Retention of plans; and Section 106.3.2, Submittal documents];

4. Ensure that the final plans, calculations and specifications clearly reflect the inclusion of approved criteria, assumptions and methods used to develop the design. The final designs, plans, calculations and specifications shall be signed and stamped by the responsible design engineer [2001 CBC, Section 106.3.4, Architect or Engineer of Record]; and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to the applicable LORS [2001 CBC, Section 106.3.4, Architect or Engineer of Record].

Verification: At least 60 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 2** of Condition of Certification **GEN-2** above, the project owner shall submit to the CBO the above final design plans, specifications and calculations, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM, in the next Monthly Compliance Report a copy of a statement from the CBO that the proposed structural plans, specifications and calculations have been approved and are in compliance with the requirements set forth in the applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. Concrete pour sign-off sheets;

3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2001 CBC, Chapter 17, Section 1701,

Special Inspections; Section 1701.5, Type of Work (requiring special inspection); Section 1702, Structural Observation and Section 1703, Nondestructive Testing.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM [2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]. The NCR shall reference the Condition(s) of Certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 2001 CBC, Chapter 1, Section 106.3.2, Submittal documents and Section 106.3.3, Information on plans and specifications, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the Monthly Compliance Report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in Chapter 3, Table 3-E of the 2001 CBC shall, at a minimum, be designed to comply with the requirements of that Chapter.

Verification: At least 30 days (or project owner and CBO approved alternate timeframe) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following Monthly Compliance Report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in **Facility Design Table 2**, Condition of

Certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of said construction [2001 CBC, Section 106.3.2, Submittal Documents; Section 108.3, Inspection Requests; Section 108.4, Approval Required; 2001 California Plumbing Code, Section 103.5.4, Inspection Request; Section 301.1.1, Approval].

The responsible mechanical engineer shall stamp and sign all plans, drawings and calculations for the major piping and plumbing systems subject to the CBO design review and approval, and submit a signed statement to the CBO when the said proposed piping and plumbing systems have been designed, fabricated and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards [Section 106.3.4, Architect or Engineer of Record], which may include, but not be limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Fresno County code.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [2001 CBC, Section 104.2.2, Deputies].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 2**, Condition of Certification **GEN-2** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by the applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of said installation [2001 CBC, Section 108.3, Inspection Requests].

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. Require the responsible design engineer to submit a statement to the CBO that the proposed final design plans, specifications and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of said construction. The final plans, specifications and calculations shall include approved criteria, assumptions and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS [2001 CBC, Section 108.7, Other Inspections; Section 106.3.4, Architect or Engineer of Record].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 480 volts and higher (see a representative list, below), with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations [CBC 2001, Section 106.3.2, Submittal documents]. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS [2001 CBC, Section 108.4, Approval Required, and Section 108.3, Inspection Requests]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

A. Final plant design plans shall include:
   1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and
   2. system grounding drawings.

B. Final plant calculations must establish:
   1. short-circuit ratings of plant equipment;
   2. ampacity of feeder cables;
   3. voltage drop in feeder cables;
   4. system grounding requirements;
   5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
   6. system grounding requirements; and
   7. lighting energy calculations.

C. The following activities shall be reported to the CPM in the Monthly Compliance Report:
   1. Receipt or delay of major electrical equipment;

2. Testing or energization of major electrical equipment; and

3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission Decision.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

REFERENCES

URS 2006a. URS Corporation/ R. Watkins (tn 38405). Application for Certification with Cover Letter for Starwood Power-Midway, LLC Peaking Project. 11/17/2006 Rec'd 11/17/2006.

GEOLOGY AND PALEONTOLOGY

Testimony of Patrick Pilling, Ph.D., P.E., G.E.

SUMMARY OF CONCLUSIONS

Strong ground shaking during an earthquake, dynamic compaction, differential settlement of heavily loaded structures, hyrdrocompaction and moderately expansive soils represent the potential geologic hazards at the Starwood Power Project (SPP) site. The effects of strong ground shaking, dynamic compaction, potential differential settlement of heavily loaded structures, hydrocompaction, and soil expansion must be mitigated through structural design as required by the California Building Code (2007) and the Conditions of Certification. There are no known viable geologic or mineralogical resources present at the project site. Paleontological resources have been documented in the general area of the project, though no significant fossils were found during field explorations in the immediate vicinity. The potential impacts to paleontological resources due to construction activities will be mitigated as required by the Conditions of Certification.

Based on this information, it is staff's opinion that the potential for significant adverse direct or cumulative impacts to the project from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project, is low. It is Energy Commission staff's opinion that the SPP can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS), and in a manner that protects environmental quality and assures public safety.

INTRODUCTION

In this section, Energy Commission staff discusses potential impacts of the proposed SPP regarding geologic hazards, geologic (including mineralogic), and paleontologic resources. Staff's objective is to ensure that there will be no significant adverse impacts to significant geological and paleontological resources during project construction, operation, and closure. A brief geological and paleontological overview is provided. The section concludes with staff's proposed monitoring and mitigation measures with respect to geologic hazards and geologic, mineralogic, and palentologic resources, with the inclusion of proposed conditions of certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

The applicable LORS are listed in the Application for Certification (AFC) (URS, 2006a, Section 5.3 and 5.8). The following is a brief description of the current LORS for geologic hazards and resources, and mineralogic and paleontologic resources.

GEOLOGY AND PALENTOLOGY Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	The proposed SPP is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State of California Division 15 of the Public Resources Code, Section 25527	The Warren-Alquist Act requires the California Energy Commission (CEC) to "give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical archaeological, and cultural site…" With respect to paleontologic resources, the CEC relies on the following guidelines from the Society for Vertebrate Paleontology (SVP).
SVP, 1995	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.
California Building Standards Code (CBSC), 2007 (Particularly, Part 2, California Building Code CBC)	The CBC includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control)
Local	None

SETTING

The proposed SPP site is a 5.6-acre site within a 128-acre parcel, approximately 50 miles west of the city of Fresno and approximately 2 miles east of the Interstate 5 (I-5) in western Fresno County, California. West Panoche Road lies just north of the site. The site is presently undeveloped land that is used as a storage yard for CalPeak Power. The proposed project will include two (2) FT8-3 SwiftPac Combustion Turbine Generator (CTG) units installed in a simple-cycle power plant arrangement capable of producing a total of 120 MW; a dead end structure that will tie into the existing 115 kV transmission system; extending natural gas to the site via an approximate 200-foot-long extension from the existing natural gas trunk line immediately north of the property; a water supply system that includes pumping ground water from an existing or new ground water well; and an evaporation pond.

REGIONAL SETTING

The SPP site is located in the western San Joaquin Valley, which is part of the Central Valley. The Central Valley is bounded on the north by low-lying hills; on the northeast by a volcanic plateau of the Cascade Range; on the west by the Coast Ranges; on the east by the Sierra Nevada; and on the south by the Coast Ranges and the Tehachapi Mountains. The northern one-third of the valley is known as the Sacramento Valley,

while the southern two-thirds is known is known as the San Joaquin Valley. The Central Valley is characterized by dissected uplands, low alluvial plains and fans, river flood plains and channels, and overflow lands and lake bottoms. The valley represents the alluvial, flood, and delta plains of the Sacramento River and the San Joaquin River, and their tributaries. In the late Cenozoic, much of the San Joaquin Valley was occupied by shallow brackish and freshwater lakes. Lake Corcoran previously covered most of the northern San Joaquin Valley during the middle to late Pleistocene, and an associated diatomaceous-lacustrine clay covers more than 5,000 square miles of the San Joaquin Valley (Norris and Webb, 1990).

The oldest rocks in the area are basement complex rocks that form much of the Tehachapi Mountains, San Emigdio Mountains, and the southern Sierra Nevada which are comprised of a mass of plutonic and metamorphic rocks. The basement complex is buried beneath the Tulare Lake bed by more than 14,000 feet of rocks of Cretaceous, Tertiary, and Quaternary age. Marine rocks of Jurassic and Cretaceous age also underlie the site at great depth below the valley floor. Younger consolidated marine and nonmarine sedimentary rocks of Tertiary age uncomformably overlie the older marine rocks, and locally this section includes the Laguna Seca and the Lodo formations of Eocene and Paleocene age. The unconformably overlying Oro Loma formation is of Pliocene and Miocene age (Bartow, 1996; Bartow and Lettis, 1990). The Tulare formation of late Pliocene and early Pleistocene age uncomformably overlies the Oro Loma formation (Bartow and Lettis, 1990), and is estimated to be in excess of 600 feet in thickness beneath the site.

The Tulare formation is locally divided into a lower unit, the Corcoran Clay Member of the upper unit, and the remainder of the upper unit. The thicknesses of these units is estimated to be greater than 275 feet, 130 feet, and 190 feet, respectively immediately southeast of the site (Lettis, 1982). The Corcoran Clay Member is significant since it divides the ground water flow system into a lower confined zone and an upper semi confined zone. This material is often referred to as “blue clay.”

The Tulare formation is overlain by alluvium of the Panoche fan, sediment derived from older rocks shed eastward from the Diablo Range towards the valley trough. These sediments were deposited during relatively short-lived water flow and infrequent mudflow events by depositional processes including debris flows, sheet floods, stream channel deposits, and sieve deposits. As a result, Panoche fan sediments generally consist of complexly interbedded lenses of gravels, sands, silts, and clay. These alluvial deposits have been subdivided into a series of geologic units that represent discrete periods of deposition, and include the Los Banos alluvium, San Luis Ranch alluvium, Patterson alluvium and Dos Palos alluvium.

The depth to ground water in the upper semi confined zone in this area is estimated to be on the order of 200 feet below existing grade, but significant variations in ground water depth within the upper semi-confined zone can be expected due to probable perched aquifers (URS, 2006a, Section 5.3).

PROJECT SITE DESCRIPTION

The site is generally underlain by alluvium of the Panoche fan (Panoche Series), which consists of poorly to moderately sorted, subangular to subrounded gravels, sands, silts,

and clays complexly interbedded in lenses of varying thickness (URS, 2006a, Section 5.3). The site is located within an area mapped as Quaternary age alluvium composed of clay and sand.

Exploration at the site (URS, 2006a, Appendix L) extended to a maximum depth of 101.5 feet below existing grade and encountered recent alluvium characterized by complexly interbedded lenses silts, sands with varying silt content, and clays. The sand soils were generally classified as slightly moist to moist, and very loose to medium dense. The silts and clays were generally classified as moist and medium stiff to very stiff.

Ground water was not encountered to the depths explored (101.5 feet).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

There are two types of impacts considered in this section. The first are geologic hazards, which could impact proper functioning of the proposed facility. The second considers potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

No federal LORS with respect to geologic hazards and geologic and mineralogic resources apply to this project. The CBSC and CBC (2007) provide geotechnical and geological investigation and design guidelines, which engineers must adhere to when designing a proposed facility. As a result, the criteria used to assess geologic hazard impact significance includes evaluating each potential hazard in relation to being able to adequately design and construct the proposed facility. Geologic hazards to be considered for all projects include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis and seiches.

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts.

- Section (V) (c) asks if the project will directly or indirectly destroy a unique paleontological resource or site or unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) pose questions that are focused on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) pose questions about the project's effect on mineral resources.

With respect to impacts the proposed facility may have on existing geologic and mineralogic resources, geologic and mineral resource maps for the surrounding area have been reviewed, in addition to any site-specific information provided by the applicant, to determine if geologic and mineralogic resources are present in the area. When available, operating procedures of the proposed facility, in particular ground water

extraction and mass grading, are reviewed to determine if such operations could adversely impact such resources.

Staff reviewed existing paleontologic information for the surrounding area, as well as site-specific information generated by the applicant for the SPP. All research was conducted in accordance with accepted assessment protocol (SVP, 1995) to determine if there are any known paleontologic resources in the general area. If present or likely to exist, conditions of certification are proposed for inclusion in the project approval, which outlines procedures required during construction to mitigate impacts to potential resources.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking and dynamic compaction during an earthquake, differential settlement of heavily loaded structures, potential hydrocompaction, and moderately expansive clay soils represent the only known geologic hazards at this site. The potential hazards can be effectively mitigated through facility design as required by the California Building Code (2007). Proposed Conditions of Certification **GEO-1,** and **GEN-1, GEN-5, and CIVIL-1** in the **Facility Design** section, are intended to mitigate these impacts to a less than significant level.

No viable geologic or mineralogic resources are known to exist in the area. Although no paleontological resources have been documented at the site, paleontological resources have been documented in the area (URS, 2006a, Section 5.8). As a result, paleontological resources may be present in the alluvial soils that underlie the site such that these materials are highly sensitive to construction activities. Since the proposed SPP will include significant amounts of grading, foundation excavation, and utility trenching, staff considers the probability that paleontological resources will be encountered during such activities to be high. This assessment is based on SVP criteria and the confidential paleontological report appended to the AFC (URS, 2006b). Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level.

The proposed Conditions of Certification are to allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geologic hazards, and to ensure protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources from the proposed project, is very low.

GEOLOGICAL HAZARDS

The AFC (URS, 2006a, Section 5.3) provides documentation of potential geologic hazards at the SPP site, in addition to subsurface exploration information. Review of the AFC, coupled with our independent research, indicates that the potential for geologic hazards to impact the plant site is low.

Our independent research included review of available geologic maps, reports, and related data contained in the AFC for the Panoche Energy Center (PEC, 2006a). Geological information was available from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG), and other governmental organizations.

Faulting and Seismicity

Energy Commission staff reviewed the CGS publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions*, dated 1994 (CGS, 1994); the *Simplified Fault Activity Map of California* (Jennings and Saucedo, 2002); the *Maps of Known Active Fault Near-Source Zones in California and Adjacent Parts of Nevada* (International Conference of Building Officials [ICBO], 1998); *Probabilistic Seismic Hazard Assessment for the State of California* (CDMG, 1996a); and *Peak Acceleration from Maximum Credible Earthquakes in California (Rock and Stiff Soil Sites)* (CDMG, 1992). Energy Commission staff did not observe any surface faulting during its site visit. No active or potentially active faults are known to cross the power plant footprint or its associated linear facilities.

The closest known active fault is the Ortigalita fault zone (a dextral strike-slip fault) which is located 19.0 miles from the site at its closest point. The next closest known active fault is the San Andreas fault (a dextral strike-slip fault) which is located 28.0 miles west of the proposed energy facility at its closest point. The Nunez fault is located approximately 30 miles from the site at its closest point. The closest Great Valley thrust fault is located approximately 4.7 miles from the site at its closest point (URS, 2006a, Section 5.3); however, the Great Valley thrust faults are not considered Earthquake Fault Zones as defined by the Alquist-Priolo Earthquake Fault Zoning Act of 1994.

The estimated peak horizontal ground acceleration for the power plant is estimated to be 0.4g based on 10% probability of exceedence in 50 years (URS, 2006a, Section 5.3).

The potential of surface rupture on a fault at the energy facility footprint is considered to be very low, since no faults are known to have ruptured the ground surface of the proposed energy facility location.

Liquefaction

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. Because the depth to ground water at the site is much greater than 50 feet below existing grade, the potential for liquefaction at the power plant site is negligible.

Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density). The decrease in volume can result in settlement of overlying structural improvements.

The site is underlain by lenses of very loose to loose granular soils that exhibit a potential for dynamic compaction during strong seismic events; however, heavily-loaded and settlement-sensitive structures can be founded on deep foundations to effectively mitigate potential settlement. As a result, the potential for dynamic compaction to affect operation of the facility is considered low as long as foundation design incorporates deep foundations beneath heavily loaded and/or settlement-sensitive structures. Proposed Condition of Certification **GEO-1** is designed to ensure mitigation of this potential hazard to a less than significant level.

Hydrocompaction

Hydrocompaction is the process of the loss of soil volume upon the application of water. Although soils in the region are known to exhibit hydrocompaction potential, the site has been irrigated for agricultural use for many years which minimizes the potential of near-surface hydrocompaction. In addition, heavily-loaded and settlement-sensitive structures can be founded on deep foundations to effectively mitigate potential settlement. As a result, the potential for hydrocompaction to affect operation of the facility is considered low as long as foundation design incorporates deep foundations beneath heavily loaded structures and settlement-sensitive structures. Proposed Condition of Certification **GEO-1** is designed to ensure mitigation of this potential hazard to a less than significant level.

Subsidence

Ground subsidence is typically caused by petroleum or ground water withdrawal such that the effective unit weight of the soil profile is increased, which increases the effective stress on the deeper soils. This results in consolidation/settlement of the underlying soils.

This area has experienced significant historic subsidence due to ground water withdrawal for agricultural use. Recently, ground subsidence due to ground water withdrawal has decreased substantially due to an increased reliance on surface water, microirrigation techniques, and land retirement such that significant subsidence due to surrounding ground water withdrawal is not anticipated.

Although water supply sources being considered by the applicant include pumping of ground water from the upper semi-confined aquifer (within 400 of the ground surface), ground water pumping for this project is expected to have an insignificant effect on the ground water level due to the estimated pumping rates (a peak of 138 gallons per minute) in relation to the annual water withdrawn relative to the volume of ground water storage and the annual yield (URS, 2006a, Section 5.5). As a result, staff believes that there is no significant potential for subsidence due to ground water withdrawal at the proposed SPP.

Expansive Soils

Soil expansion occurs when clay-rich soils, with an affinity for water, exist in-place at a moisture content below their plastic limit. The addition of moisture from irrigation, capillary tension, water line breaks, etc. causes the clay soils to collect water molecules in their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to movement of overlying structural improvements.

Surficial clays of medium plasticity have been documented at this site (URS, 2006a, Appendix L) and at the adjacent Panoche Energy Center site (PEC, 2006a). These types of soils will exhibit some shrink-swell behavior. Mitigation of expansive soil, by over-excavation and replacement of these materials under the proposed structures, or by founding structures on deep foundations, is considered appropriate. Proposed Condition of Certification **GEO-1** is designed to ensure mitigation of this potential hazard to a less than significant level.

Landslides

Landslide potential at the SPP site is negligible since the proposed energy facility is located on a broad, gently sloping (0.5% to the northeast) alluvial fan.

Flooding

The SPP lies on a very gently sloping alluvium plain, and drainage of the site is accomplished by overland sheet flow. The entire SPP site has been identified as existing within the limits of a special flood hazard area (Zone A) that can be inundated by a 100-year flood with no base flood elevation determined (Federal Emergency Management Agency [FEMA], 2001). The effect of any flooding can be effectively mitigated by establishing finish grade above any flood elevation as required by facility design. Therefore, the potential for flooding to affect operation of the plant is considered low.

Tsunamis and Seiches

The proposed SPP site is not near any large body of water. As a result, the potential for tsunamis to affect the operation of the facility is considered negligible. There is also no potential for a seiche wave to impact the operation of the facility.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff has reviewed applicable geologic maps and reports for this area (*California Department of Conservation, 2001; CDMG, 1990; CDMG, 1999; CGS, 2002)*. Based on this review and the information contained in the AFC (URS, 2006a, Section 5.3), there are no known viable geologic or mineralogic resources located at or immediately adjacent to the proposed SPP site. The southern extent of the Chaney Ranch gas field is located approximately ½ mile north of the plant site; however, the last production from this field was in 1951 and the field was officially abandoned in 1964.

A paleontologic resources field survey has been performed for the entire project and the area surrounding it (URS, 2006d). The results of this study indicate that excavations in the underlying native soils, in particular the Los Banos alluvium and the San Luis Ranch alluvium, could disturb fossiliferous sediments such that adverse impacts on significant paleontological resources could be experienced. In addition, fossil sites are present within 3 miles of the project site.

Based on this information and staff's review of available information, the proposed SPP site has a high potential to contain significant paleontological resources when native materials are encountered during grading, foundation, and trenching activities.

Construction Impacts and Mitigation

Clay soils, which exhibit the potential to consolidate when subjected to loading and expand/contract when subjected to moisture content fluctuations, are present at the site and must be addressed during design and construction (See proposed **Conditions of Certification GEO-1,** and **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section).

As noted above, no viable geologic or mineralogic resources are known to exist in the area. Paleontological resources have been documented within 3 miles of the project site, and the native materials exhibit a high sensitivity rating with respect to containing significant paleontologic resources. Since construction of the proposed project will include significant amounts of grading, foundation excavation, and utility trenching, staff considers the probability that paleontological resources will be encountered during such activities to be high when native materials are encountered, based on SVP assessment criteria. Potential impacts to paleontologic resources would include, but not be limited to, disturbing the natural depositional state of the resource that would prevent proper chronological inventory, in addition to damaging (i.e. crushing, cracking, and/or fragmentation) the resource itself. Proposed Conditions of Certification **PAL-1** to **PAL-7** are appropriate for excavation activities in native ground and are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level.

Operation Impacts and Mitigation

Operation of the proposed plant facilities should not have any adverse impact on geologic, mineralogic, or paleontologic resources. Potential geologic hazards, including strong ground shaking, dynamic compaction, hydrocompaction, and expansive soils can be effectively mitigated through facility design (See proposed **Conditions of Certification GEO-1,** and **GEN-1, GEN-5**, and **CIVIL-1** in the **Facility Design** section) such that these potential hazards should not affect operation of the facility.

CUMULATIVE IMPACTS AND MITIGATION

Geologic hazards present at this site include strong ground shaking during an earthquake, potential dynamic compaction, potential differential settlement of heavily loaded structures, potential hydrocompaction, and moderately expansive soils. The SPP site lies in an area that exhibits no known viable geologic or mineralogic resources. Strong ground shaking, potential dynamic compaction, potential settlement of heavily loaded structures, potential hydrocompaction, and expansive clay soils must be mitigated through foundation design as required by the CBC (2007) and proposed **Conditions of Certification GEO-1,** and **GEN-1, GEN-5, and CIVIL-1** under **Facility Design**. Paleontological resources have been documented in the general area of the project. The potential impacts to paleontological resources due to construction activities will be mitigated as required by proposed **Conditions of Certification PAL-1 to PAL-7**.

Based on this information, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources from the proposed project, is low.

Based upon the literature and archives search, field surveys and compliance documentation for the SPP project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the SPP. Energy Commission staff agree with the applicant that the facility can be designed and constructed to minimize the effect of geologic hazards at the site, and that impacts to vertebrate fossils encountered during construction of the power plant and associated linears would be mitigated to a level of insignificance.

The proposed conditions of certification allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geologic hazards, and geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

A definition and general approach to closure is presented in the General Conditions section of this assessment. Facility closure activities are not anticipated to impact geologic, mineralogic, or paleontologic resources. This is due to the fact that no such resources are known to exist at the power plant location or along its proposed linears. In addition, decommissioning and closure of the power plant should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed in plant decommissioning and closure would have been disturbed during construction and operation of the facility.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or the public regarding geologic hazards, mineral resources, or paleontology.

CONCLUSIONS

The applicant will likely be able to comply with applicable LORS, provided that the proposed Conditions of Certification are followed. The project should have no adverse impact with respect to design and construction of the project, and geologic, mineralogic, and paleontologic resources. Staff proposes to ensure compliance with applicable LORS through the adoption of the proposed Conditions of Certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

General Conditions of Certification with respect to Geology are covered under proposed Conditions of Certification **GEN-1, GEN-5, and CIVIL-1** in the **Facility Design** section, in addition to **GEO-1** below. Proposed paleontological Conditions of Certification follow **GEO-1**.

GEO-1 The Soils Engineering Report required by the 2007 CBC Appendix Chapter 33, Section 3309.5 Soils Engineering Report, should specifically include laboratory test data, associated geotechnical engineering analyses, and a thorough discussion of potential dynamic compaction, hydrocompaction, expansion potential, and settlement potential of the site soils; as well as

recommendations for ground improvement and/or foundation systems necessary to mitigate these potential geologic hazards.

Verification: The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report which addresses the potential for site soils to experience dynamic compaction, hydrocompaction, expansion, and settlement due to structure surcharge, and a summary of how the results of the analyses were incorporated into the project foundation and grading plan design for review and comment by the Chief Building Official (CBO). A copy of the Soils Engineering Report, application for grading permit and any comments by the CBO are to be provided to the CPM at least 30 days prior to grading.

PAL-1 The project owner shall provide the Compliance Project Manager (CPM) with the resume and qualifications of its Paleontological Resource Specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain CPM approval of the replacement PRS. The project owner shall submit to the CPM to keep on file, resumes of the approved Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM, the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995. The experience of the PRS shall include the following:

1. institutional affiliations, appropriate credentials and college degree,

2. ability to recognize and collect fossils in the field;

3. local geological and biostratigraphic expertise;

4. proficiency in identifying vertebrate and invertebrate fossils and;

5. at least three years of paleontological resource mitigation and field experience in California, and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic resource monitors (PRMs) shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year experience monitoring in California; or

- AS or AA in geology, paleontology or biology and four years experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification:

1. At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.
2. At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project and stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor beginning on-site duties.
3. Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction laydown areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance to greater than 5 feet depth is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and the plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and can be at a scale of 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the power plant or linear facility changes, the project owner shall provide maps and drawings reflecting these changes to the PRS and CPM.

If construction of the project will proceed in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Prior to work commencing on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

2. If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

3. If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure the PRS prepares, and the project owner submits to the CPM for review and approval, a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting and sampling activities and may be modified with CPM approval. This document shall be used as a basis for discussion in the event that on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (SVP, 1995) and shall include, but not be limited to, the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to the PRMMP procedures;

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the Conditions of Certification;

3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;

4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for the monitoring and sampling;

6. A discussion of the procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive any data and fossil materials collected, requirements or specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the paleontological Conditions of Certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for the following workers: project managers, construction supervisors, foremen, and general workers who are involved with or operate ground disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of an initial in-person PRS training during the project kick-off for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern. No ground disturbance shall occur prior to CPM approval of the WEAP, unless specifically approved by the CPM.

The Worker Environmental Awareness Program (WEAP) shall address the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

The training shall include:

1. A discussion of applicable laws and penalties for violation of the laws;

2. Depictive photographs or physical examples of vertebrate fossils shall be provided for project sites containing units of high paleontologic sensitivity;

3. Information discussing the authority of the PRS or PRM to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;

4. Instruction directing employees to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;

5. An informational brochure that identifies reporting procedures in the event of a paleontological discovery;

6. A Certification of Completion of WEAP form signed by each worker indicating that they have received the training; and

7. A sticker for employees to place on hard hats indicating that environmental training has been completed.

Verification:

1. At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP including the brochure with the set of reporting procedures the workers are to follow.

2. At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning on using a video for interim training.

3. If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

4. In the Monthly Compliance Report (MCR) the project owner shall provide copies of the WEAP Certification of Completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potentially fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full time monitoring is not necessary in locations that were identified in the PRMMP as potentially fossil-bearing, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring different from the accepted schedule presented in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring. These changes should also be included in the Monthly Compliance Report. The

letter or email shall state the justification for the change in monitoring and be submitted to the CPM for review and approval;

2. The project owner shall ensure the PRM(s) keeps a daily log of monitoring of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time;

3. The project owner shall ensure the PRS immediately notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources Conditions of Certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the Conditions of Certification;

4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours or Monday morning in the case of a weekend when construction has been halted due to a paleontological find.

The project owner shall ensure the PRS prepares a summary of the monitoring and other paleontological activities which will be placed in the Monthly Compliance Reports (MCR). The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities and general locations of excavations, grading, etc. A section of the report shall include the geologic units or subunits encountered; descriptions of sampling within each unit; and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring including any incidents of non-compliance and any changes to the monitoring plan approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, in collaboration with the designated PRS, shall ensure all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during the project construction.

Verification: The project owner shall maintain in their compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after completion and approval of the CPM-approved Paleontological Resource Report (See

PAL-7). The project owner shall be responsible to pay any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information and submitted to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground disturbing activities, including landscaping, the project owner shall submit the Paleontological Resources Report under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
Starwood Power Project (06-AFC-10)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on Cultural, Paleontology and Biological Resources for all personnel (i.e., construction supervisors, crews and plant operators) working on-site or at related facilities. By signing below, the participant indicates that they understand and shall abide by the guidelines set forth in the Program materials. Include this completed form in the Monthly Compliance Report.

No.	Employee Name	Title/Company	Signature
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25.			

Cultural Trainer: _____ Signature:_____Date: ___/___/____

PaleoTrainer: _____ Signature:_____Date: ___/___/____

Biological Trainer: _____ Signature:_____Date: ___/___/__

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POWER PLANT EFFICIENCY

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 120 MW of peaking electric power at an overall project fuel efficiency of 36.6% lower heating value (LHV) at maximum full load. While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

INTRODUCTION

In its final decision on the project, the Energy Commission will make findings as to whether energy use by the Starwood Power Project (SPP) 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 SPP's consumption of energy would create a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impacts. In this analysis, staff addresses the issue of inefficient and unnecessary consumption of energy.

In order to assist the Energy Commission in making its findings, this analysis will:

- examine whether the facility will likely present any adverse impacts upon energy resources;
- examine whether these adverse impacts are significant; and if so,
- examine whether feasible mitigation measures exist that would eliminate the adverse impacts, or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

No Federal, State or local/county laws, ordinances, regulations and standards (LORS) apply to the efficiency of this project.

SETTING

Starwood Power-Midway, LLC (SPM) proposes to construct and operate the 120 MW (nominal net output) simple cycle SPP, providing peaking power and quick start capability to Pacific Gas and Electric Company (PG&E) as dispatched by PG&E (URS 2006a, AFC §§ 1.1, 1.2.2, 2.3, 3.9.2.1, 3.11.4). The project will consist of two Pratt & Whitney Power Systems FT8-3 SWIFTPAC gas turbine generators and ancillary equipment. Under the terms of the Power Purchase Agreement with PG&E, the

applicant intends to permit the project to operate at an annual capacity factor up to 46% (4,000 hours per year), but actually expects it to be dispatched at a capacity factor less than 4.6% (400 hours per year) (URS 2006a, AFC §§ 1.1, 1.2.2, 3.9.2.1, 3.11.4). The gas turbines will be equipped with inlet air fogging to enhance power on hot days, as well as combustor water injection and selective catalytic reduction (SCR) to control oxides of nitrogen emissions and a combustion catalyst to control carbon monoxide (URS 2006a, AFC §§ 1.1, 1.2.4, 2.3, 3.1, 3.4.1, 3.9.2.1.2, 3.11.6).

The project will be constructed on a site currently in agricultural use adjacent to PG&E's Panoche substation in unincorporated western Fresno County. The site has access to existing electric transmission and existing ground water wells (URS 2006a, AFC §§ 1.1, 1.2, 1.2.4, 3.3). The site is adjacent to or near two existing power plants (CalPeak Panoche and Wellhead Panoche) and one proposed power plant (Panoche Energy Center).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE OF ENERGY RESOURCES

CEQA Guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Cal. Code Regs., tit. 14, § 15126.4(a)(1)). Appendix F of the Guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce wasteful, inefficient and unnecessary consumption of energy (Cal. Code Regs., tit. 14, § 15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- adverse effects on local and regional energy supplies and energy resources;
- a requirement for additional energy supply capacity;
- noncompliance with existing energy standards; or
- the wasteful, inefficient and unnecessary consumption of fuel or energy.

PROJECT ENERGY REQUIREMENTS AND ENERGY USE EFFICIENCY

Any power plant large enough to fall under Energy Commission siting jurisdiction will consume large amounts of energy. Under average ambient conditions, the SPP would burn natural gas at a nominal rate of 1,126 million Btu[1] per hour LHV (URS 2006a, AFC §§ 1.2.3, 3.4.8, 3.11.7.1; Fig. 3.4-3). This is a substantial rate of energy consumption, and holds the potential to impact energy supplies. Under expected project conditions,

[1] British thermal units.

electricity will be generated at a full load efficiency of approximately 36.6% LHV (URS 2006a, AFC § 3.4.5.2; Figs. 3.4-3, 3.4-3C).

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of supply of natural gas for the project (URS 2006a, AFC §§ 1.2.3, 3.4.1, 3.4.8, 3.7, 3.11.7.1). Natural gas for the SPP will be supplied from the existing PG&E high pressure[2] natural gas trunk line running along West Panoche Road that currently serves the adjacent CalPeak Panoche power plant. The PG&E natural gas system has access to gas from the Rocky Mountains, Canada and the Southwest. This represents a resource of considerable capacity, an adequate source for a project of this size. Taking into account the two nearby existing and one proposed gas-fired power plants, it is highly unlikely that the project could pose a significant adverse impact on natural gas supplies in California.

Power plants are high value gas consumers. Should gas supplies or gas transport capacity fall short, power plants would not be curtailed until after most or all industrial and commercial users had been curtailed. Given PG&E's extensive system, staff does not envision the project suffering significant risk of gas supply curtailment.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel will be supplied to the project from the existing PG&E line that serves the CalPeak Panoche power plant via a new 6-inch diameter, 800 foot-long interconnection (URS 2006a, AFC §§ 1.2, 1.2.3, 3.4.4, 3.4.8, 3.7, 3.7.1.1, 3.11.7.1). This is a resource with adequate delivery capacity for a project of this size. There is no real likelihood that the SPP will require the development of additional energy supply capacity.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of the SPP or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT AND UNNECESSARY ENERGY CONSUMPTION

The SPP could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce the project's use of fuel. Evaluation of alternatives to the project that could reduce wasteful, inefficient or unnecessary energy consumption first requires examination of the project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by the configuration of the power producing system and by the selection of equipment used to generate power.

Project Configuration

The project objective is to provide peaking power during periods of high demand (typically hot summer days) and quick start capability (ten minutes to full load) as dispatched by PG&E (URS 2006a, AFC §§ 1.1, 1.2.2, 2.1, 2.3, 3.9.2.1, 3.11.4, 6). A

[2] Gas line pressure is 500 to 600 psig, sufficient to supply the project without the need for onsite gas compressors (URS 2006a, AFC §§ 3.4.8, 3.11.7.1).

simple-cycle configuration is consistent with this objective. The SPP will be configured as two simple cycle power plants operating in parallel, in each of which electricity is generated by an electrical generator driven by two natural gas-fired gas turbines (URS 2006a, AFC §§ 1.1, 1.2.2, 2.3, 3.1, 3.4.1, 3.4.2, 3.4.5, 3.4.5.1, 4.3). This configuration, with its short start-up time and fast ramping[3] capability, is well suited to providing peaking power. Further, when reduced output is required, one or more gas turbines can be shut down, allowing the remaining machine(s) to produce a percentage of the full power at optimum efficiency, rather than operating a single, larger machine at a less efficient part load output.

The applicant intends to acquire the necessary air emissions permits to allow this facility to operate in peaking duty at an annual capacity factor up to 46% for both units (URS 2006a, AFC §§ 1.1, 1.2.2, 3.1, 3.9.2.1, 3.11.4). This is equivalent to each machine running no more than 4,000 hours per year.

Equipment Selection

Modern gas turbines embody the most fuel-efficient electric generating technology available today. The SPP will employ Pratt & Whitney FT8-3 SWIFTPAC gas turbine generator units, one of the more efficient such machines available (URS 2006a, AFC §§ 1.1, 1.2.2, 2.3, 3.1, 3.4.1, 3.4.2, 3.4.5.1; Figs. 3.4-3, 3.4-3A, 3.4-3B, 3.4-3C). This model of the FT8 is nominally rated at 61.2 MW at a fuel efficiency of 37% (P&W 2006). The SPP will actually produce 120 MW (60 MW per machine) at a site rated fuel efficiency of 36.6% LHV, based on ISO weather conditions (59°F); and 109.7 MW (54.9 MW per machine) at a site rated fuel efficiency of 35.7% LHV on a typical hot day (114°F) (URS 2006a, AFC Figures 3.4-3, 3.4-3A). This site rating differs from nominal figures due to site specific ambient conditions (altitude and humidity), power losses from parasitic loads, and reduced system output due to flow losses caused by the inlet air cooling system and the SCR unit and combustion catalyst installed on the exhaust of each turbine.

Efficiency of Alternatives to the Project

Alternative Generating Technologies

Alternative generating technologies for the SPP are considered in the AFC (URS 2006a, AFC §§ 4.3, 4.4). Fossil fuels (coal and natural gas), nuclear, windpower, biomass and solar power were all considered. Solar and windpower are not dispatchable, so are incapable of producing the quick start capability needed. Coal is too highly polluting to be viable in California, and new nuclear plants are not allowed. Biomass presents problems with fuel availability. Staff agrees with the applicant that only natural gas-burning technologies are feasible for this project.

Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil-fired power plant (Power 1994). Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a

[3] Ramping is increasing and decreasing electrical output to meet fluctuating load requirements.

power plant, the plant owner is thus strongly motivated to purchase fuel-efficient machinery.

Capital cost is also important in selecting generating machinery. Current progress in the development of gas turbines, incorporating technological advances made in the development of aircraft (jet) engines, combined with the cost advantages of assembly-line manufacturing, has made available machines that not only offer the lowest available fuel costs, but at the same time sell for the lowest per-kilowatt capital cost.

The Pratt & Whitney FT8-3 SWIFTPAC

The applicant will employ two Pratt & Whitney FT8-3 SWIFTPAC gas turbine generator units in the SPP (URS 2006a, AFC §§ 1.1, 1.2.2, 2.3, 3.1, 3.4.1, 3.4.2, 3.4.5.1). The FT8-3, an aeroderivative engine (adapted from a Pratt & Whitney aircraft jet engine), represents one of the more modern and efficient such machines now available. This machine is nominally rated at 60.2 MW and 36.9% efficiency LHV at ISO[4] conditions (P&W 2006). (Staff compares alternative machines' ISO ratings as a common baseline, since project-specific ratings are not available for the alternative machines.)

The FT8, a more efficient update of the FT4, has been on the market since 1992. The FT4, in turn, has been on the market for over 30 years; the FT8-3 to be employed in the SPP has been available since 2004. Each unit consists of two gas turbine engines driving opposite ends of a single generator. Each unit can operate with one or both engines; this allows plant output to be adjusted in 30 MW steps with no drop in fuel efficiency.[5] The FT8-3 can go from a cold start to full load in ten minutes (URS 2006a, AFC §§ 1.1, 3.1, 3.4.5.1). Such efficiency and operating flexibility make this a capable machine for providing the requisite peaking power and quick start capability.

Alternatives to the FT8-3 SWIFTPAC

Alternative machines that could meet the project's objectives are the LM6000 SPRINT and the SGT-800 from General Electric and Siemens Power Generation, respectively. Another possible alternative is General Electric's LMS100, a machine new on the market that blends technologies from aeroderivative and industrial gas turbines.

The General Electric (GE) LM6000PC SPRINT gas turbine generator is an aeroderivative engine. In a simple cycle configuration, it is nominally rated at 50.1 MW and 40.5% efficiency LHV at ISO conditions (GTW 2006).

The Siemens SGT-800 gas turbine generator in a simple cycle configuration is nominally rated at 45 MW and 37% efficiency LHV at ISO conditions (GTW 2006).

The GE LMS100 gas turbine generator is currently available only in simple cycle configuration, and is nominally rated at 98.8 MW and 45.1% efficiency LHV at ISO conditions (GTW 2006).

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[4] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60% relative humidity, and one atmosphere of pressure (equivalent to sea level).

[5] Reducing the output of a gas turbine below full load typically causes a significant drop in fuel efficiency.

Machine	Generating Capacity (MW)	ISO Efficiency (LHV)
GE LMS100	98.8	45.1 %
GE LM6000PC SPRINT	50.1	40.5 %
P & W FT8-3 SWIFTPAC	**60.2**	**36.9 %**
Siemens SGT-800	45	37.0 %

Source: GTW 2006; P&W 2006

The SPP will sell power to PG&E under the terms of a PG&E RFO (Request for Offers) contract approved by the California Public Utilities Commission. This contract specifically calls for the use of Pratt & Whitney FT8-3 gas turbine generators (URS 2006a, AFC § 2.3). The GE LMS100 offers higher fuel efficiency than any of the alternative machines, but its generating capacity of 99 MW does not satisfy the requirement. Likewise, a pair of GE LM6000 machines would generate only 100 MW, less than the required 120 MW; two Siemens SGT-800 machines would produce only 90 MW. The rated fuel efficiency of the FT8-3 matches that of the Siemens unit. While it is less efficient than the two GE machines at full load, its ability to maintain high efficiency at part load redeems it. Thus, while SPP is required to employ the FT8-3 in the project, its selection would make sense regardless.

Inlet Air Cooling

A further choice of alternatives involves the selection of gas turbine inlet air-cooling methods.[6] The two commonly used techniques are the evaporative cooler or fogger, and the chiller (mechanical or absorption); both techniques increase power output by cooling the gas turbine inlet air. In general terms, a mechanical chiller can offer greater power output than the evaporative cooler on hot, humid days, but consumes electric power to operate its refrigeration process, thus slightly reducing overall net power output and, thus, overall efficiency. An absorption chiller uses less electric power, but necessitates the use of a substantial inventory of ammonia. An evaporative cooler or a fogger boosts power output best on dry days; it uses less electric power than a mechanical chiller, possibly yielding slightly higher operating efficiency. The difference in efficiency among these techniques is relatively insignificant.

The applicant proposes to employ inlet air fogging when ambient temperatures exceed 60°F (URS 2006a, AFC §§ 1.2.4, 2.3, 3.4.1, 3.4.2, 3.4.5, 3.9.2.1.2, 3.11.6; Figs. 3.4-3, 3.4-3A, 3.4-3B, 3.4-3C). Given the climate at the SPP site and the relative lack of superiority of one system over the other, staff agrees that the applicant's approach will yield no significant adverse energy impacts.

In conclusion, the project configuration (simple cycle) and generating equipment chosen appear to represent a reasonably efficient combination to satisfy the project objectives. There are no alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

Two nearby projects have been identified that could potentially combine with the SPP to create cumulative impacts on natural gas resources. One is a minor modification to the

[6] A gas turbine's power output decreases as ambient air temperatures rise. Cooling the air as it enters the machine increases power output.

existing CalPeak Panoche power plant. The applicant considers it unlikely that this minor modification could affect natural gas consumption at the plant, and staff agrees. The other project is the Panoche Energy Center, a 400 MW peaking power plant to be built adjacent to the PG&E Panoche substation. Panoche is also the result of a PG&E RFO contract, and like Starwood, it will be supplied with natural gas from the PG&E system. The PG&E natural gas supply system is adequate to supply both the SPP project and the Panoche project.

NOTEWORTHY PUBLIC BENEFITS

The applicant proposes to provide peaking power and quick start capability to the PG&E system (URS 2006a, AFC §§ 1.1, 1.2.2, 2.3, 3.9.2.1, 3.11.4). By doing so in this fuel-efficient manner, i.e., employing a modern peaking gas turbine generator, the SPP will provide a benefit to the electric consumers of California.

CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 120 MW of peaking power at an overall project fuel efficiency of 36.6% LHV at maximum full load. While it will consume substantial amounts of energy, it will do so in an acceptably efficient manner. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources. No cumulative impacts on energy resources are likely.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

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URS 2006a - URS Corporation/ R. Watkins (tn 38405) Application for Certification with Cover Letter for Starwood Power-Midway, LLC Peaking Project. 11/17/2006 Rec’d 1/17/2006.

POWER PLANT RELIABILITY

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

Starwood Power Midway, LLC (SPM) predicts an equivalent availability factor of 95 to 99%, which staff believes is achievable. Based on a review of the proposal, staff concludes that the Starwood Power Project would be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

INTRODUCTION

In this analysis, Energy Commission staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric system it serves (see **Setting** below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliability of power generation. While SPM has predicted an equivalent availability factor from 95 to 99% for the Starwood Power Project (SPP) (see below), staff uses typical industry norms as a benchmark, rather than SPM's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

No Federal, State or local/county laws, ordinances, regulations and standards (LORS) apply to the reliability of this project.

SETTING

In the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the State's control area operators, such as the California Independent System Operator (Cal-ISO), that purchase, dispatch, and sell electric power throughout the State. How the Cal-ISO and other control area operators will ensure system reliability is an ongoing process; protocols are still being developed and put in place that will allow sufficient reliability to be maintained under the competitive market system. "Must-run" power purchase agreements and "participating generator"

agreements are two mechanisms being employed to ensure an adequate supply of reliable power.

The Cal-ISO also requires those power plants selling ancillary services, as well as those holding reliability must-run contracts, to fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the Cal-ISO.

The Cal-ISO's mechanisms to ensure adequate power plant reliability apparently have been devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there is cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants were to exhibit individual reliability sufficiently lower than this historical level, the assumptions used by Cal-ISO to ensure system reliability would prove invalid, with potentially disappointing results. Until the restructured competitive electric power system has undergone an adequate shakeout period, and the effects of varying power plant reliability are thoroughly understood and compensated for, staff will recommend that power plant owners continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

As part of its plan to provide needed reliability, the applicant proposes to operate the 120 MW (nominal output) SPP, a simple-cycle peaking power plant, providing peaking power and quick start capability[1] to Pacific Gas and Electric Company (PG&E) as dispatched by PG&E (URS 2006a, AFC §§ 1.1, 1.2.2, 2.3, 3.9.2.1, 3.11.4). The project is expected to achieve an equivalent availability factor (EAF) in the range of 95 to 99% (URS 2006a, AFC § 3.11.4). The project will be permitted to operate at capacity factors up to 46% during each year of its operating life, being dispatched to serve peak loads at times of high demand (URS 2006a, AFC §§ 1.2.2, 3.9.2.1, 3.11.4).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Commission must make findings as to the manner in which the project is to be designed, sited and operated to ensure safe and reliable operation [Cal. Code Regs., tit. 20, § 1752(c)]. Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if the project exhibits reliability at least equal to that of other power plants on that system.

[1] The FT8-3 SWIFTPAC machines to be employed in this project can achieve full load from a cold start in ten minutes (URS 2006a, AFC § 3.9.2.1.3; P&W 2006).

The availability factor for a power plant is the percentage of the time that it is available to generate power; both planned and unplanned outages subtract from its availability. Measures of power plant reliability are based on its actual ability to generate power when it is considered available and are affected by starting failures and unplanned, or forced, outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Throughout its intended 30-year life (URS 2006a, AFC § 3.11.4), the SPP will be expected to perform reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that the SPP will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will be ensured by use of appropriate quality assurance/ quality control (QA/QC) programs during design, procurement, construction and operation of the plant, and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

Quality Control Program

The applicant describes a QA/QC program (URS 2006a, AFC §§ 3.11.5.3, 3.11.8, 3.11.8.1, 3.11.8.2) typical of the power industry. Equipment will be purchased from qualified suppliers, based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history will be evaluated. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A peaking generating facility commonly offers adequate opportunity for maintenance work during its downtime. During periods of extended dispatch, however, as could occur if other major generating or transmission assets were disabled, the facility may be required to operate for extended periods. A typical approach for achieving reliability in such circumstances is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide appropriate redundancy of function for the project (URS 2006a, AFC §§ 1.1, 1.2.2, 2.3, 3.1, 3.4.1, 3.4.2, 3.4.5, 3.4.5.1, 3.4.7.3, 3.11.5, 3.11.5.2, 3.11.5.3, 4.3). The fact that the project consists of two combustion turbine-generator sets operating in parallel as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to

continue to generate (at reduced output). In addition, each generator is powered by two gas turbines; either or both turbines can drive the generator. Further, all plant ancillary systems are also designed with adequate redundancy to ensure continued operation in the face of equipment failure (URS 2006a, AFC §§ 3.4.2, 3.4.7.3, 3.4.7.4, 3.4.7.5, 3.9.2.5). Staff believes that equipment redundancy will be sufficient for a project such as this.

Maintenance Program

The applicant proposes to establish a preventive plant maintenance program typical of the industry (URS 2006a, AFC §§ 3.9.2.1, 3.9.2.1.1, 3.11.5.1). Equipment manufacturers provide maintenance recommendations with their products; the applicant will base its maintenance program on these recommendations. The program will encompass preventive and predictive maintenance techniques. Maintenance outages will be planned for periods of low electricity demand. In light of these plans, staff expects that the project will be adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

The SPP will burn natural gas supplied by PG&E from the PG&E system. Natural gas fuel will be supplied to the project via a new 6-inch diameter, 650-foot long interconnection from the existing gas tapline that delivers natural gas to the CalPeak Panoche project from a PG&E main trunk line (URS 2006a, AFC §§ 1.2, 1.2.3, 3.4.1, 3.4.4, 3.4.8, 3.7, 3.7.1.1, 3.11.7.1). The PG&E natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas from the Rocky Mountains, Canada and the Southwest. Taking into account the two nearby existing and one proposed gas-fired power plants, staff agrees with the applicant's prediction that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The SPP will obtain service water via a 3-inch diameter, 1,200 foot long pipeline from an existing well that currently serves the nearby CalPeak Panoche power plant. This water will be used for plant service water, and will be treated by reverse osmosis and demineralization and used for inlet air fogging and turbine combustor water injection. Safety and sanitary water (showers, safety showers and eyewash stations) will be provided by self-contained water processing units. Potable water for drinking will be provided by a bottled water supplier (URS 2006a, AFC §§ 1.2, 1.2.4, 3.4.1, 3.4.4, 3.4.5.1.1, 3.4.9, 3.4.9.1.2, 3.11.7.2, 4.6.1). Two 75,000 gallon demineralized water storage tanks and a 75,000 gallon raw water/fire water storage tank will allow the plant to continue operating for several hours in case of an interruption in water supply (URS 2006a, AFC §§ 3.4.1, 3.4.2, 3.4.9, 3.11.5.4). Staff believes this source, combined with

the onsite storage capacity, yields sufficient likelihood of a reliable supply of water. (For further discussion of water supply, see the **Soil and Water Resources** section of this document.)

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, tsunamis (tidal waves) and seiches (waves in inland bodies of water) will not likely represent a hazard for this project, but seismic shaking (earthquake) and flooding may present credible threats to reliable operation.

Seismic Shaking

The site lies within Seismic Zone 3 (URS 2006a, AFC § 3.3.2.2); see that portion of this document entitled **Geology and Paleontology**. The project will be designed and constructed to the more stringent Seismic Zone 4 standards of the latest appropriate LORS (URS 2006a, AFC Apps. C, D, E, F, G, H and L). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking compared to older facilities, due to the fact that these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project will likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see that portion of this document entitled **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no special concern with power plant functional reliability affecting the electric system's reliability due to seismic events.

Flooding

The site lies within a 100-year floodplain. To mitigate this hazard, the site will be filled and raised one foot, as required by Fresno County Ordinance, Title 15, Flood Hazard Areas (URS 2006a, AFC § 3.5.8). With this mitigation, staff believes there should be no significant concerns with power plant functional reliability due to flooding. For further discussion, see **Soil and Water Resources** and **Geology and Paleontology**.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as many other related reliability data) are kept by the North American Electric Reliability Council (NERC). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System (GADS), and periodically summarizes and publishes the statistics on the Internet (http://www.nerc.com). NERC reports the following summary generating unit statistics for the years 2000 through 2005 (NERC 2006):

For Gas Turbine units (50 MW and larger):

Equivalent Availability Factor = 90.82%

The gas turbine generators that will be employed in the project represent a mature, proven technology. While these Pratt & Whitney FT8-3 SWIFTPAC units have been available only since 2004, the FT8 series engines have been available since 1992.

These, in turn, are an improved version of the FT4 engine, which has been on the market for over 30 years. All these engines are developed from Pratt & Whitney aircraft engines that date back to the 1950s. More specifically, CalPeak Power has operated five FT8 units in California since 2002, with an average availability of 97% (URS 2006a, AFC §§ 1.1, 3.1, 3.9.2.1, 3.9.2.1.1, 3.11.4, 3.11.5, 3.11.5.1, 3.11.5.2; P&W 2006).

The applicant's prediction of an equivalent availability factor of 95 to 99% (URS 2006a, AFC § 3.11.4) appears reasonable compared to the NERC figure for similar plants throughout North America (see above) and in light of the history of the machines selected. The plant will consist of two parallel gas turbine generating trains, allowing one unit to continue to operate if the other fails. Additionally, each unit can operate on only one engine if the other engine fails. Further reliability is provided by the plant's intended duty. While the plant will be permitted to operate up to 4,000 hours annually (representing a 46% capacity factor), it will likely see much less service. Since the SPP's fuel efficiency will equal that of the nearby CalPeak Panoche plant, SPM expects it will be dispatched similarly by PG&E. The Panoche plant typically sees fewer than 400 hours of operation annually, or a capacity factor of 4.6%. With such infrequent operation, there will be ample opportunity to perform all scheduled maintenance during non-dispatched hours. SPM will also subscribe to Pratt & Whitney's lease engine program; if an engine fails, it can be replaced and the unit returned to service within 72 hours.

The applicant's estimate of plant availability, therefore, appears realistic. The stated procedures for assuring design, procurement and construction of a reliable power plant appear to be in keeping with industry norms, and staff believes they are likely to yield an adequately reliable plant.

NOTEWORTHY PROJECT BENEFITS

The applicant proposes to provide peaking power and quick start capability as dispatched by PG&E during periods of high demand (URS 2006a, AFC §§ 1.1, 1.2.2, 2.3, 3.9.2.1, 3.11.4). The fact that the project consists of two combustion turbine generators configured as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate (at reduced output). In light of this and the additional reliability-enhancing features of the project described above, the applicant's prediction of an equivalent availability factor of 95 to 99% appears achievable. Staff believes this should provide an adequate level of reliability.

CONCLUSION

SPM predicts an equivalent availability factor of 95 to 99%, which staff believes is achievable. Based on a review of the proposal, staff concludes that the plant would be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

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URS 2006a - URS Corporation/ R. Watkins (tn 38405) Application for Certification with Cover Letter for Starwood Power-Midway, LLC Peaking Project. 11/17/2006 Rec'd 1/17/2006

TRANSMISSION SYSTEM ENGINEERING

Testimony of Laiping Ng and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed Starwood Power Project outlet transmission lines and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards. The power plant interconnection to the grid would not require additional new downstream transmission facilities, other than those proposed by the applicant, needing California Environmental Quality Act review.

- The adverse transmission system impacts can be mitigated by installation of special protection systems, operating procedures, disconnect switches, and the replacement of breakers. These upgrades will mitigate the incremental overloads caused by the project, along with all other pre-project overloads caused by generation projects in the generation interconnection queue.
- The interconnecting facilities between the new combustion turbine generators and the Pacific Gas and Electric Panoche Substation, including the step-up transformers and the 115 kV overhead transmission line and terminations, as proposed, are in accordance with good utility practices and are acceptable to staff according to engineering laws, ordinances, regulations, and standards.

INTRODUCTION

STAFF ANALYSIS

This Transmission System Engineering (TSE) analysis examines whether or not the facilities associated with the proposed interconnection conform to all applicable laws, ordinances, regulations, and standards (LORS) required for safe and reliable electric power transmission. Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (Cal Code Regs, tit 14, §15378). Therefore, the Energy Commission must identify the system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are required for interconnection and that represent the "whole of the action."

Energy Commission staff relies on the interconnecting authority, in this case the California Independent System Operator (California ISO), for the analysis of impacts on the transmission grid from the proposed interconnection as well as the identification and approval of new or modified facilities downstream that may be required as mitigation measures. The proposed Starwood Power Project (SPP) would connect to the PG&E transmission network and requires analysis by PG&E and approval of the California ISO.

ROLE OF PACIFIC GAS AND ELECTRIC

PG&E is responsible for ensuring electric system reliability in its system for addition of the proposed transmission modifications and determines both the standards necessary

to achieve reliability and whether the proposed transmission modifications conform to those standards. The California ISO will provide analysis and reports in System Impact and Facilities Studies, and its approval for the facilities and changes required in its system for addition of the proposed transmission modifications.

ROLE OF CALIFORNIA INDEPENDENT SYSTEM OPERATOR

The California ISO is responsible for ensuring electric system reliability for all participating transmission owners and is also responsible for developing the standards necessary to achieve system reliability. The California ISO will determine the reliability impacts of the proposed transmission modifications on the PG&E transmission system in accordance with all applicable reliability criteria. According to the California ISO Tariffs, it will determine the need for transmission additions or upgrades downstream from the interconnection point to insure reliability of the transmission grid. The California ISO will, therefore, perform the System Impact Study (SIS), provide its analysis, conclusions, and recommendations, and issue a preliminary approval or concurrence letter to PG&E. On completion of the Facilities Study (FS), the California ISO will provide its conclusions and recommendations, and issue a final approval/disapproval letter for the interconnection of the proposed generation project. If necessary, the California ISO will provide written and verbal testimony on its findings at the Energy Commission hearings.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission General Order 95, *Rules for Overhead Electric Line Construction*, formulates uniform requirements for construction of overhead transmission lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance, and operation or use of overhead electric lines and to the public in general.
- California Public Utilities Commission General Order 128, *Rules for Construction of Underground Electric Supply and Communications Systems*, formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons engaged in the construction, maintenance, and operation or use of underground electric lines and to the public in general.
- The National Electric Safety Code, 1999, provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.
- The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Corporation (NERC) Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. These standards require the continuity of service to loads as the first priority, and preservation of interconnected operation as a secondary priority. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards alone. These standards provide planning for electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within

equipment and electric system thermal, voltage, and stability limits. These standards include the reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on section I. A. of the standards, entitled *NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table,* and on section I. D., entitled *NERC and WECC Standards for Voltage Support and Reactive Power*. These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal loading, voltage, and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines along a common right of way, and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, its uncontrolled loss is not permitted (WECC 2002).

- NERC Reliability Standards for the Bulk Electric Systems of North America provide national policies, standards, principles, and guidelines to assure the adequacy and security of the electric transmission system. The NERC Reliability Standards provide for system performance levels under normal and contingency conditions. While these reliability standards are similar to NERC/WECC standards, certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards with regard to power flow and stability simulations for transmission system contingency performance. The NERC Reliability Standards apply not only to interconnected system operation but also to individual service areas (NERC 2006).
- California ISO Planning Standards also provide standards and guidelines to assure adequacy, security, and reliability in the planning of the California ISO transmission grid facilities. The California ISO Standards incorporate the NERC/WECC and NERC standards. With regard to power flow and stability simulations, these standards are similar to the NERC/WECC or NERC standards for transmission system contingency performance. However, the California ISO standards also provide some additional requirements that are not found in the NERC/WECC or NERC standards. The California ISO standards apply to all participating transmission owners interconnecting to the grid controlled by California ISO. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent grids not operated by California ISO (California ISO 2002a).
- The California ISO/FERC (Federal Energy Regulatory Commission) Electric Tariff provides guidelines for construction of all transmission additions/upgrades within the grid controlled by California ISO. The California ISO determines the need for the proposed project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the cost responsibility of the proposed project and provides an operational review of all facilities that are to be connected to the California ISO grid (California ISO 2003a).

PROJECT DESCRIPTION

The SPP is a simple-cycle power generating facility that would be located in western Fresno County adjacent to the Panoche Hills and east of the San Benito County line. The SPP would consist of two FT8-3 SwiftPac combustion turbine generator (CTG) units with a nominal output of approximately 120 MW. Each unit would consist of two combustion gas turbines and one electric generator. The two CTG units would each connect to the low side of the three-winding 112/148/188 MVA generator step-up (13.8/115 kV) transformer through a circuit breaker. The high voltage side of the transformer would tap into the existing Calpeak Panoche peaker generator tie-line through a new 115 kV circuit breaker. The 115 kV SPP switchyard would consist of 115 kV circuit breakers, disconnect switches, current transformers, and a generator protective system. Conditions of Certification TSE-5 insure these facilities comply with LORS.

The SPP generator tie-line would be built with 954 kcmil aluminum conductors and would tap into the existing CalPeak Panoche Plant generation tie-line at the Panoche Substation. The new transmission line would be supported by wooden poles and two dead-end, take-off support structures. The proposed structure would be the A-frame type in the SPP switchyard and the other would be the existing structure at the Panoche Substation. The existing 700-foot, 115 kV Calpeak generator tie-line would be reconductored so that it could carry the full generation capacity of both the SPP and Calpeak power plants. The reconductoring of the CalPeak Panoche 115 kV transmission lines would take place within the PG&E Panoche Substation fence line. Power will be distributed to the grid via transmission lines from the Panoche Substation (URS 2006a, section 1.1, 3.6; URS 2007h**,** section 3).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility (PG&E in this case) and the control area operator (California ISO) are responsible for ensuring grid reliability. These entities determine the transmission system impacts of the proposed project, and any mitigation measures needed to ensure system conformance with performance levels required by utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. A System Impact Study and a Facilities Study are used to determine the impacts of the proposed project on the transmission grid. Staff relies on these studies and any review conducted by the California ISO to determine the project's effect on the transmission grid and to identify any necessary downstream facilities or indirect project impacts required to bring the transmission network into compliance with applicable reliability standards.

The SIS and FS analyze the grid with and without the proposed project under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds through which grid reliability is determined. The studies must analyze the impact of the project for the first year of operation and thus are based on a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnecting utility and the

California ISO. Generation and transmission forecasts are established by an interconnection queue. The studies are focused on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads, or cascading outages), and short circuit duties.

If the System Impact Study and Facilities Study show that the interconnection of the project causes the grid to be out of compliance with reliability standards, then the studies will identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. When a project connects to the grid controlled by California ISO, both the studies and mitigation alternatives must be reviewed and approved by the California ISO. If the mitigation identified by California ISO or interconnecting utility includes transmission modifications or additions that require CEQA review as part of the "whole of the action," the Energy Commission must analyze the environmental impacts of these modifications or additions.

CALIFORNIA INDEPENDENT SYSTEM OPERATOR STUDY

The California ISO has performed the SIS and proposed mitigation measures and granted the preliminary interconnection approval to the interconnection of the SPP project.

SYSTEM IMPACT STUDY

The System Impact Study was performed by California ISO at the request of Starwood Power-Midway, LLC, to identify the transmission system impacts caused by the SPP project on PG&E transmission system. The SIS included Power Flow analyses, Short Circuit Duty analyses, Dynamic Stability analyses, Reactive Power Deficiency analysis, an analysis of system protection requirements, and substation evaluations (URS 2007h, section 1). The study modeled the SPP for a net output of 120 MW. The base cases included all planned generating facilities in PG&E's service territory, the Sacramento Municipal Utility District, the Turlock Irrigation District, and Silicon Valley Power whose on-line schedules are concurrent with or precede the SPP project. The detailed study assumptions have been described in the SIS. The Power Flow analyses were conducted with and without the SPP connected to the PG&E grid at the Panoche Substation using full loop-base cases modeling projected 2009 summer peak, summer off-peak, and spring peak conditions. The Power Flow analyses assessed the project's impact on thermal loading of the transmission lines and equipment. Dynamic Stability analyses were conducted with the SPP using projected 2009 summer peak base cases to determine whether the SPP would create instability in the system following certain selected outages. Short Circuit Duty analyses were conducted with and without the SPP to determine if the SPP would result in overstressing existing substation facilities. A Reactive Power Deficiency analysis was conducted to study the transmission line voltage drops cause by selected outages.

Power Flow Study Results and Mitigation Measures

The SIS identified pre-existing overloads in the transmission system, and determined that the addition of the SPP will exacerbate the overloads. The overloading problems affect transmission line facilities under normal conditions, single-contingency (N-1) conditions, and double-contingency (N-2) conditions (see **Definition of Terms** below). The SIS identified required mitigations for the connection of and power delivery from the

SPP to PG&E's transmission system. The proposed mitigation measures for the post-project conditions involve installation of special protection systems and mitigations, for which the respective project owner/applicant is responsible if it is ahead of the SPP in the California ISO's generation interconnection queue and/or has an earlier on-line date (URS 2007h, section 12).

The following mitigation measures are the responsibility of projects that are ahead of SPP in the California ISO's generation interconnection queue. Should these projects not materialize, SPP may become responsible for the upgrades.

- Borden – Gregg 230 kV line: This line is overloaded under normal, N-1, and N-2 contingency conditions before the addition of the SPP. The SPP increases the forecasted overload by 1%.
    - Mitigation: The mitigation of these overloads is the responsibility of generation projects P0418, P0429, P0435, and P0507[1] because these projects are ahead of SPP in the California ISO's generation interconnection queue and/or have earlier on-line dates.
- Oro Loma – Canal #1 70 kV (Oro Loma – Dos Palos) line: This line is overloaded under N-1 contingency conditions before the addition of the SPP. The addition of the SPP increases the forecasted overload by 2%.
    - Mitigation: The mitigation of this overload is the responsibility of generation projects P0418, P0429, P0435, and P0507 because these projects are ahead of SPP in the California ISO's generation interconnection queue and/or have earlier on-line dates.
- Wilson – Gregg 230 kV (Story 1 – Gregg) line: This line is overloaded under N-1 contingency conditions before the addition of the SPP. The addition of the SPP increases the forecasted overload 1%.
    - Mitigation: The mitigation of this overload is the responsibility of generation projects P0418, P0429, P0435, and P0507 because these projects are ahead of SPP in the California ISO's generation interconnection queue and/or have earlier on-line dates.
- Helm – Kerman 70 kV (Agrico – Kerman) line: This line is overloaded under N-1 and N-2 contingency conditions before the addition of the SPP. The addition of the SPP increases the forecasted overload 1 to 2%.
    - Mitigation: The mitigation of these overloads is the responsibility of generation projects P0418, P0429, P0435, and P0507 because these projects are ahead of SPP in the California ISO's generation interconnection queue and/or have earlier on-line dates.

The following N-2 overloads would be mitigated by operating procedures and/or installation of special protection systems.

- Panoche – Oro Loma 115 kV (Panoche JCT – Hammonds) line: The addition of the SPP causes this line to overload under N-2 contingency conditions.

[1] The project identification numbers refer to projects in the California ISO generator interconnection queue, which can be found on the California ISO website.

- Mitigation: The 6% N-2 line overload would be mitigated by installation of a special protection system.

- Coppermine – Tivy Valley 70 kV line: This line is overloaded under N-2 contingency conditions before the addition of the SPP. The addition of the SPP increases the forecasted overload by 1%.
  - Mitigation: The overload would be mitigated by operating procedures and/or installation of a special protection system.
- Tivy Valley – Reedley 70 kV line: This line is overloaded under N-2 contingency conditions before the addition of the SPP. The addition of the SPP increases the forecasted overload by 1%.
  - Mitigation: The overload would be mitigated by operating procedures and/or installation of a special protection system.
- Wilson – Le Grand 115 kV line: This line is overloaded under N-2 contingency conditions before the addition of the SPP. The addition of the SPP increases the forecasted overload by 5%.
  - Mitigation: The overload would be mitigated by operating procedures and/or installation of a special protection system.
- Herndon – Ashlan 230 kV line: This line is overloaded under N-2 contingency conditions before the addition of the SPP. The addition of the SPP increases the forecasted overload by 2%.
  - Mitigation: The overload would be mitigated by operating procedures and/or installation of a special protection system.
- Le Grand – Dairyland 115 kV line: This line is overloaded under N-2 contingency conditions before the addition of the SPP. The addition of the SPP increases the forecasted overload by 8%.
  - Mitigation: The overload would be mitigated by operating procedures and/or installation of a special protection system.
- Wilson – Oro Loma 115 kV (Le Grand Jct - Wilson) line: This line is overloaded under N-2 contingency conditions before the addition of the SPP. The addition of the SPP increases the forecasted overload by 7%.
  - Mitigation: The overload would be mitigated by operating procedures and/or installation of a special protection system.

Dynamic Stability Study Results and Mitigation Measures

Dynamic Stability studies for SPP were conducted using projected 2009 summer peak full-loop base case to determine if the SPP would create any adverse impact on the stable operation of the transmission grid following selected N-1 and N-2 outages (URS 2007h, section 9). The results indicate there are no adverse impacts on the stable operation of the transmission system following the selected disturbances, as outlined in the SIS for integration of the SPP (URS 2007h, Section 9).

Short Circuit Study Results and Mitigation Measures

Short Circuit studies were performed to determine the degree to which the addition of the SPP increases fault duties at PG&E's substations, adjacent utility substations, and the other 115 kV and 230 kV busses within the study area. The busses at which faults were simulated, the maximum three-phase and single line-to-ground fault currents at these busses, both without and with the SPP, and information on the breaker duties at each location are summarized in the System Impact Study. The Short Circuit study indicates that the addition of the SPP would increase the fault currents of the three circuit breakers at the Panoche Substation. The mitigation would require a replacement of one 115 kV (circuit breaker 112) and two 230 kV circuit breakers (circuit breakers 222 and 322) within the fenced Panoche Substation. Generation project P0406, with a superior generation queue position and earlier on-line date, is responsible for upgrading these breakers. Should project P0406 not materialize, SPP would be responsible for replacing these breakers. The remaining breakers of the substations are adequate enough to withstand the post-project incremental fault currents identified in the Short Circuit study (URS 2007h, section 11, 12.4).

CUMULATIVE IMPACTS

The TSE analysis focuses on whether or not a proposed project will meet required codes and standards. At all times the transmission grid must remain in compliance with reliability standards, whether one project or many projects interconnect. Potential cumulative impacts on the transmission network are identified through the California ISO and utility generator interconnection process. This process analyzes not only the impacts of the proposed project but also all other projects ahead of the studied project in the generation interconnection queue. In cases where a significant number of proposed generation projects could affect a particular portion of the transmission grid, the interconnecting utility or the California ISO can study the cluster of projects in order to identify the most efficient means to interconnect all the proposed projects. It is apparent from the System Impact Study results that impacts of other projects in the generation queue require mitigation and that the interconnection of the SPP does not require significant mitigation beyond that needed for other projects.

COMPLIANCE WITH LORS

The System Impact Study indicates that the project interconnection would comply with NERC/WECC planning standards and California ISO reliability criteria. The applicant will design, build, and operate the proposed 115 kV overhead transmission line. The proposed modifications to the Panoche Substation would be done by PG&E. Staff concludes that with implementation of the proposed conditions of certification, the project will meet all applicable LORS.

CONCLUSIONS AND RECOMMENDATIONS

The proposed SPP outlet transmission lines and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards. The SPP

interconnection to the grid would not require additional new downstream transmission facilities other than those proposed by the applicant.

- The adverse transmission system impacts can be mitigated by installation of special protection systems, operating procedures, and disconnect switches, and the replacement of breakers. These upgrades will mitigate the incremental overloads caused by the SPP, along with all other pre-project overloads caused by projects in the generation interconnection queue.
- The interconnecting facilities between the new combustion turbine generators and the Panoche Substation, including the step-up transformers and the 115 kV overhead transmission line and terminations, as proposed, are in accordance with good utility practices and are acceptable to staff according to engineering LORS.

PROPOSED CONDITIONS OF CERTIFICATION

TSE-1 The project owner shall furnish to the Compliance Project Manager (CPM) and to the Chief Building Official (CBO) a schedule of transmission facility design submittals, a master drawing list, a master specifications list, and a major equipment and structure list. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction, the project owner shall submit the schedule, a master drawing list, and a master specifications list to the CBO and the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Transmission System Engineering Table 1** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

TRANSMISSION SYSTEM ENGINEERING Table 1
Major Equipment List

Breakers
Step-up Transformer
Switchyard
Busses
Surge Arrestors
Disconnects
Take off facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Grounding System

TSE-2 Prior to the start of construction the project owner shall assign an electrical engineer and at least one of each of the following to the project:

- a civil engineer;
- a geotechnical engineer, or a civil engineer experienced and knowledgeable in the practice of soils engineering;
- a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; and
- a mechanical engineer.

Business and Professions Code, sections 6704 et seq. require state registration to practice as a civil engineer or structural engineer in California.

The tasks performed by the civil, mechanical, and electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical, or civil and design engineer assigned in conformance with **Facility Design** Condition of Certification **GEN-5**, may be responsible for design and review of the TSE (Transmission System Engineering) facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. be responsible for the electrical design of the power plant switchyard, outlet, and termination facilities; and

2. sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner

shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action (pursuant to 2001 California Building Code, chapter 1, section 108.4; chapter 17, section 1701.3; appendix chapter 33, section 3317.7). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action required to obtain the CBO's approval.

TSE-4 For the power plant switchyard, outlet line, and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable laws, ordinances, regulations, and standards (LORS). The following activities shall be reported in the monthly compliance report:

- receipt or delay of major electrical equipment;
- testing or energizing of major electrical equipment; and
- the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications, and calculations for equipment and systems of the power plant switchyard, outlet line, and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

TSE-5 The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS, including the requirements listed below. The project owner shall submit the

required number of copies of the design drawings and calculations as determined by the CBO.

1. The existing Panoche Substation will require upgrades and rearrangement to accommodate the addition of the SPP.
   a. Install a tap interconnection at the CalPeak Panoche generator tie-line.
   b. Reconductor the CalPeak Panoche generator tie-line between CB 142 at CalPeak Panoche and CB 162 at Panoche Substation with 954 kcmil aluminum conductor or conductor with a higher rating.
   c. Rearrange or rebuild the Panoche-Shindler 115 kV Number 1 and Number 2 lines to accommodate crossing of the new tap line.
   d. Protection requirements will consist of a fully redundant, three-terminal, double-pilot current differential scheme.
2. The SPP will be interconnected to the Panoche Substation via a single 115 kV transmission line approximately 1000 feet long with 954 kcmil aluminum conductor or conductor with a higher rating.
3. The power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of California Public Utilities Commission General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code of Regulations; articles 35, 36 and 37 of the High-Voltage Electric Safety Orders; California ISO Standards; National Electric Code (NEC); and related industry standards.
4. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.
5. Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.
6. The project conductors shall be sized to accommodate the full output from the project.
7. Termination facilities shall comply with applicable PG&E interconnection standards.
8. The project owner shall provide to the CPM:
   a. The final Detailed Facility Study including a description of facility upgrades, operational mitigation measures, and/or special protection system sequencing and timing, if applicable.
   b. Executed project owner and California ISO facility interconnection agreement.

9. A request for minor changes to the facilities described in this condition may be allowed if the project owner informs the CBO and CPM and receives approval for the proposed change. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

Verification: At least 60 days prior to the start of construction of transmission facilities (or a lesser number of days mutually agreed to by the project owner and CBO), the project owner shall submit the following to the CBO for approval.

1. The project owner shall submit design drawings, specifications and calculations conforming with California Public Utilities Commission General Order 95 or National Electric Safety Code; Title 8 of the California Code of Regulations; articles 35, 36, and 37 of the High Voltage Electric Safety Orders; California ISO standards; National Electric Code; and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems, and major switchyard equipment.

2. For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on worst-case conditions,[2] and a statement signed and sealed by the registered engineer in charge, or other acceptable alternative verification, that the transmission element(s) will conform with California Public Utilities Commission General Order 95 or National Electric Safety Code; Title 8 of the California Code of Regulations, articles 35, 36, and 37 of the High-Voltage Electric Safety Orders; California ISO standards; National Electric Code and related industry standards.

3. The project owner shall submit electrical one-line diagrams signed and sealed by the registered professional electrical engineer in charge, a route map, an engineering description of equipment, and the configurations covered by requirements 1 through 9 in Condition Of Certification **TSE-5** above.

4. The final Detailed Facility Study, including a description of facility upgrades, operational mitigation measures, and/or special protective system sequencing and timing, if applicable, shall be provided concurrently to the CPM.

5. At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes that may not conform to the facilities described in this condition, and shall request approval to implement such changes.

[2] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

TSE-6 The project owner shall provide the following notice to the California ISO prior to synchronizing the facility with the California transmission system.

1. At least one week prior to synchronizing the facility with the grid for testing, the project owner shall provide the California ISO with a letter stating the proposed date of synchronization.

2. At least one business day prior to synchronizing the facility with the grid for testing, the project owner shall provide telephone notification to the California ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. The project owner shall contact the California ISO Outage Coordination Department, Monday through Friday, between the hours of 7:00 a.m. and 3:30 p.m. at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

TSE-7 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM- and CBO-approved changes thereto, to ensure conformance with California Public Utilities Commission General Order 95 or National Electric Safety Code, Title 8 of the California Code of Regulations, articles 35, 36, and 37 of the High Voltage Electric Safety Orders, California ISO standards, National Electric Code and related industry standards. In case of nonconformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such nonconformance, and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

1. "As built" engineering description(s) and one-line drawings of the electrical portion of the transmission facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with California Public Utilities Commission General Order 95 or National Electric Safety Code; Title 8 of the California Code of Regulations; articles 35, 36, and 37 of the High Voltage Electric Safety Orders; California ISO Standards; National Electric Code Standards; and related industry standards;

2. an "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in charge or acceptable alternative verification. "As built" drawings of the electrical, mechanical, structural, and civil portions of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the compliance monitoring plan"; and

3. a summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

REFERENCES

California ISO (Independent System Operator). 1998a. California ISO Tariff Scheduling Protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

California ISO (Independent System Operator). 1998b. California ISO Dispatch Protocol posted April 1998.

California ISO (Independent System Operator). 2002a. California ISO Grid Planning Standards, February 2002.

California ISO (Independent System Operator). 2003a. California ISO, FERC Electric Tariff, First Replacement Vol. No. 1, March 11, 2003.

NERC (North American Electric Reliability Council). 2006. Reliability Standards for the Bulk Electric Systems of North America, May 2 2006.

URS 2006a – URS Corporation/ R. Watkins (tn 38405) Application for Certification with Cover Letter for Starwood Power-Midway, LLC Peaking Project. 11/17/2006 Rec'd 1/17/2006.

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DEFINITION OF TERMS

AAC	All aluminum conductor.
ACSR	Aluminum conductor steel-reinforced.
ACSS	Aluminum conductor steel-supported.
Ampacity	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
Ampere	The unit of current flowing in a conductor.
Bundled	Two wires, 18 inches apart.
Bus	Conductors that serve as a common connection for two or more circuits.
Conductor	The part of the transmission line (the wire) that carries the current.
Congestion management	A scheduling protocol, which provides that dispatched generation and transmission loading (imports) will not violate criteria.

Double–contingency condition
: Also known as emergency or N-2 condition, a forced outage of two system elements usually (but not exclusively) caused by one single event. Examples of an N-2 contingency include loss of two transmission circuits on a single tower line or loss of two elements connected by a common circuit breaker due to the failure of that common breaker.

Emergency overload
: See single–contingency condition. This is also called an N-1 condition.

kcmil
: One-thousand circular mil. A unit of the conductor's cross-sectional area divided by 1,273 to obtain the area in square inches.

Kilovolt (kV)
: A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.

Loop
: An electrical cul-de-sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection, and returns it back to the interrupted circuit, thus forming a loop or cul-de-sac.

Megavar
: One megavolt ampere reactive.

Megavars
: Mega-volt-ampere-reactive. One million volt-ampere-reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.

Megavolt ampere (MVA)
: A unit of apparent power equal to the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000.

Megawatt (MW)
: A unit of power equivalent to 1,341 horsepower.

N-0 condition
: See normal operation/normal overload.

Normal operation/normal overload (N-0)
: When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.

N-1 condition
: See single–contingency condition.

N-2 condition
: See double–contingency condition.

Outlet
: Transmission facilities (e.g., circuit, transformer, circuit breaker) linking generation facilities to the main grid.

Power flow analysis
: A power flow analysis is a forward-looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers, and other equipment and system voltage levels.

Reactive power
: Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.

Remedial action scheme (RAS)
: A remedial action scheme is an automatic control provision, which, for instance, will trip a selected generating unit upon a circuit overload.

SF6
: Sulfur hexafluoride is an insulating medium.

Single–contingency condition
: Also known as emergency or N-1 condition, occurs when one major transmission element (e.g., circuit, transformer, circuit breaker) or one generator is out of service.

Solid dielectric cable
: Copper or aluminum conductors that are insulated by solid polyethylene-type insulation and covered by a metallic shield and outer polyethylene jacket.

Special protection scheme/system (SPS)
: An SPS detects a transmission outage (either a single or credible multiple contingency) or an overloaded transmission facility and then trips or runs back generation output to avoid potential overloaded facilities or other criteria violations.

Switchyard
: A power plant switchyard is an integral part of a power plant and is used as an outlet for one or more electric generators.

Thermal rating
: See ampacity.

TSE
: Transmission System Engineering.

Tap
: A transmission configuration creating an interconnection through a sort single circuit to a small- or medium-sized load or generator. The new single circuit line is inserted into an existing circuit by using breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.

Undercrossing
: A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild
: A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

ALTERNATIVES

Testimony of Dr. James W. Reede, Jr., Ed.D and Che McFarlin

PURPOSE OF THE ALTERNATIVES ANALYSIS

The California Environmental Quality Act (CEQA) allows a state agency, such as the California Energy Commission, to utilize its own "regulatory program" review process in lieu of the "environmental impact report" (EIR) review process specified in CEQA. However, to do so the agency's regulatory program must be "certified" by the Secretary of the Resources Agency (Public Resources Code §21080.5). The Energy Commission's Power Plant Siting Regulatory Program is such a "certified regulatory program" under CEQA.

With regard to the "Alternatives" analysis required in a certified siting proceeding such as the Starwood Power Project (SPP) application, the CEQA Guidelines (California Code of Regulations, Title 14, §15252) state that:

"The document used as a substitute for an EIR or negative declaration in a certified program shall include at least the following items:

Either:

1. Alternatives to the activity and mitigation measures to avoid or reduce any significant or potentially significant effects that the project might have on the environment, or

2. A statement that the agency's review of the project showed that the project would not have any significant or potentially significant effects on the environment and therefore no alternatives or mitigation measures are proposed to avoid or reduce any significant effects on the environment. This statement shall be supported by a checklist or other documentation to show the possible effects that the agency examined in reaching this conclusion."

The Energy Commission's Siting Regulations (Cal. Code Regs., tit. 20, Section 1765) require that:

"At the hearings . . . on an application exempt from the [Notice Of Intent] requirements pursuant to Public Resources Code section 25540.6, the parties shall present information on 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. . . ."

In light of these provisions, staff presents information in this section on the "feasibility of available site and facility alternatives to the applicant's proposal that substantially lessen the significant adverse impacts of the proposal on the environment" (Cal. Code Regs., tit. 20, §1765). Staff also analyzes whether there are any feasible alternative designs or alternative technologies, including the "no project alternative," that may be capable of reducing or avoiding any potential impacts of the proposed project while achieving its major objectives.

SCOPE AND METHOD FOR THIS ALTERNATIVE ANALYSIS

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 "no project" alternative. (Cal. Code Regs., tit. 14, §15126(d).)

The range of alternatives is governed by the "rule 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 of which the effect cannot be reasonably ascertained and of which the implementation is remote and speculative. (Cal. Code Regs., tit. 14, §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.)

To prepare this alternatives analysis, the staff used the methodology summarized below:

- Identify the basic objectives and potential significant impacts of the project.
- Determine whether there are any feasible *site alternatives* for analysis by evaluating the extent to which most of the project objectives can be achieved at alternative sites and the degree to which any significant impacts of the project would be substantially lessened at such alternative sites.
- Identify and evaluate *facility design and related facilities alternatives* to the project as proposed.
- Identify and evaluate *technical alternatives* to the project. The principle project alternatives examined that do not require the construction of a natural gas-fired facility are increased energy efficiency (or demand side management) and the construction of alternative technologies (e.g. wind, solar, or geothermal).
- Evaluate the feasibility and impacts of not constructing the project (the "*no project*" *alternative*).

STAFF'S ALTERNATIVES ANALYSIS

Staff's alternatives analysis begins by identifying the basic objectives of the project, describing the project and project setting, and listing potential significant impacts from the project as currently proposed. The analysis then turns to a consideration of various alternatives to the proposed Starwood Power Project (SPP).

BASIC OBJECTIVES OF THE PROJECT

After studying the Applicant's Application for Certification (AFC), Energy Commission staff has determined the SPP project's objectives to be:

- Development of a project to meet the contractual terms of the Pacific Gas & Electric, Power Purchase agreement.
- Meet various vendor requirements necessary for power generation and environment control equipment guarantees.
- A project that could obtain all required permits due to a lack of significant adverse environmental impacts.
- A site that is located near an existing substation and transmission line.
- A project that will provide a fair return on the project investment.
- A project that will be sufficiently attractive to the investment community so that the required construction funds can be obtained at reasonable rates.

PROJECT DESCRIPTION AND SETTING

The project area is located in an unincorporated area of western Fresno County, adjacent to the Panoche Hills. The site is approximately 15 miles southwest of the city of Mendota, 16 miles south-southwest of the city of Firebaugh and approximately 2 miles east of Interstate 5, adjacent to the Pacific Gas & Electric (PG&E) existing Panoche Substation. The proposed site and substation are located south of West Panoche Road. The site is more specifically described as the Southwest Quarter of Section 5, Township 15 South, Range 13 East, on the United States Geological Survey (USGS) Quadrangle map. The assessor's parcel number (APN) is 027-060-78S.

A more complete description of the project and its setting is in the **Project Description** section of this Preliminary Staff Assessment (PSA). See **Project Description Figure 2** for a map of the project location and related facilities. **Project Description Figure 3** shows the general arrangement and layout of the proposed facility. **Project Description Figure 4** is an architectural rendering of the proposed SPP.

POWER PLANT EQUIPMENT AND LINEAR FACILITIES

The proposed SPP would be a simple-cycle power plant with a nominal electrical output of 120 MW, consisting of two Pratt & Whitney FT8-3 SwiftPac natural gas-fired combustion turbine generators. Auxiliary equipment would include inlet air foggers with evaporative coolers, a step-up transformer, a compressed-air system, control enclosures, an aqueous ammonia storage tank, a natural gas fuel system, a water treatment system, water storage tanks, a wastewater system, a site stormwater drainage system, and a lined evaporation pond.

ELECTRIC TRANSMISSION

The SPP would connect to PG&E's electrical transmission system via the tie-line that currently connects the CalPeak Panoche plant to the adjacent PG&E Panoche Substation. To accomplish this a new 300-foot, 115--kV generator tap line would originate from a new step-up transformer near the western perimeter of the SPP site, exit from the northwest edge of the site, and travel west into the existing CalPeak Panoche tie-line to the Panoche Substation. The tie-line connecting the existing

CalPeak Panoche Plant to PG&E's system is already sized to carry the output of the proposed SPP.

Although the SPP would be interconnected to the CalPeak Panoche transmission system, each project would utilize independent breakers for isolation from the PG&E system. Neither the SPP or Calpeak Panoche plants would be dependent on the other for its transmission interconnection (URS 2006a, p 3-31). No new transmission facilities would be necessary beyond the switchyard.

NATURAL GAS SUPPLY

Natural gas would be delivered to the SPP from connection to the existing Calpeak Panoche plants' gas supply which is connected to the existing PG&E trunk line running along West Panoche Road north of the project site. PG&E would tap the 6-inch natural gas service line serving the CalPeak plant approximately 25 feet upstream of the existing meter set and connect it with 200 feet of new 6-inch steel pipeline to a new turbine meter set adjacent to the existing meter set. From the new meter 600 feet of 6 inch steel pipeline would be constructed along the western perimeter of the SPP site to complete the connection from the meter set to the SPP (URS 2006a, pp 3-5 & 3-37; CEC 2007z1).

WATER SUPPLY

Peak water usage associated with the SP project would be 98 gallons per minute (gpm) (URS 2006a, p 5-5.9) of demineralized water for NOx control and 40 gpm for inlet fogging. On an annual basis, the proposed SPP is anticipated to consume approximately 14 acre-feet per year, presuming 400 hours of operation. Annual water consumption could be as high as 136 acre-feet per year if the SPP operated at the permitted maximum of 4,000 hours per year. Water would be delivered to the site from a connection to the adjacent and existing CalPeak plant well (URS 2006a, pp 3-14 and 5.5-9).

WASTEWATER DISCHARGE

The SPP facility is expected to generate process wastewater at an average rate of 25 gpm. Process and industrial wastewater discharge from the proposed SPP would consist of nonhazardous reject water that would range from 3.4 acre-feet per year based on 400 hours of operation, to approximately 34 acre-feet per year based on 4,000 hours of operation. The wastewater discharge would be sent to an evaporation pond on the east side of the site via a 4-inch PVC gravity pipe. The evaporation pond would be a 25,000-square-foot surface impoundment with a polyethylene liner. Following drying in the evaporation pond, the solids would be tested and removed to a local landfill (URS 2006a, pp 5.5-12 to 5.5-14).

ALTERNATIVES TO THE PROJECT

SITE ALTERNATIVES

Consistent with the CEQA Guidelines, the scope of staff's consideration of alternative sites was guided by consideration of whether most project objectives could be accomplished at alternative sites, and whether locating the project at an alternative site

would substantially lessen any identified significant impacts of the project (Cal. Code Regs., tit. 14 §15126.6(a)). These alternatives were developed in response to information received from the applicant, Energy Commission's staff and from other agencies.

Staff selected four sites to be reviewed as alternatives, two identified by the applicant for the proposed adjacent Panoche project and two selected by staff based on prior knowledge of the area. Of these four alternative sites, three are near or adjacent to the PG&E Los Banos Control Station, and one is adjacent to the PG&E Gates Substation. All were environmentally inferior to the proposed due to potential significant impacts to Endangered Species Act listed species. The three Los Banos sites are all identified as San Joaquin Kit Fox primary habitat versus foraging areas at the proposed SPP site and Gates Substation. These Los Banos sites also support other endangered species (see **Alternatives Table 1** below) and listed populations of burrowing owls, Tule elk, kangaroo rats, and golden eagles. As shown in **Alternatives Table 1** below, the biological environmental impacts at the alternative sites were more significant.

ALTERNATIVES Table 1
Comparison of the Alternative Sites

Sites	Starwood Power Project	Los Banos-1	Los Banos-2	Los Banos-3	Gates
Size (1)	5.6 Acres	306 Acres	150 Acres	300 Acres	82.64 Acres
Zoning	Exclusive Agriculture (AE-20)	Exclusive Agriculture (A-2)	Exclusive Agriculture (A-2)	Exclusive Agriculture (A-2)	Exclusive Agriculture (AE-20)
California Department of Conservation Farmland Designation	Prime Farmland	Grazing Land	Grazing Land	Grazing Land	Prime Farmland
Current Use	Agriculture	Open space and agricultural use adjacent to substation fence line.	Wind Farm, agricultural use adjacent to substation fence line	Wind Farm, agricultural use adjacent to substation fence line	Agriculture
Impacts	Less than Significant	Less than Significant	Less than Significant	Less than Significant	Less than Significant
Biological Resources	San Joaquin Kit Fox Foraging Area	Primary Habitat for: San Joaquin Kit Fox Burrowing Owls Tule Elk Kangaroo Rat Golden Eagles	Primary Habitat for: San Joaquin Kit Fox Burrowing Owls Tule Elk Kangaroo Rat Golden Eagles	Primary Habitat for: San Joaquin Kit Fox Burrowing Owls Tule Elk Kangaroo Rat Golden Eagles	San Joaquin Kit Fox Foraging Area
Impacts	Significant	Significant	Significant	Significant	Significant
Water Resources	Low quality wellwater	Non-potable available	Non-potable available	Non-potable available	Non-potable available
Impacts	Significant	Less than Significant	Less than Significant	Less than Significant	Less than Significant

(1) The project would require permanent use of 5.6 acres.
(2) The California Department of Conservation (DOC) classifies crop and grazing lands on Important Farmland Inventory maps for each county with agricultural activity

In addition to the alternative sites shown in **Alternatives Table 1**, staff also investigated the possibility of locating the proposed project adjacent to the 230 kilovolt line that runs from the Gates Substation to the Los Banos Control Center. Staff discovered during

interviews of the Los Banos Control Station Supervisor and Operating Engineer on June 6, 2007, that PG&E requires a plant of that size to either tie-in to a substation bus or reconductor the line to handle the power. In addition, staff determined that placing the proposed project adjacent to the 230 kV power line at any alternative site would require reconducturing of between 40 and 80 miles of transmission lines causing additional significant impacts. Under these circumstances, staff has applied the "rule of reason" and decided that it need not perform a detailed analysis of additional alternative sites such as those that may exist along the Los Banos-Gates 230kV Line.

Meeting Major Objectives of the Project

One of the basic objectives of this project are to provide economically competitive electricity in Northern California while minimizing impacts and costs by making use of related infrastructure to the extent feasible. The project as proposed in the AFC would make use of an adjacent substation switchyard to connect to the transmission grid.

Based on this analysis, staff has determined that the proposed project makes substantial use of existing infrastructure. A "stand-alone" simple cycle power plant at an alternative site that makes no use of the infrastructure at the proposed site is possible. However, this alternative would not achieve the major objectives of avoiding or reducing significant impacts and the minimizing project costs and by using existing on-site infrastructure to the extent feasible.

Staff also analyzed the feasibility of a combined-cycle plant as an alternative to the proposed simple-cycle plant. A combined-cycle plant would require construction of additional cooling tower cells, greatly increasing water consumption, additional transmission line and equipment upgrades, and expansion of the existing site with increased environmental impacts. While a combined-cycle more efficiently uses natural gas, this alternative would also not achieve the major objectives of avoiding additional significant impacts and installation of peaking capabilities.

Reducing Significant Environmental Impacts

Staff's review of the proposed project has identified the permanent loss of foraging habitat for the San Joaquin kit fox, a federally endangered and California threatened species, as a potentially significant impact. Staff's assessment has not identified an alternative site that would substantially lessen this impact.

"Site" Alternatives Conclusion

Staff found that while developing a similar project at an alternative site is possible, it would not substantially lessen the potentially significant impact, and concluded that none were superior to the proposed site. Staff also considered a combined-cycle configuration and determined that it would not meet the major project objectives. Based on these factors, staff has applied the "rule of reason" and determined that a more detailed analysis of these alternative sites is not necessary.

GENERATION TECHNOLOGY ALTERNATIVES

One alternative to meeting California's electricity demand with new generation is to reduce that demand for electricity. Such "demand side" measures include programs that

increase energy efficiency, reduce electricity use, or shift electricity use away from "peak" hours of demand[1].

In California there is a considerable array of demand side programs. At the federal level, the Department of Energy adopts national standards for appliance efficiency and building standards to reduce the use of energy in federal buildings and at military bases.

At the state level, the Energy Commission adopts comprehensive energy efficiency standards for most buildings, appliance standards for specific items not subject to federal appliance standards, and load management standards. The Energy Commission also provides grants for energy efficiency development through the Public Interest Energy Research (PIER) program. The California Public Utilities Commission, along with the Energy Commission, oversees investor-owned utility demand side management programs financed by the utilities and its ratepayers.

At the local level, many municipal utilities administer demand side management and energy conservation programs. These include subsidies for the replacement of older appliances through rebates, building weatherization programs, and peak load management programs. In addition, several local governments have adopted building standards which exceed the state standards for building efficiency, or have by ordinance set retrofit energy efficiency requirements for older buildings.

Even with this great variety of federal, state, and local demand side management programs, the state's electricity use is still increasing as a result of population growth and business expansion. Current demand side programs are not sufficient to satisfy future electricity needs, nor is it likely that even much more aggressive demand side programs could accomplish this at the economic and population growth rates of the last ten years.

Therefore, although it is likely that federal, state, and local demand side programs will receive even greater emphasis in the future, both new generation and new transmission facilities will be needed in the immediate future and beyond in order to maintain adequate supplies.

Staff compared various alternative technologies with the proposed project, scaled to meet the project's objectives. Technologies examined were those principal electricity generation technologies which do not burn fossil fuels such as natural gas, solar, wind, and biomass[2]. Both solar and wind generation can be credited with an absence or reduction in air pollutant emissions and need for related controls, and visible plumes. In the case of biomass, however, emissions can be substantially greater. In addition, the water consumption for both wind and solar generation are substantially less than for a natural gas fired plant because there is no thermal cooling requirement.

[1] Although Public Resources Code Section 25305 provides that demand side alternatives are not to be considered as project alternatives for power plant siting cases, air districts are required to consider alternatives generally prior to issuing Prevention of Serious Deterioration (PSD) permits pursuant to the Federal Clean Air Act. Air districts normally rely on the Energy Commission to perform the alternatives analysis for siting cases; these analyses are then relied on for the issuance of the PSD permit. For this reason, Commission staff includes this analysis in its environmental documents for consideration by the air districts.

[2] There are no geothermal or hydroelectric resources in this western section of the southern San Joaquin Valley (California Geological Data Map Series #4 (1980); CDWR, California Water Plan Update: Bulletin 160-98, Vol.2, pp. 8-43-54.

Solar Generation

Solar resources would require large land areas in order to generate 120 MW of electricity. Specifically, assuming location in an area receiving maximum solar exposure (such as desert areas in Southern California), central receiver solar thermal projects require approximately 5-7 acres per MW, and 120 MW would require approximately 600-840 acres.

Although solar facilities significantly reduce or eliminate air emissions, they can have significant visual effects, such as visible plumes. Water consumption for solar generation is substantially less than for a natural gas-fired plant because there is a reduced thermal cooling requirement.

Like all technologies generating power for sale into the state's power grid, solar thermal facilities generation require near access to transmission lines. Large solar thermal plants are optimally located in desert areas; in these remote areas transmission availability is limited. Additionally, solar energy technologies cannot provide full-time availability due to the natural intermittent availability of sunlight. Therefore, solar energy technologies are considered to be infeasible for the project location and needs.

Wind Generation

Modern wind turbines represent viable alternatives to large bulk power fossil power plants as well as small-scale distributed systems. The range of capacity for an individual wind turbine today ranges from 400 watts up to 3.6 MW.

Although air emissions are significantly reduced or eliminated for wind facilities, such turbines can have significant visual effects. Wind turbines also cause bird mortality (especially for raptors) resulting from collision with rotating blades.

Wind resources would require large land areas in order to generate 120 MW of electricity. Depending on the size of the wind turbines, wind generation "farms" generally require large tracts of land—between 5-17 acres to generate one megawatt resulting in between 600 to 2,040 acres required to generate 120 MW. This land requirement is significantly more than the amount of land that will be used by the proposed project. With these characteristics, wind energy generation is not feasible in this location.

Biomass Generation

Biomass generation uses a waste vegetation fuel source such as wood chips (the preferred source) or agricultural waste. The fuel is burned to generate steam. Biomass facilities generate substantially greater quantities of air pollutant emissions than natural gas burning facilities. In addition, biomass plants are typically sized to generate less than 25 MW, which is substantially less than the capacity of the 120 MW SPP project. Many biomass facilities would be required to meet the project goal of generating 120 MW. Land and project infrastructure impacts would be significantly more damaging to the environment than the proposed project. Emissions from the large number of generating units would be greater than the proposed project, and air quality emission limitations would not be achievable.

Geothermal

Geothermal technologies use steam or high-temperature water obtained from naturally occurring geothermal reservoirs to drive steam turbine/generators. Geothermal technology is limited to areas where geologic conditions resulting in high subsurface water temperatures occur. There are no viable geothermal resources in the location of the proposed project in Fresno County.

Hydropower

Hydropower facilities require large quantities of water (either stored or flowing water) and sufficient topography to allow power generation as water drops in elevation and flows through a turbine. Neither the water resources nor the topographic conditions are present in the project region.

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 constructed, and is compared to the proposed project. A determination is made whether the "no project" alternative is superior, equivalent, or inferior to the proposed project.

Staff has not identified any potentially significant unmitigated impacts.

Staff views the "no project" alternative as feasible. If this project is not built, the same market conditions that encouraged it to be proposed will encourage other similar projects. It is quite feasible that a substantial amount of additional generating capacity will be proposed even in the absence of this project. Staff can reasonably expect California's need for new electric power plants to be filled with or without the proposed project. There is no reason to assume that the total amount of capacity actually built would differ with or without this project.

It follows then, that the extent to which nuclear and older fossil generation resources will be replaced by new resources can be expected to be the same with or without this project. The extent to which generation from existing power plants would consume fuel and emit pollutants would be likely the same with or without this project.

The "no project alternative would eliminate the expected economic benefits that the proposed project would bring to Fresno County, including increased property taxes, employment, sales taxes, and sales of services, manufactured goods, and equipment. (See the **Socioeconomics** section.)

Staff has determined that the "no project" alternative is environmentally superior to the project as originally proposed. This is because the original proposal could have had significant environmental impacts on local and regional air quality, the San Joaquin kit fox, and the agricultural lands. Not constructing and operating an (unmitigated) power plant would avoid these impacts. However, as stated above, staff believes that use of the mitigation described in the various sections will reduce any impacts to less than significant levels. In addition, staff recognizes potential economic benefits will be

derived from the project. Therefore, staff believes that, overall, the “no project” alternative is not the preferred alternative.

CONCLUSIONS AND RECOMMENDATION

Staff has analyzed in detail alternatives to the project design and related facilities, alternative technologies, and the “no project” alternative. Staff did not analyze in detail alternative sites for the project. Staff determined that developing the project at an alternative site would not allow SPP to make use of infrastructure at the proposed site, one of the major objectives of the project, and would not substantially lessen the potentially significant impacts of the project identified in the staff’s assessment.

Staff has determined that the preferable alternative is the proposed project using suggested mitigation. Staff does not believe that energy efficiency measures and alternative technologies (solar, wind, biomass, geothermal, and hydroelectric) present feasible alternatives to the proposed project.

REFERENCES

URS 2006a - URS Corporation/ R. Watkins (tn 38405) Application for Certification with Cover Letter for Starwood Power, LLC Peaking Project. 11/17/2006 Rec’d 11/17/2006

URS 2006k - URS Corporation/ M. Fitzgerald (tn 38796) Data adequacy responses. 12/28/2006 Rec’d 12/29/2006

URS 2006l - URS Corporationa/ A. Leiba (tn 38845) DA supplement information.(non-confidential) 12/29/2006 Rec’d 01/05/2007

URS 2007b - URS Corporation/ A. Leiba (tn 39567) Starwood responses to data requests (#1-67). 03/09/2007 Rec’d 03/12/2007

URS 2007d - URS Corporation/ A. Leiba (tn 39973) Starwood additional project information for responses to data requests (#1-67). 04/12/2007 Rec’d 04/12/2007

URS 2007f – URS Corporation/ A. Gramlich (tn 40116) Starwood additional project description information. 4/20/2007 Rec’d 4/24/2007

URS 2007h – URS Corporation/ A. Gramlich (tn 40198) Starwood Interconnection Re-Study 4/26/2007 Rec’d 4/30/2007

AEG 2007a - Aspen Environmental Group/ H. Blair (tn 39316) Report of Conversation with Susan Jones, San Joaquin Valley Branch Chief USFWS. 02/15/2007 Rec’d 02/16/2007

CEC 2007z1 - California Energy Commission/ C. McFarlin (tn 40062) Email – reply – correct length of natural gas line. 4/19/2007 Rec’D 4/19/2007

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Paula David

INTRODUCTION

The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions of certification;
- establish requirements for facility closure plans; and
- specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure to an insignificant level. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

The following terms and definitions are used to establish when Conditions of Certification are implemented.

PRE-CONSTRUCTION SITE MOBILIZATION

Site mobilization is limited preconstruction activities at the site to allow for the installation of construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities is considered part of site mobilization. Fencing for the site is also considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization.

CONSTRUCTION GROUND DISTURBANCE

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site and for access roads and linear facilities.

CONSTRUCTION GRADING, BORING, AND TRENCHING

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g., alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and removal of soil.

CONSTRUCTION

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. Construction does **not** include the following:

1. the installation of environmental monitoring equipment;

2. a soil or geological investigation;

3. a topographical survey;

4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and

5. any work to provide access to the site for any of the purposes specified in "Construction" 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, "commercial operation" begins after the completion of start-up and commissioning, where the power plant has reached reliable steady-state production of electricity at the rated capacity. For example, at the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The CPM will oversee the compliance monitoring and shall be responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;

2. resolving complaints;

3. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;

4. documenting and tracking compliance filings; and

5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM usually schedules 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 ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight, and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain as a public record, in either the Compliance file or Dockets 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 of certification changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that the compliance conditions of certification and all of the other conditions of certification that appear in the Commission Decision are satisfied. The compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, conditions of certification, or ownership. Failure to comply with any of the conditions of certification or the compliance conditions may result in reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate. A summary of the Compliance Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section.

COMPLIANCE CONDITIONS OF CERTIFICATION

Unrestricted Access (COMPLIANCE-1)

The CPM, responsible Energy Commission staff, and delegate agencies or consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

Compliance Record (COMPLIANCE-2)

The project owner shall maintain project files onsite or at an alternative site approved by the CPM, for the life of the project unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all "as-built" drawings, all documents submitted as verification for conditions, and all other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files.

Compliance Verification Submittals (COMPLIANCE-3)

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by the CPM, and in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

1. reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;

2. providing appropriate letters from delegate agencies verifying compliance;

3. Energy Commission staff audits of project records; and/or

4. Energy Commission staff inspections of work or other evidence that the requirements are satisfied.

Verification lead times (e.g., 90, 60 and 30-days) associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the involved condition(s) of certification by condition number and include a brief description of the subject of the submittal**. The project owner shall also identify those submittals **not** required by a condition of certification with

a statement such as: “This submittal is for information only and is not required by a specific condition of certification.” When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All submittals shall be addressed as follows:

Compliance Project Manager
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

If the project owner desires Energy Commission staff action by a specific date, it shall so request in its submittal cover letter and include a detailed explanation of the effects on the project if this date is not met.

Pre-Construction Matrix and Tasks Prior to Start of Construction (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner’s **first** compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be in the same format as the compliance matrix described below.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times (e.g., 30, 60, 90 days) for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner anticipates starting project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. This is important if the required lead-time for a required compliance event extends beyond the date anticipated for start of construction. It is also important that the project owner understand that the submittal of compliance documents prior to project certification is at the owner’s own risk. Any approval by Energy Commission staff is subject to change based upon the Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions

of the Energy 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 (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. the technical area;

2. the condition number;

3. a brief description of the verification action or submittal required by the condition;

4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);

5. the expected or actual submittal date;

6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable; and

7. the compliance status of each condition, e.g., “not started,” “in progress” or “completed” (include the date).

Satisfied conditions do not need to be included in the compliance matrix after they have been identified as satisfied in at least one monthly or annual compliance report.

Monthly Compliance Report (COMPLIANCE-6)

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the **Key Events List. The Key Events List Form is found at the end of this section.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and eight copies of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, and submitted as attachments to the Monthly Compliance Report;

3. an initial, and thereafter updated, compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

4. a list of conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;

5. a list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;

6. a cumulative listing of any approved changes to conditions of certification;

7. a listing of any filings submitted to, or permits issued by, other governmental agencies during the month;

8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;

9. a listing of the month's additions to the on-site compliance file; and

10. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved actions, and the status of any unresolved actions.

Annual Compliance Report (COMPLIANCE-7)

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall identify the reporting period and shall contain the following:

1. an updated compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

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 submitted as attachments to the Annual Compliance Report;

4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;

5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;

6. a listing of filings submitted to, or permits issued by, other governmental agencies during the year;

7. a projection of project compliance activities scheduled during the next year;

8. a listing of the year's additions to the on-site compliance file;

9. an evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see Compliance Conditions for Facility Closure addressed later in this section]; and

10. a listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved matters, and the status of any unresolved matters.

Confidential Information (COMPLIANCE-8)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

Annual Energy Facility Compliance Fee (COMPLIANCE-9)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay an annual fee of seventeen thousand six hundred seventy-six dollars ($17,676), which will be adjusted annually on July 1. The initial payment is due on the date the Energy Commission adopts the final decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

Reporting of Complaints, Notices, and Citations (COMPLIANCE-10)

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded complaints shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to the CPM who will post it on the Energy Commission's web page at:

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html

Any changes to the telephone number shall be submitted immediately to the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies to the CPM of all complaint forms, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure and unplanned permanent closure**.**

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner implements the on-site contingency plan. It can also include unplanned closure where the project owner fails to implement the contingency plan, and the project is essentially abandoned.

COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to commencement of closure activities. The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;

2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;

3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and

4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

In the event that there are significant issues associated with the proposed facility closure plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities until the Energy Commission approves the facility closure plan.

Unplanned Temporary Closure/On-Site Contingency Plan (COMPLIANCE-12)

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all

necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less that 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

Unplanned Permanent Closure/On-Site Contingency Plan (COMPLIANCE-13)

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.
In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

Post Certification Changes to the Energy Commission Decision: Amendments, Ownership Changes, Insignificant Project Changes and Verification Changes (COMPLIANCE-14)

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. **It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769.** Implementation of a project modification without first securing Energy Commission, or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with section 25534 of the Public Resources Code.

A petition is required for **amendments** and for **insignificant project changes** as specified below. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of approval and the process that applies are explained below. They reflect the provisions of Section 1769 at the time this condition was drafted. If the Commission's rules regarding amendments are amended, the rules in effect at the time an amendment is requested shall apply.

Amendment

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769, when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in deletion or change of a condition of certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations or standards, the petition will be processed as a formal amendment to the final decision, which requires public notice and review of the Energy Commission staff analysis, and approval by the full Commission. This process takes approximately two to three months to complete, and possibly longer for complex project modifications.

Change of Ownership

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769 (b). This process takes approximately one month to complete, and requires public notice and approval by the full Commission.

Insignificant Project Change

Modifications that do not result in deletions or changes to conditions of certification, and that are compliant with laws, ordinances, regulations and standards may be authorized by the CPM as an insignificant project change pursuant to section 1769(a) (2). This process usually takes less than one month to complete, and it requires a 14-day public review of the Notice of Insignificant Project Change that includes staff's intention to approve the modification unless substantive objections are filed.

Verification Change

A verification may be modified by the CPM without requesting an amendment to the decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification. This process usually takes less than five working days to complete.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Energy Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental protection when conducting project monitoring.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

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 1237, but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by future law or regulations.

The Energy Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

Informal Dispute Resolution Procedure

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237, 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 brought before the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter and within seven working days of the CPM's request, provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site

visit and/or request the project owner to provide an initial report, within 48 hours, followed by a written report filed within seven days.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;

3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and

4. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum that fairly and accurately identifies the positions of all parties and any conclusions reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

Any person may file a complaint with the Energy Commission's Dockets Unit alleging noncompliance with a Commission decision adopted pursuant to Public Resources Code section 25500. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1237.

KEY EVENTS LIST

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	Compliance Record	The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed or the project owner or his agent.
COMPLIANCE-4	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until the all of the following activities/submittals have been completed: ▪ property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, ▪ a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, ▪ all pre-construction conditions have been complied with, ▪ the CPM has issued a letter to the project owner authorizing construction.
COMPLIANCE-5	Compliance Matrix	The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COMPLIANCE-6	Monthly Compliance Report including a Key Events List	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-14	Post-certification changes to the Decision	The project owner must petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

ATTACHMENT A

COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME:
AFC Number:

COMPLAINT LOG NUMBER _____
Complainant's name and address:

Phone number: _____

Date and time complaint received:

Indicate if by telephone or in writing (attach copy if written):
Date of first occurrence:

Description of complaint (including dates, frequency, and duration):

Findings of investigation by plant personnel:

Indicate if complaint relates to violation of a CEC requirement:
Date complainant contacted to discuss findings: _____

Description of corrective measures taken or other complaint resolution:

Indicate if complainant agrees with proposed resolution:
If not, explain:

Other relevant information:

If corrective action necessary, date completed: _____
Date first letter sent to complainant: _____(copy attached)
Date final letter sent to complainant: _____(copy attached)

This information is certified to be correct.
Plant Manager's Signature: _____ Date:

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

PREPARATION TEAM

STARWOOD POWER PLANT PROJECT
PREPARATION TEAM

Executive Summary ..... Che McFarlin

Introduction ..... Che McFarlin

Project Description ..... Che McFarlin

Air Quality ..... William Walters and Lisa Blewitt

Biological Resources ..... Heather Blair

Cultural Resources ..... Michael K. Lerch, Amanda C. Cannon, and Beverly E. Bastian

Hazardous Materials Management ..... Alvin J. Greenberg, Ph.D. and Rick Tyler

Land Use ..... Amanda Stennick

Noise and Vibration ..... Shahab Khoshmashrab, P.E.

Public Health ..... Obed Odoemelam, Ph.D.

Socioeconomic Resources ..... Joseph Diamond, PhD

Soils and Water Resources ..... Somer Goulet and Richard Anderson

Traffic and Transportation ..... James Adams

Transmission Line Safety and Nuisance ..... Obed Odoemelam, Ph.D.

Visual Resources ..... Mark R. Hamblin

Waste Management ..... Ellie Townsend-Hough

Worker Safety and Fire Protection ..... Alvin J. Greenberg, Ph.D. and Rick Tyler

Facility Design ..... Shabab Khoshmasrab, P.E.

Geology and Paleontology ..... Patrick Pilling, Ph.D., P.E., G.E.

Power Plant Efficiency ..... Steve Baker, P.E.

Power Plant Reliability ..... Steve Baker, P.E.

Transmission System Engineering ..... Laiping Ng and Mark Hesters

Alternatives ..... Dr. James W. Reede, Jr., Ed.D and Che McFarlin

General Conditions including Compliance Monitoring & Facility Closure ..... Paula David

Project Secretary ..... Terry Piotrowski

DECLARATION
OF
CHE MCFARLIN

I, **Che McFarlin**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facility Siting Division** as a **Project Manager**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Project Description**, **Executive Summary, Alternatives, and the Introduction,** for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 28, 2007 Signed: 

At: Sacramento, CA

CHE MCFARLIN

EDUCATION

August 1998	University of Iowa, Iowa City , IA *Bachelor of Science, Major: Geography* Emphasis: Urban and Regional Planning

PROFESSIONAL EXPERIENCE

November 2007 – Present	Siting Project Manager -Planner II California Energy Commission Sacramento, CA
January 2001 – November 2007*	Associate Environmental Planner California Department of Transportation Sacramento, California *6 month break from June to November 2004
June 2004 – November 2004	Associate Planner - Team Leader Pacific Municipal Consultants Rancho Cordova, California
March 1999 – January 2001	Environmental Planner California Department of Transportation Los Angeles, California

DECLARATION OF
Testimony of William Walters, P.E.

I, **William Walters,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a senior associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Air Quality** for the **Starwood Power Plant project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 12, 2007 Signed: _____

At: Agoura Hills, California

WILLIAM WALTERS, P.E.
Air Quality Specialist

ACADEMIC BACKGROUND
B.S., Chemical Engineering, 1985, Cornell University

PROFESSIONAL EXPERIENCE

Mr. Walters has over 20 years of technical and project management experience in environmental compliance work, including environmental impact reports, RCRA/CERCLA site assessment and closure, site inspection, source monitoring, emissions inventories, source permitting, and energy and pollution control research.

Aspen Environmental Group 2000 to present

Responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- **Engineering and Environmental Technical Assistance to Conduct Application for Certification Review for the California Energy Commission:**
  - Preparation and project management of the air quality section of the Staff Assessment and/or Initial Study and the visual plume assessment for the following California Energy Commission (CEC) licensing projects: Hanford Energy Park; United Golden Gate, Phase I; Huntington Beach Modernization Project (including Expert Witness Testimony); Woodland Generating Station 2; Ocotillo Energy Project, Phase I; Magnolia Power Project; Colusa Power Project; Inland Empire Energy Center; Rio Linda/Elverta Power Plant Project; Roseville Energy Center; Henrietta Peaker Project; Tracy Peaking Power Plant Project (including Expert Witness Testimony); Avenal Energy Project; San Joaquin Valley Energy Center (including expert witness testimony); Salton Sea Unit 6 Project (including expert witness testimony); Modesto Irrigation District Electric Generation Station (including expert witness testimony); Walnut Energy Center (including expert witness testimony); Riverside Energy Resource Center (including expert witness testimony); Pastoria Energy Facility Expansion; Panoche Energy Center (in progress); Starwood Power Plant (in progress); Bullard Energy Center (in progress).
  - Preparation and project management of the visual plume assessment for the following California Energy Commission (Energy Commission) licensing projects: Metcalf Energy Center Power Project (including Expert Witness Testimony); Contra Costa Power Plant Project (including Expert Witness Testimony); Mountainview Power Project; Potrero Power Plant Project; El Segundo Modernization Project; Morro Bay Power Plant Project; Valero Cogeneration Project; East Altamont Energy Center (including expert witness testimony); Russell City Energy Center; SMUD Cosumnes Power Plant Project (including expert witness testimony); Pico Power Project; Blythe Energy Project Phase II; City of Vernon Malburg Generating Station; San Francisco Electric Reliability Project; Los Esteros Critical Energy Facility Phase II; Roseville Energy Park; City of Vernon Power Plant (in progress); South Bay Replacement Project; Walnut Creek Energy Park; Sun Valley Energy Project; Highgrove Power Plant (in progress); Colusa Generating Station; and Russell City Energy Center (in progress).
  - Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; Russell City Energy Center Amendment (in progress); Eastshore Energy Power Plant; and the Blythe Energy Power Plant and Blythe Energy Project Phase II (including expert witness testimony) siting cases. Assistance in the aircraft safety review of thermal and visual plumes of the operating Blythe Energy Power Plant.

- Preparation of a white paper on methods for the determination of vertical plume velocity determination for aircraft safety analyses.
- Preparation and instruction of a visual water vapor plume modeling methodology class for the CEC.
- Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 Energy Commission licensing project.
- Preparation of project amendment or project compliance assessments, for air quality or visual plume impacts, for several licensed power plants, including: Metcalf Energy Center; Pastoria Power Plant; Elk Hills Power Plant; Henrietta Peaker Project; Tracy Peaker Project; Magnolia Power Project; Delta Energy Center; SMUD Cosumnes Power Plant; Walnut Energy Center; San Joaquin Valley Energy Center; City of Vernon Malburg Generating Station; Otay Mesa Power Plant; Los Esteros Critical Energy Facility; Pico Power Project; Riverside Energy Resource Center; Blythe Energy Project Phase II; Inland Empire Energy Center; and Salton Sea Unit 6 Project.
- Preparation of the air quality section of the staff paper "A Preliminary Environmental Profile of California's Imported Electricity" for the Energy Commission and presentation of the findings before the Commission.
- Preparation of the staff paper "Emission Offsets Availability Issues" and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the Energy Commission.
- Completion of an audit of power plant cost factors for integration into the Energy Commission Cost of Generation Model.

- For the **Los Angeles Department of Water and Power (LADWP)**:
  - Preparation of the Air Quality Inventory for the LADWP River Supply Pipeline Project EIR.
  - Project management and preparation of the Air Quality Section for the LADWP Valley Generating Station Stack Removal IS/MND support project.
- For the **Department of Water Resources (DWR)**:
  - Preparation of the Air Quality sections for two separate DWR Santa Ana Valley Pipeline Repairs Project CEQA Categorical Exemption Memorandums.
  - Preparation of the emission estimates used in the Air Quality Sections for the DWR Tehachapi Second Afterbay Project Initial Study and EIR.
- For the **U.S. Army Corps of Engineers (Corps)**:
  - Preparation of the Air Quality Section and General Conformity Analysis for the Matilija Dam Ecosystem Restoration Project EIS/R for the Corps.
  - Preparation of emission inventory and General Conformity Analysis of the Murrieta Creek Flood Control Project and the Joint Red Flag exercise to be conducted in the Nevada Test and Training Range.
  - Emission inventory for the construction activities forecast for the San Jose/Old San Jose Creeks Ecosystem Restoration project for the Corps.
- For **Los Angeles Unified School District (LAUSD)**:
  - Preparation of the Air Quality Section of the LAUSD New School Construction Program EIR and provided traffic trip and VMT calculation support for the Traffic and Transportation Section.
  - Management and preparation of the Draft Air Quality Sections for the Reseda Senior High School Portable Addition IS/MND and Wonderland Elementary Addition IS/MND projects for LAUSD.
- Other Projects:
  - Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.

- Preparation of the Air Quality section of the PG&E Hydrodivestiture Draft EIR/EIS for the California Public Utilities Commission (CPUC).
- Preparation of the Air Quality Section of the Environmental Information Document in support of the Coastal Consistency Determinations for the suspension of operation requests for undeveloped units and leases off the Central California Coast.
- Preparation of comments on the Air Quality, Alternatives, Marine Traffic, Public Safety, and Noise section of the Cabrillo Port Liquefied Natural Gas Deepwater Port Draft EIS/EIR for the City of Oxnard.

Camp Dresser & McKee, Inc. 1998 to 2000

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Preparation of emission inventories and dispersion modeling for criteria and air toxic pollutants for the Los Angeles International Airport Master Plan (LAXMP) EIS/EIR.
- Project Manager/Technical lead for the completion of air permit applications and air compliance audits for two Desa International fireplace accessory manufacturing facilities located in Santa Ana, California.
- Project manager/technical lead for the completion of Risk Management Plans (RMPs) for four J.R. Simplot food processing facilities in Oregon, Idaho, and Washington and the Consolidated Reprographics facility located in Irvine, California.

Planning Consultants Research 1997 to 1998

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Project Manager for a stationary source emission audit of the entire Los Angeles International Airport complex for Los Angeles World Airports (LAWA) in support of the LAXMP.
- Review of the Emission Dispersion Modeling System (EDMS) and preparation of a report with findings to the Federal Aviation Administration for LAWA in support of the LAXMP.
- Project manager for the ambient air monitoring and deposition monitoring studies performed for LAWA in support of the LAXMP, including the selection of the monitoring sites and specialty subcontractor, and review of all monitoring data.

Aspen Environmental Group/Clean Air Solutions 1995 to 1996

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Manager of the Portland, Oregon, office of Clean Air Solutions from March 1995 to December 1995, with responsibilities including Project Management, Business Development, and Administration.
- Control technology assessment, engineering support and Notice of Intent to construct preparation for J.R. Simplot's Hermiston, Oregon, food processing facility. Review and revision of an Air Contaminant Discharge Permit application, Title V permit application, and PSD modeling analysis for J.R. Simplot's Hermiston facility.

- Air quality compliance report including an air emission inventory, regulation and permit compliance determination, and recommendations for compliance for Lumber Tech, Inc.'s Lebanon, Oregon, wood products facility.

Fluor Daniel, Inc. 1990 to 1995 and 1996 to 1997

Mr. Walters was responsible as lead technical or project manager for major environmental projects for both government and private clients. His projects included:

- Prepared several air permit applications for the ARCO Los Angeles Refinery Polypropylene Plant Project; Phase I environmental assessments for properties located in Southern California; and a site investigation and RCRA closure plan for a hazardous waste storage site in Vernon, California.
- Project manager of the Anaconda Smelter site for the U.S. Environmental Protection Agency's (EPA) Alternative Remedial Contract System (ARCS) project during the conclusion of technical activities and project closeout. Prepared a cost recovery report for the project.
- Performed environmental analysis for the Bonneville Power Authority, including air pollution BACT analysis, wastewater analysis, and evaluation of secondary environmental effects of electric power producing technologies.

Jacobs Engineering Group 1988 to 1990

Mr. Walters was responsible for a wide range of air pollution regulatory and testing projects, including the following:

- Project manager of air toxic emission inventory reports prepared for U.S. Borax's boron mining and refining facility and the Naval Aviation Depot (N. Island Naval Base, San Diego, California).
- Prepared air permit applications and regulatory correspondence for several facilities including the U.S. Department of Energy's Feed Material Production Center uranium processing facility in Fernald, Ohio; Evaluation of a sludge dewatering process at Unocal's Wilmington, California, Refinery; and United Airlines blade repair facility at the San Francisco Airport.
- Characterized and quantified air emissions for offshore oil and gas development activities associated with Federal oil and gas Lease Sale 95, offshore southern California, for the U.S. Minerals Management Service.

CERTIFICATIONS

- Chemical Engineer, California License 5973
- CARB, Fundamentals of Enforcement Seminar
- EPA Methods 1-8, 17; Training Seminar

AWARDS

- California Energy Commission Outstanding Performance Award 2001

DECLARATION OF
Testimony of Lisa Blewitt

I, **Lisa Blewitt,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a senior associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Air Quality** for the **Starwood Power Plant project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 12, 2007 Signed: 

At: Agoura Hills, California

LISA A. BLEWITT
Associate Engineer/Physical Scientist

ACADEMIC BACKGROUND
B.S., Chemical Engineering, University of California, Santa Barbara, 1996

PROFESSIONAL EXPERIENCE

Ms. Blewitt is an Associate in Engineering and Physical Sciences with experience serving as project manager as well as deputy project manager for California Environmental Quality Act (CEQA) projects. In addition, Ms. Blewitt has four years of experience evaluating the potential impacts to the physical environment, particularly with regard to air quality, plume, noise, and hazards and hazardous materials associated with proposed infrastructure projects in compliance with CEQA and the National Environmental Policy Act (NEPA). Prior experience includes working as a process engineering doing refinery and power plant design.

Aspen Environmental Group 2001 to present

Ms. Blewitt's project experience at Aspen includes the following:

California Energy Commission (CEC) (2001-2003). Ms. Blewitt performed plume analysis and/or air quality analysis on several projects to support the Staff Assessments for the CEC's CEQA equivalent review process. She also helped manage the Aspen Team as Power Plant Coordinator (PPC). Coordination of the Aspen team with CEC project managers included providing up-to-date information to all members of the team, identifying key issues, and preparing monthly progress reports. She also managed the Aspen team as the overall Aspen PPC for all CEC projects by providing weekly progress reports to all Aspen PPCs. In addition to her work on the Staff Assessments for the CEC, Ms. Blewitt was also the Coastal Power Plant Inventory Coordinator for the Coastal Plant Study.

- **Avenal Energy Center.** AFC for 600 MW combined cycle plant located in Avenal, Kings County. Ms. Blewitt performed the plume analysis for the cooling tower, heat recovery steam generators (HRSGs), and auxiliary boiler.
- **Blythe Energy Project Phase II.** Aspen Team PPC to support the Staff Assessment of the AFC for a 520 MW combined cycle power plant located entirely within the previously approved Blythe Energy Project facility boundaries west of the City of Blythe, Riverside County. Ms. Blewitt performed the plume analysis for the cooling tower and HRSGs.
- **City of Vernon Combined Cycle.** AFC for the Malburg Generating Station (MGS), a 120 MW combined cycle power plant to be located in the City of Vernon, Los Angeles County. Ms. Blewitt performed the plume analysis for the cooling tower and HRSGs. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.
- **Colusa Power Project.** AFC for a 500 MW combined cycle power generation facility located west of the City of Williams in Colusa County. Ms. Blewitt assisted with the air quality analysis.

- **East Altamont Energy Center.** AFC for a 1,100 MW combined cycle power generation facility located southeast of Tracy in Alameda County. Ms. Blewitt assisted with the cooling tower plume analysis. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.
- **Henrietta Peaker Project.** AFC for a 91.4 MW simple cycle power plant to be located west of the City of Lemoore, in Kings County. Ms. Blewitt assisted with the air quality analysis and performed the plume analysis for the HRSGs. This plant did not require a cooling tower.
- **Inland Empire Energy Center.** AFC for a 670 MW combined cycle power plant to be located near the town of Romoland and Perris, within an unincorporated area of Riverside County. Ms. Blewitt performed the plume analysis for the cooling tower, HRSGs, and auxiliary boiler.
- **Los Esteros Critical Energy Facility.** Aspen Team PPC to support the Staff Assessment of the AFC for a 180 MW simple cycle peaking plant in San Jose, CA.
- **Magnolia Power Project.** AFC to add 250 MW of new generation at Magnolia Generation Power Plant in Burbank, CA. Ms. Blewitt assisted in the air quality analysis and performed the plume analysis for the cooling tower and HRSGs. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.
- **Modesto Irrigation District Electric Generation Station.** SPPE for a 95 MW simple cycle project located in Ripon, San Joaquin County. Ms. Blewitt assisted with the air quality analysis.
- **Roseville Energy Facility.** AFC for 900 MW combined cycle power plant five miles northwest of downtown Roseville in Placer County. Ms. Blewitt performed the plume analysis for the cooling towers.
- **Salton Sea Unit 6 Project.** Aspen Team Power Plant Coordinator to support the Staff Assessment of the AFC for 185 MW geothermal plant near Calipatria, Imperial County. Ms. Blewitt assisted with the air quality analysis and performed the plume analysis for the cooling tower and dilution water heaters.
- **San Joaquin Valley Energy Center.** Aspen Team PPC to support the Staff Assessment of the AFC for a 1,060 MW combined cycle power generation facility located in the City of San Joaquin, Fresno County. Ms. Blewitt assisted with the air quality analysis, and performed the plume analysis for the cooling tower, HRSGs, and auxiliary boiler. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.
- **SMUD Cosumnes Power Plant Project.** AFC for 1000 MW combined cycle power plant to be located at the Rancho Seco Nuclear Power Plant in Sacramento County. Ms. Blewitt performed the plume analysis for the cooling towers and HRSGs.
- **Tracy Peaker Power Plant Project.** Aspen Team PPC to support the Staff Assessment of the AFC for a 169 MW simple cycle power plant to be located southwest of the City of Tracy, in western San Joaquin County. Ms. Blewitt also assisted with the air quality analysis and performed the plume analysis based on results from Spartan I Energy Center Project.
- **Turlock Irrigation District Walnut Energy Center.** AFC for a 250 MW combined cycle power plant located in Turlock, Stanislaus County. Ms. Blewitt assisted with the air quality analysis and performed the plume analysis for the cooling tower and heat recovery steam generator.
- **Coastal Plant Study.** Ms. Blewitt was the Coastal Power Plant Inventory Coordinator for this special study conducted as part of Aspen's contract with the CEC. As Inventory Coordinator her responsibilities included collection of plant data and permits, coordinating and summarizing all data collected. The intent of the study is to provide sufficient background information to help identify red flag items for the CEC in order to streamline future licensing processes.

California Public Utilities Commission (CPUC) (2005). Ms. Blewitt is assisting in the alternatives analysis for this EIR/EIS, where the proposed project would include building a new 25.6-mile 500-kV transmission line between Southern California Edison's existing Antelope and Pardee Substations, which are located in Lancaster and Santa Clarita, California, respectively. The proposed route would traverse Angeles National Forest generally within the existing Saugus-Del Sur transmission corridor.

California Department of Water Resources (DWR). Ms. Blewitt performed various environmental analyses for the following projects:

- **Tehachapi East Afterbay Project (2003-2004).** Initial Study/Environmental Impact Report (IS/EIR) to construct a reservoir near the bifurcation of the East Branch and West Branch of the California Aqueduct, nine miles east of Gorman, California. The project would provide additional storage to the existing Tehachapi Afterbay to enable enhanced peaking operation of upstream pumping plants and increased operational flexibility. Ms. Blewitt acted as the Deputy Project Manager for the IS/EIR. She prepared the project description and performed the environmental analysis for air quality, cultural resources, geology/soils, hazards/hazardous materials, noise, transportation/traffic, and utilities/service systems for the Initial Study (Tehachapi Second Afterbay). It was decided to move the proposed reservoir and redesigned the project to reduce escalating costs associated with the original design. Ms. Blewitt prepared the Notice of Preparation (NOP) for the Tehachapi East Afterbay (TEA) Project, prepared the executive summary and project description, and assisted with the air quality analysis for the EIR. Ms. Blewitt also prepared the Final EIR, Statement of Findings, and Statement of Overriding Considerations for the TEA Project.
- **Pyramid Dam Emergency Access Road (PDEAR) (2005).** As Project Manager, Ms. Blewitt is managing the preparation of a Biological Evaluation/Biological Assessment (BE/BA), Initial Study and Mitigated Negative Declaration in compliance with CEQA, and obtaining the required environmental permits for an emergency access road. DWR proposes to build an emergency access road to Pyramid Dam in northwestern Los Angeles County, California, in the Angeles National Forest. The purpose of the emergency access road would be to provide full and adequate access to Pyramid Dam in the event of an emergency (dam failure and/or leakage), and for required periodic inspections and maintenance.

Los Angeles Department of Water Resources (LADWP) (2004-2005). Ms. Blewitt is serving as the Deputy Project Manager for the Lower Reach River Supply Conduit Project. She assisted with the preparation of the IS/EIR for this 7.1 mile water pipeline project, which will be located in public street rights-of-way, LADWP property, and LADWP utility easements in the communities of Silver Lake and Los Feliz (including Griffith Park) in the City of Los Angeles. For the IS, Ms. Blewitt prepared the project description, cultural resources, and hazards and hazardous materials discussions. A Draft EIR was prepared for the project in May 2005, focusing on air quality, noise, and traffic impacts.

U.S. Army Corps of Engineers (Corps). Ms. Blewitt performed various environmental analyses for the following projects.

- **Murrieta Creek (2003).** Supplemental Environmental Assessment/Environmental Impact Report Addendum to assess the differences in impacts resulting from implementation of the Modified Phase I Plan (as compared with the impacts of the Original Phase I Plan addressed in the 2000 EIS/EIR). The project involved improvements to Murrieta Creek that extend from the 1st Street Bridge in Temecula, California downstream to just north of the USGS stream gage, which is located just upstream of Murrieta Creek's confluence with Temecula Creek at the headwater of the Santa Margarita River. Ms. Blewitt performed the environmental analysis for public health and safety and utilities and public services.

- **Matilija Dam (2003-2004).** Environmental Impact Statement and Environmental Impact Report (EIS/EIR) prepared to analyze and disclose the potential environmental effects associated with the proposed Matilija Dam Ecosystem Restoration Feasibility Study. Ms. Blewitt performed the noise analysis for the various project alternatives.

- **Joint Red Flag '05 Exercise (2004-2005).** Environmental Assessment to analyze the impacts associated with the ground component of the Joint Red Flag '05 Exercise which would be performed on Bureau of Land Management (BLM) lands surrounding Nellis Air Force Base in Lincoln County, Nevada. Ms. Blewitt attended the site visits; and performed the noise, transportation, public health and safety (hazardous materials), and utilities analyses.

- **Fort Irwin EBS (2005).** Environmental Baseline Survey (EBS) report on the Russell-Soller Property near Fort Irwin, San Bernardino County, California to support the purchase of the site by the U.S. Army for the Fort Irwin National Training Center. Ms. Blewitt was the Deputy Project Manager assisting in the development of the EBS. Specifically, Ms. Blewitt conducted site investigations, prepared the project description, and reviewed the potential hazards on the site.

- **Murrieta Creek Water Quality Monitoring (2005).** The Corps of Engineers is constructing a flood control, ecosystem restoration and recreation project. Phase I of this construction project is currently occurring along an approximately one mile portion of Murrieta Creek between Highway 79 South and 1st Street. Best Management Practices applied to the project failed to provide adequate erosion and sediment control, resulting in violations of the State Water Resources Control Board Order No. 99-08-DWQ, *National Pollutant Discharge Elimination System No. CA000002, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity.* As Project Manager, Ms. Blewitt is managing the water quality monitoring efforts to comply with Section 401 Water Quality Certification conditions, the Notice of Violation and Cleanup and Abatement Order letters received from the California Regional Water Quality Control Board Region 9.

Fluor Daniel, Inc. 1996 to 2001

Ms. Blewitt was a Process Engineer at Fluor Daniel, Inc. in Aliso Viejo, CA, from August 1996 to July 2001. She did process design work for both refineries and power plants.

MODELS

- Seasonal/Annual Cooling Tower Impact (SACTI) Model
- Combustion Stack Visible Plume (CSVP) Model
- FHWA Traffic Noise Model®
- BEEST for Windows (BEE-Line Software's ISCST3/SCREEN3 modeling manager)

ADDITIONAL TRAINING AND COURSES

- Engineer-In-Training Certificate, October 1996
- UCSB Extension 2-day class – Preparing CEQA/NEPA Documents, January 2002
- UCSB Extension Project Management Professional Certification Program, June 2003
- BEE-Line Software 2-day course – PERMITS: Modeling for State and Federal Permit Applications Using BPIP/BPIP-Prime, AerMod, ISC-Prime & ISCST3 (BEEST software package), November 2003

DECLARATION OF
Heather Blair

I, **Heather Blair**, declare as follows:

1. I am presently employed as a **consultant** to the California Energy Commission in the **Environmental Protection Office** of the **Energy Facilities Siting Division**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepared the staff testimony on **Biological Resources** for the **Starwood Power – Midway Project** based on my independent analysis of the application and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/29/07 Signed: Heather Blair

At: Sacramento, California

HEATHER BLAIR

Environmental Scientist

ACADEMIC BACKGROUND

M.S., Conservation Biology, Sacramento State University, In Progress
B.S., Ecology, San Diego State University, 2004

PROFESSIONAL EXPERIENCE

Heather Blair is an Environmental Scientist experienced in a range of natural resource investigations and environmental impact analysis including botanical and wildlife research, inventory, and survey techniques; technical writing; and data analysis. She has experience preparing environmental documents pursuant to the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA), and the Endangered Species Act (ESA), as well as other federal and state regulations.

Aspen Environmental Group — 2004 to present

Selected project experience at Aspen includes the following:

- **North Area ROW Maintenance Project**. Under contract to Western Area Power Administration (Western), Ms. Blair is currently providing project support to prepare an Environmental Assessment and Operation and Maintenance Program associated with the operation and maintenance procedures along Western's transmission line ROWs between Sacramento (Sutter/Yuba County line) and the Oregon border. This project also includes a detailed survey of the biological and cultural resources along 434 miles of North Area ROW, 342 miles of COTP ROW, and several hundred miles of access and maintenance roads. Ms. Blair is working closely with project management and resource specialists to coordinate and execute over 800 miles of surveys. She conducted wildlife inventory and surveyed portions of ROW for sensitive species and recorded habitat types, jurisdictional waters and infrastructure using a Trimble GeoXT GPS unit. Additionally, Ms. Blair was integrally involved in the management and development of the North Area O&M GIS database.

- **Categorical Exclusions for Routine Operation and Maintenance.** Under contract to Western, Aspen has prepared multiple CXs for routine maintenance activities along Western's CVP, PACI, and COTP transmission line ROWs and access roads. Aspen has developed a streamlined and highly efficient system to use the results and analysis for the North Area ROW Maintenance project to complete these documents.

- **Sacramento Area Voltage Support Project.** Under contract to Western, Aspen is preparing a SEIS and EIR for a double-circuit 230 kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. Ms. Blair assisted in the preparation of the land use section, which includes an analysis of potential impacts to recreation and agricultural resources. In addition she assisted in the development of the project description and alternatives and performed biological resource surveys of each alternative.

- **Sunrise Powerlink Transmission Line Project.** Under contract to the California Public Utilities Commission (CPUC), Aspen is preparing an EIR/EIS for a 150-mile proposed transmission line from Imperial Valley Substation, near El Centro, California, to Peñasquitos Substation in northwestern San Diego County. The Proposed Project would potentially deliver renewable resources from the Imperial Valley via a 500 kV transmission line to a new 500/230 kV substation, and from the new substation to

western San Diego via 230 kV overhead and underground transmission lines. Ms. Blair is analyzing the impacts to wilderness, recreation and agriculture. Additionally, she is writing the project description and coordinating the biological resources analysis.

- **Rare Plant Surveys for the East Branch Extension Pipeline Project.** Ms. Blair conducted rare plant surveys of the endangered Santa Ana River wooly star (*Eriastrum densifolium* ssp. *sanctorum*) and the state and federally endangered slender horned spine flower (*Dodecahema leptoceras*) in response to the proposed construction of a water pipeline through San Bernardino and Riverside Counties.

- **Least Tern Monitoring for the Montezuma Slough Tidal Wetlands Restoration Project**. Under contract to EcoBridges Environmental, Ms. Blair is monitoring the nesting success of three nesting colonies of the federally and State endangered least tern. This effort involves counting and mapping the nest sites and tern chicks once a week.

- **Hazardous Fuels and Vegetation Management for Angeles National Forest.** Under contract to the U.S. Forest Service, Ms. Blair conducted botanical and wildlife surveys at approximately 100 sites ranging from one to 2500 acres throughout the Angeles National Forest. Surveys included identification and mapping of potential habitat for listed species, and submittal of listed species occurrence information to the California Natural Diversity Database. She is currently writing 75 Biological Evaluations/Biological Assessments that assess the impacts of proposed fuel management practices throughout the forest.

- **Atlantic–Del Mar Reinforcement Project Mitigated Negative Declaration**. Ms. Blair served as an assistant environmental monitor during the construction of 4 miles of overhead transmission towers and lines and approximately 1.3 miles of underground lines. The project involved trenching, horizontal drilling and blasting and requires avoidance of several wetlands, seasonal pools and T and E species.

- **Diablo Canyon Power Plant Steam Generator Replacement Project.** Ms. Blair supported the management team in preparing the project description, alternatives and supporting sections of the Draft and Final EIR.

- **Miguel-Mission 230 kV #2 Project EIR Addendum**. Ms. Blair helped to prepare a detailed addendum associated with engineering design changes for the Miguel-Mission 230 kV #2 Project.

- **California Energy Commission.** Aspen has a multi-year contract to provide support to the Energy Facility Planning and Licensing Programs. Under this contract Ms. Blair has participated in the following projects:

  - **Biological Resources Assessment for the Panoche Energy Center.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 1600 MW PEC. Required coordination with USFWS and CDFG regarding impacts to the State and federally listed San Joaquin kit fox.

  - **Biological Resources Assessment for the Starwood-Midway Power Plant.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 120 MW Starwood Project. Required coordination with USFWS and CDFG regarding impacts to the State and federally listed San Joaquin kit fox.

  - **Biological Resources Assessment for the Chevron Richmond Power Plant Replacement Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 60 MW Chevron Richmond PPRP.

  - **LNG Interagency Working Group Fact Sheets.** Ms. Blair researched information on operational and safety issues associated with new LNG facilities. These fact sheets, intended for public distribution, include Biological Resource Impacts of LNG, air and water quality impacts of LNG and others.

- **Natural Gas Supply and Demand Report.** Ms. Blair researched recent natural gas supply and demand developments throughout the United States for incorporation into an Energy Commission report on the potential need for expanded natural gas supplies in California.

PREVIOUS EXPERIENCE

Soil Ecology and Restoration Group — January to May 2004

- **Research Assistant.** Ms. Blair assisted in managing the greenhouse where native seeds were germinated and raised. In this role, she collected seeds from native plants and analyzed the composition of the soil present in their native habitat to ensure seedling viability. The plants were subsequently used in the restoration of degraded habitat as contracted by the U.S. Army Corps of Engineers and others.

DECLARATION OF
Michael K. Lerch

I, **Michael K. Lerch**, declare as follows:

1. I am presently a consultant to the California Energy Commission, **Energy Facilities Siting Division** as a **Cultural Resources Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Cultural Resources** for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 25, 2007 Signed: Michael K. Lerch

At: Woodland, California

Michael K. Lerch
Statistical Research, Inc.
194 W. Main Street, Suite 200
Woodland, CA 95695
(530) 661-1400 email: mlerch@sricrm.com

Education

School	Field	Degree	Year
University of California, Riverside	Anthropology	B.A	1981
University of California, Riverside	Anthropology	M.A	1992

Experience

Statistical Research, Inc. (SRI), Woodland, California *2006 to present*
Office Director, Principal Investigator
As office director, Mr. Lerch is responsible for personnel, administrative tasks, proposals, budgets, and project management. As principal investigator (PI), he supervises as many as 20 staff members in three offices on multiple concurrent projects throughout California and Nevada. He is currently Principal Professional on six proposed power plants as a consultant, through Aspen Environmental Group, for the California Energy Commission (CEC). As such, he directs, reviews, and edits the work of several staff members in the preparation of Preliminary and Final Staff Assessments for CEC power plant siting projects. This involves all tasks related to the production of the cultural resources sections of CEQA (California Environmental Quality Act)-equivalent documents for the environmental review of proposed power plants in California, including review of data provided by applicants, preparation of background information and historic contexts, evaluation of historical and cultural significance of cultural resources subject to impacts from proposed projects, and participation in public workshops and hearings. It also includes assisting CEC staff with development of mitigation measures to reduce potential impacts to cultural resources eligible for listing in the California Register of Historical Resources to less-than-significant levels. Mr. Lerch is PI for a cultural resources study for The Villages of Lakeview, a 3,000-acre specific plan in Riverside County, and a member of the Riverside County Cultural Resources Working Group. He also is currently preparing cultural affiliation studies pursuant to the Native American Graves Protection and Repatriation Act (NAGPRA) for the U.S. Army Corps of Engineers, Sacramento and San Francisco Districts, on 14 project areas in northern and central California.

Statistical Research, Inc., Redlands, California *1999 to 2005*
Principal Investigator
During his tenure in the SRI Redlands office, Mr. Lerch conducted a number of large survey, testing, and data recovery investigations on prehistoric and historical-period archaeological resources and cultural landscapes in the San Bernardino and San Jacinto Mountains for the U.S. Forest Service; surveys of extensive pipeline and transmission line corridors in the Mojave Desert, Owens Valley, and inland southern California valleys; and studies of ethnobotany and traditional cultural properties in compliance with the National Historic Preservation Act and CEQA. As PI, he prepared proposals, budgets, and research designs, supervised fieldwork and report preparation, consulted with Native American tribes, and coordinated project implementation with clients and agency officials.

Michael K. Lerch & Associates, Riverside, California *1984 to 1999*
Owner and Principal Investigator
For more than 15 years, Mr. Lerch ran a successful consulting business, providing high-quality cultural resource studies to local, state, and federal agencies, as well as private clients, throughout southern California. During this time, he surveyed thousands of acres of land for cultural resources, recorded and evaluated hundreds of prehistoric and historical-period archaeological resources, and prepared more than

350 technical reports of findings in compliance with the NHPA and CEQA. Among the major projects he conducted were the Rail-Cycle Bolo Station Landfill project in the Mojave Desert, the Calico Ghost Town inventory and management plan, the Mojave River Pipeline project, and the San Bernardino Santa Fe Yards project.

County of San Bernardino, Office of Planning *1986 to 1989*
Senior Planner, Environmental Analysis Team and General Plan Team
As a senior planner in charge of environmental analysis, Mr. Lerch supervised a staff of seven to prepare all CEQA initial studies for County projects, and selected and managed consultants who prepared environmental impact reports for both County projects and private developments. He prepared and delivered staff reports to the County Planning Commission and Board of Supervisors, and presided over public information meetings on controversial projects. He also served as a member of the General Plan Team for the 1989 General Plan update, for which he supervised preparation of the natural resources element and wrote the cultural resources element.

Archaeological Research Unit (ARU), University of California, Riverside *1984 to 1987*
Museum Scientist (Archaeologist), part-time
During his years as a graduate student, Mr. Lerch worked part-time for the ARU as a project director, during which time he conducted numerous archaeological surveys and test excavations in western Riverside County, the Coachella Valley, the San Bernardino Mountains, and the Mojave Desert. Among these were geomorphic and archaeological testing of the Elsinore site, ultimately determined to be more than 8,500 years old, and extensive studies in the Clark Mountains in the eastern Mojave Desert, where he documented a succession of use by Virgin Branch Anasazi, Colorado River Patayan, and Southern Paiute cultures.

San Bernardino County Museum Association, Redlands, California *1981 to 1984*
Archaeologist-Curator and Coordinator, San Bernardino County Archaeological Information Center
As archaeologist-curator, Mr. Lerch conducted prefield research, field surveys, test excavations, and collections research for private and public agency clients to a non-profit corporation; prepared site records, cultural resource management reports, and research reports. As information center coordinator, he maintained all the maps, site records, and report files for San Bernardino County, assigned trinomial designations to newly recorded sites, prepared records searches for private consultants as well as local, state, and federal agencies. He also conducted research on museum collections, assisted with exhibit design and interpretation, led tour groups, and spoke with local schools and avocational groups.

San Bernardino National Forest, San Bernardino, California *1980 to 1981*
Seasonal Archaeologist, GS-5
Conducted archaeological surveys in the San Bernardino Mountains in the Heart Bar dispersed recreation area, Delamar timber sale area, Holcomb Valley area, and several segments of the Pacific Crest Trail; prepared site records and Archaeological Reconnaissance Reports for each survey.

Professional Societies

Register of Professional Archaeologists, #154587
Society for California Archeology
Society for American Archaeology
Association of Environmental Professionals

DECLARATION OF
Name

I, **Amanda Cannon**, declare as follows:

1. I am presently a consultant to The California Energy Commission, **Energy Facilities Siting Division** as a **Cultural Resources Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Cultural Resources** for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/25/2007 Signed: 

At: Statistical Research, Inc., Redlands, California

Amanda C. Cannon
Statistical Research, Inc.
P.O. Box 390
Redlands, California 92373-0123

(909) 335-1896 email: acannon@sricrm.com

Education

School	Field	Degree	Year
University of California, Davis	Anthropology	B.S	2000
University of California, Davis	Environmental Sciences	B.S.	2000
Humboldt State University, Arcata, California	Archaeology/Social Science	M.A.	2006

Experience

Statistical Research, Inc. *2006 to present*
Project Director
Assist with the production of the cultural resources sections of CEQA-equivalent (California Environmental Quality Act) documents for the environmental review of proposed power plants in California, including initiating project research, evaluating historical/cultural significance of cultural resources subject to significant impacts from proposed projects, preparing data requests to applicants, collecting information from other agencies, and preparing the cultural resource sections of Preliminary and Final Staff Assessments. Additionally, direct cultural resource management projects. Past projects include archaeological testing and data recovery excavations at Loyola Marymount University, Los Angeles, California; data recovery excavations in Port Hueneme, Ventura County, California; and consultation with the Morongo Band of Mission Indians for the Riverside County Mid County Parkway Extended Phase I project. Also reviewed Environmental Impact Report documents for the Villages of Lakeview Specific Plan, Riverside County; synthesized previous archaeological investigations at CA-SNI-16, San Nicolas Island, California; prepared background information and a research design for San Nicolas Island, California, for the U.S. Army Corps of Engineers; and analyzed worked shell for the Playa Vista Archaeological and Historical Project, Marina del Rey, California.

Center for Indian Community Development, Humboldt State University *2003 to 2006*
Archaeological Research Associate
Directed more than 75 cultural resource investigations throughout California for CEQA and National Historic Preservation Act (NHPA) compliance under contract with the Department of Fish and Game, California Department of Forestry and Fire Protection, California State Parks and Recreation, Bureau of Land Management, and private land owners. Consulted with Native American groups; local, state, and federal agencies; and private land owners regarding cultural resource management issues. Assessed the eligibility of historic properties to the National Register of Historic Places and the California Register of Historical Resources. Prepared project scopes of work, research designs, effect determinations, avoidance and mitigation measures, and professional reports.

Albion Environmental, Inc. *2002 to 2003*
Archaeologist
Directed and assisted with federal, state, local, and private archaeological surveys as well as testing and data recovery excavations. Prepared and edited CEQA and NHPA compliance documents. Conducted extensive Phase I surveys for the Department of Defense at Fort Hunter Liggett, Monterey County, California as well as data recovery excavations for Federal Highway Administration and Pacific Gas and Electric Company. Prepared and edited CEQA and NHPA compliance documents; created maps, illustrations, and data tables for these documents; made effect determinations and prepared avoidance and

mitigation measures; cataloged and archived artifact collections, and developed and managed GPS/GIS mapping projects.

Far Western Anthropological Research Group, Inc. *2000 to 2002*
Archaeological Technician
Assisted with federal, state, local, and private cultural resource management projects. Coordinated with California Historical Resources Information System centers to conduct archival/records searches. Collaborated with Western Area Power Administration to design a GIS cultural resource database. Conducted archaeological surveys as well as testing and data recovery excavations for numerous agencies including Federal Highway Administration; Naval Air Weapons Station, China Lake; El Dorado Irrigation District; and Lake Tahoe Nevada State Park. Assisted with artifact analyses, database entry, and report production.

Other Archaeological Projects
2004-2006 Graduate Teaching Assistant for summer archaeological field school at CA-SNI-25, San Nicolas Island, California, Department of Anthropology, Humboldt State University, Arcata, California.
2003-2006 Graduate Teaching Assistant for archaeology lab methods, Department of Anthropology, Humboldt State University, Arcata, California.
2003 Graduate Teaching Assistant for Archaeology and World Prehistory, Department of Anthropology, Humboldt State University, Arcata, California.
1999 Student Conservation Association Intern for archaeological surveys at Lava Beds National Monument, California.
1999 Yosemite Association Archaeological Intern for backcountry archaeological surveys at Yosemite National Park, California.

Professional Societies
Register of Professional Archaeologists, #15908
Society for California Archeology
Society for American Archaeology

DECLARATION OF
Beverly E. Bastian

I, **Beverly E. Bastian**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facilities Siting Division** as a **Planner II.**

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I assisted in the preparation of the staff testimony on **Cultural Resources,** for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 20, 2007 Signed: Beverly E. Bastian

At: Sacramento, California

Beverly E. Bastian
1516 Ninth Street MS 40
Sacramento, CA 95814-5504
(916) 654-4840 email: bbastian@energy.state.ca.us

Education

School	Field	Degree	Year
University of California, Davis	Anthropology	B.A	1967
University of California, Davis	Anthropology	M.A	1969
Tulane University	Anthropology	A.B.D.	1975
University of Mississippi	American History	(courses only)	1989
University of California, Santa Barbara	Public (American) History and Historic Preservation	A.B.D.	1996

Experience

State of California, California Energy Commission *2005 to present*
Planner II, Facilities Siting Division, Environmental Office, Biological and Cultural Unit,
All tasks related to the production of the cultural resources sections of CEQA-equivalent (California Environmental Quality Act) documents for the environmental review of proposed power plants in California, including: Evaluating data in applications; writing data requests to applicants and doing independent research to compile an inventory of and evaluate the historical/cultural significance of cultural resources subject to significant impacts from proposed projects; providing and receiving information in public hearings on applications; analyzing all pertinent data; writing Staff Assessments of impacts; developing mitigation measures to reduce to insignificant any impacts to significant cultural resources; providing expert testimony on my analyses and findings in public hearings; and reviewing compliance with mitigation measures during the construction, operation, and decommissioning of certified power plants. Additional tasks include: providing prefiling assistance to applicants, reviewing the CEQA documents of sister state agencies; consulting and advising cultural resources specialists in sister state agencies; coordinating and reviewing the work of Commission cultural resources consultants; and developing internal procedures and guidelines to improve cultural resources review of applications.

State of California, Department of Parks and Recreation *2001 to 2005*
Historian I1, Cultural Resources Division, Cultural Resources Support Unit
Conduct major and complex historical and historic architectural investigations and studies dealing with the significance, integrity, and management of historic buildings, structures, and landscapes in California's state parks; participate in interdisciplinary teams and project assignments; prepare technical reports and correspondence; carry out inventories and evaluations of historic properties; coordinate the statewide registration of historical properties; assess the eligibility of historic properties to the National Register of Historic Places and the California Register of Historical Resources; review environmental documents and provide technical analyses of major Departmental projects to determine impacts to cultural resources under State and federal laws; identify resource issues and constraints; establish allowable use and development guidelines; develop approaches to protect, enhance, and perpetuate cultural resources under relevant State and federal laws, regulations, and standards; propose and develop programs, policies, and budgets to meet Department's historic preservation missions.

Department of Sociology and Anthropology, University of Mississippi *1987 to 1989*
Archaeologist, Center for Archaeological Research
All tasks for the completion of the historical archaeological part of a Phase II archaeological survey and testing program final report related to a U. S. Army Corps of Engineers erosion control project in twelve north-central Mississippi counties, including: Coordinating the activities of a field crew and the research

of historians working in archives; setting up an artifact database using survey data to generate statistical summaries for discovered historical archaeological sites; gathering historical settlement and land-use data for twelve counties; conducting a special statistical analysis and synthesis of historical data only, focusing on pre-and post-Civil War land tenure and agricultural production for plantations in two counties where soil fertility contrasted; synthesizing data from all sources, collaborating on the final cultural resources management report with archaeologists specializing in prehistory and survey and sampling methodology; presenting findings at the annual meeting of the Society for Historical Archaeology in 1989.

Gilbert Commonwealth, Inc. *1984 to 1987*
Historical Archaeologist and Project Manager, Environmental Unit
All tasks as Principal Investigator for six major historical archaeological and/or historical architectural cultural resources management projects done under contract to federal, state, and local governments, including: Writing winning proposals for these projects; negotiating and managing project budgets; gathering/supervising the gathering of historical, oral historical, and archaeological data; analyzing/supervising the analysis of gathered data; and writing/supervising the writing of reports of findings, along with the creation of maps, illustrations, and data tables for these reports; serving as the historian and historical preservationist on several multidisciplinary teams tasked with siting the routes for several major power lines in east Texas.

Tennessee Valley Authority *1979 to 1981, 1983-1984*
Land & Economic Resources, Cultural Resources Program (personal services contract)
Historical Archaeologist (self-employed)
All tasks as Principal Investigator for various cultural resources management projects in areas affected by TVA construction, the most significant of which were: the complete excavation of and report on seven nineteenth-century log-cabin sites in Cedar Creek Reservoir in northwestern Alabama; and all historical research, the field work, and the report for the underwater remote-sensing reconnaissance and underwater videotaping of sunken Civil War cargo boats and gunboats at Johnsonville, Tennessee, in the western part of the Tennessee River.

Other Archaeological Projects
1981-1982 Project Director for the field excavation, historical research, data analysis, and report on Fort Independence, South Carolina (dating to the time of the Revolutionary War) for the U. S. Army Corps of Engineers.
1975-1978 Field Director for the total excavation of French-and-Indian-War-period Fort Loudoun in east Tennessee and laboratory supervisor of artifact conservation and analysis for this project at Vanderbilt University for the Tennessee Division of Archaeology.
1974 Archaeologist and Junior Investigator for intensive historical research and archaeological testing at the defunct 19th-century northeastern Alabama river town of Bellefonte, for the Department of Anthropology and Sociology, University of Alabama, Birmingham.
1973 Teaching Assistant for a summer archaeological Field School at historic Fort Southwest Point, dating to the War of 1812, Department of Anthropology, University of Tennessee.
1967 Crew Foreman for a National Park Service-sponsored salvage excavation project along the Delaware riverfront in Philadelphia, for the Department of American Civilization, University of Pennsylvania.
1966 Excavator and a laboratory technician for two California historic sites, Old Sacramento and Old Columbia, for the Department of Anthropology at the University of California, Davis.

Professional Societies

Register of Professional Archaeologists, #10683
Society for Historical Archaeology
National Council on Public History
Vernacular Architecture Forum
Society for California Archeology
California Council for the Promotion of History

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I, Alvin J. Greenberg, Ph.D. declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on the **Hazardous Materials Management and the Worker Safety/Fire Protection** sections for the **Starwood Power Project** based on my independent analysis of the amendment petition, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Sept. 28, 2007 Signed: 

At: Sacramento, California

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader for hazardous waste site characterization, preparation of human and ecological risk assessments, air quality assessments, interaction with regulatory agencies in obtaining permits, hazardous materials handling and risk management prevention, infrastructure vulnerability assessments, conducting lead surveys and studies, with particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, and the intrusion of subsurface contaminants into indoor air. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission. In addition to providing security expertise to the State of California, Dr. Greenberg is Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 25

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002
Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)
September 2000 – February 2001
Member, State Water Resources Control Board Noncompliant Underground Tanks Advisory Group
January 1999 – June 2001
Member, California Air Resources Board Advisory Committee on Diesel Emissions
January 1994 - September 1999
Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee
September 1998
Member, US EPA Workgroup on Cumulative Risk Assessment
April 1997 - September 1997
Member, Cal/EPA Private Site Manager Advisory Committee
January 1986 - July 1996
Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)
January 1988 - June 1995
Member: California Department of Toxic Substance Control Site Mitigation Program Advisory Group
January 1989 - February 1995
Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992
Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991
Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988
ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987
California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987
Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987
Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986
Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985
Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983
Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

Present Position

January 1983- present
Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, and litigation support for toxic substance exposure cases.

Previous Positions

Jan. 2, 1983 - June 12, 1984
Member, State of California Occupational Safety and Health Standards Board (Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983
Assistant Deputy Chief for Health, California Occupational Safety and Health Administration

Feb. 1, 1979 - Aug. 1, 1979
Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979
Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975
Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

Experience

General

Dr. Greenberg has been a consultant in Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Materials Management and Security, Hazardous Waste Site Characterization and Toxic Substances Control Policy for over 25 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Since the events of 9/11, Dr. Greenberg has taken the lead for the California Energy Commission in developing a power plant vulnerability assessment methodology and model power plant security plan. He also assisted the CEC in the preparation of a "background" report on the risks and hazards of siting LNG terminals in California and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. In August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the

Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead oxide contaminated soil at DOD facilities.

Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

Mercury Contamination

Dr. Greenberg has prepared and/or reviewed several human health and ecological risk assessments regarding mercury contamination in soils, sediments, and indoor surfaces. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Examples

Review and evaluation of a human health risk assessment of ingestion of sport fish caught from San Diego Bay and which contain tissue levels of mercury and PCBs (November 2004 – present)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Air Pathway Analysis

Dr. Greenberg has prepared numerous Air Pathway Analyses and human health risk assessments, evaluating exposure at numerous locations in California, Hawai'i, Oregon, Minnesota, Michigan, and New York. He is experienced in working with Region IX EPA, the State of California DTSC, and the Hawai'i Department of Health Clean Air Branch in the application of both site-specific and non site-specific health risk assessment criteria.

Examples

Human Health Risk Assessment for the Open Burn/Open Detonation Operation at McCormick Selph, Inc., Hollister, Ca. (June 2003)

Air Quality and Human Health Risk Assessment for the Royal Oaks Industrial Complex, Monrovia, Ca. (January 2003)

Human Health Risk Assessment and Indoor Vapor Intrusion Assessment for the former Pt. St. George Fisheries Site, Santa Rosa, Ca. (October 2002)

Human Health Risk Assessment for the former Sargent Industries Site, Huntington Park, Ca. (July 2001)

Ballard Canyon Air Pathway Analysis and Human Health Risk Assessment, Santa Barbara County, Ca. (September 2000)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawai'i (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (March 1993)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Cancer Risk Assessment for the H-Power Generating Station, Campbell Industrial Park, Oahu, Hawai'i (1988)

Infrastructure Security

For the past three years, Dr. Greenberg has been trained by and is working with the Israeli company SB Security, LTD, the most experienced and tested security planning and service company in the world. Since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments and power plant security programs for the California Energy Commission (CEC). In taking the lead for this state agency, Dr. Greenberg has

interfaced with the California Terrorism Information Center (CATIC) and provided analysis, recommendations, and testimony at CEC evidentiary hearings regarding the security of power plants within the state. These analyses include the preparation of vulnerability assessments and off-site consequence analyses addressing the use, storage, and transportation of hazardous materials, recommendations for security to reduce the threat from terrorist activities, perimeter security, site access by personnel and vendors, personnel background checks, management responsibilities for facility security, and employee training in security methods. Dr. Greenberg is the lead person in developing a model power plant security plan, vulnerability assessment matrix, and a security training manual for the CEC. The model security plan will be used by all power plants in California as guidance in developing and implementing security measures to reduce the vulnerability of California's energy infrastructure to terrorist attack. He has testified at several evidentiary hearings for the CEC on power plant security issues. He has also led an audit team conducting safety and security audits at power plants throughout California that are under the jurisdiction of the CEC. In addition to providing security expertise to the State of California, Dr. Greenberg is Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Sites with RWQCB and/or DTSC Oversight

Dr. Greenberg has specific experience in assessing human health and ecological risks at contaminated sites at the land/water interface, including petroleum contaminants, metals, mercury, and VOCs at several locations in California including Oxnard, Richmond, Avila Beach, Mare Island Naval Shipyard, San Diego, Hollister, San Francisco, Hayward, Richmond, the Port of San Francisco, and numerous other locations. He has used Cal/EPA methods, US EPA methods, and ASTM Risk Based Corrective Action (RBCA) and Cal/Tox methodologies. He is extremely knowledgeable about SWRCB and SF Bay RWQCB regulations on underground storage tank sites and with ecological issues presented by contaminated sediments including sediment analysis, toxicity testing, tissue analysis, and sediment quality objectives. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Dr. Greenberg experience on many of these contaminated sites has been as a consultant to local governments, state agencies, and citizen groups. He assisted the City and County of San Francisco in developing local ordinance requiring soil testing (Article 20, Maher ordinance) and hazardous materials use reporting (Article 21, Walker ordinance). He served as the City of San Rafael's consultant to provide independent review and evaluation of the site characterization and remedial action plan prepared for a former coal gasification site. He was a consultant to a citizen group in northern California regarding exposure and risks due to accidental releases from a petroleum refinery and assisted in the assessment of risks due to crude petroleum contamination of a southern California beach. He has prepared a number of risk assessments addressing crude petroleum, diesel and gasoline contamination, including coordinating site investigations, environmental monitoring, and health risk assessment for the County of San Luis Obispo regarding Avila Beach subsurface petroleum contamination. That high-profile project lasted for over one year and Dr. Greenberg managed a team of experts with a budget of $750,000. Another high-profile project included the preparation of an extensive comprehensive human and ecological risk assessment for the Hawaii Office of Space Industry on rocket launch impacts and transportation/storage of rocket fuels at the southern end of the Big Island of Hawaii. Dr. Greenberg's risk assessments were part of the EIS for the project. Dr. Greenberg also worked on

another high-profile project conducting Air Pathway Analysis of off-site and on-site impacts from landfill gas constituents, including indoor and outdoor air measurements, air dispersion modeling, flux chamber investigations, and health risk assessment for the County of Santa Barbara.

Dr. Greenberg has conducted RI/FS work, prepared health risk assessments, evaluated hazardous waste sites and hazardous materials use at numerous locations in California, Hawaii, Oregon, Minnesota, Michigan, and New York. He has considerable experience in the development of clean-up standards and the development of quantitative risk assessments for site RI/FS work at CERCLA sites, as well as site closures, involving toxic substances and petroleum hydrocarbon wastes. He is experienced in working with both Region IX EPA and the State of California DTSC in negotiating clean-up standards based on the application of both site-specific and non site-specific health and ecological based clean-up criteria. He has significant experience in the development of site chemicals of concern list, quantitative data quality levels, site remedial design, the site closure process, the design and execution of data quality programs and verification of data quality prior to its use in the decision making process on large NPL sites.

Examples

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)
The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment, Ecological Screening Evaluation, and Development of Proposed Remediation Goals for the Flair Custom Cleaners Site, Chico, California (January 1996)

Human Health Risk Assessment for the X-3 Extrudate Project at Criterion Catalyst, Pittsburg, Ca. (November 1994)

Screening Health Risk Assessment and Development of Proposed Soil Remediation Levels at Hercules Plant #3, Culver City, Ca. (July 1993)

Ecological Screening Evaluation for the Altamont Landfill, Alameda County, Ca. (June, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawaii (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (March 1993)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Screening Health Risk Assessment for the Proposed Expansion of the West Marin Sanitary Landfill, Point Reyes Station, Ca.
(March, 1993)

Health Risk Assessment for the Proposed Expansion of the Forward, Inc. Landfill, Stockton, Ca. (September 14, 1992)

Health Risk Assessment for the Rincon Point Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency.
(August 10, 1992)

Health Risk Assessment for the South Beach Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency.
(August 10, 1992)

Screening Health Risk Assessment and Development of Proposed Soil and Groundwater Remediation Levels, Kaiser Sand and Gravel, Mountain View, Ca. Prepared for Baseline Environmental Consulting (January 30, 1992)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Preliminary Health Risk Assessment for the City of Pittsburg Redevelopment Agency, Pittsburg, California (May 29, 1991)

Military Bases

Dr. Greenberg has experience in conducting assessments at DOD facilities, including RI/FS work, preparation of health risk assessments, evaluation of hazardous waste sites and hazardous materials use at the following Navy sites in California: San Diego Naval Base; Marine Corps Air-Ground Combat Center, 29 Palms; Mare Island Naval Shipyard, Vallejo; Treasure Island Naval Station, San Francisco, Hunters Point Naval Shipyard, San Francisco, and the Marine Corps Logistics Base, Barstow. He worked with the U.S. Navy and the U.S. EPA in the implementation of Data Quality Objectives (DQO's) at MCLB, Barstow.

Examples

Review and Evaluation of the Remedial Investigation Report and Human Health Risk Assessment for the U. S. Naval Station at Treasure Island, Ca. (June 1999)

Screening Health Risk Assessment for the Proposed San Francisco Police Department's Helicopter Landing Pad at Hunters Point Shipyard, San Francisco, Ca. (September 1997)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Health Risk Assessment for the Chrome Plating Facility, Mare Island Naval Shipyard, Vallejo, California (October 24, 1988)

Background Levels and Health Risk Assessment of Trace Metals present at the Naval Petroleum Reserve No.1, 27R Waste Disposal Trench Area, Lost Hills, California (August 12, 1988)

RCRA Facility Investigation (RFI) Work Plan of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 14, 1989)

Hazardous Waste and Solid Waste Audit and Management Plan, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (July 3, 1989)

Water Quality Solid Waste Assessment Test (SWAT) Proposal RCRA Landfill, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (October 31, 1988)

Waste Disposal Facilities, Waste Haulers, Waste Recycling Facilities Report, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 22, 1988)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Air Quality Solid Waste Assessment Test (SWAT) Proposal, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 25, 1988)

Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, and worker-right-to-know (MSDSs). He has conducted numerous occupational health surveys and has extensive experience in the sampling and analysis of indoor air quality at residences, workplaces, and school classrooms.

Examples

Preliminary Report on Indoor Air Quality in Elementary School Portable Classrooms, Marin County, Ca. (December 1999)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Air Pathway Analysis for the Ballard Canyon Landfill,. Submitted to the County of Santa Barbara, (March 1999)

Review and Evaluation of the Health Risk Assessment for Outdoor and Indoor Exposures at the Former Golden Eagle Refinery Site, Carson, Ca. (May 1998)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)
The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Determination of Occupational Lead Exposure at a Tire Shop in Placerville, Ca. (April 1993)

Development of an Environmental Code of Regulations for Hazardous Waste Treatment Facilities on La Posta Indian Tribal lands, San Diego County, Ca. (August 1992)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Hazardous Materials Assessments, Waste Management Assessments, Worker Safety and Fire Protection Assessments, and Public Health Impacts Assessments

Dr. Greenberg also has significant experience as a consultant and expert witness for the California Energy Commission providing analysis, recommendations, and testimony in the areas of hazardous materials management, process safety management, waste management, worker safety and fire protection, and public health impacts for proposed power plant/cogeneration facilities. These analyses include the evaluation and/or preparation of the following:

- Off-site consequence analyses of the handling, use, storage, and transportation of hazardous materials,
- Risk Management Plans (required by the Cal-ARP) and Business Plans (required by H&S Code section 25503.5),

- Safety Management Plans (required by 8 CCR section 5189),
- Natural gas pipeline safety,
- Solid and hazardous waste management plans,
- Phase I and II Environmental Site Assessments,
- Construction and Operations Worker Safety and Health Programs,
- Fire Prevention Programs,
- Human health risk assessment from stack emissions and from diesel engines, and
- Mitigation measures to address PM exposure, including diesel particulates

Examples

- San Francisco Energy Reliability Project, San Francisco, Ca. 2004-present. Hazardous materials management, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Malburg Generating Station Project, City of Vernon, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Blythe II, Blythe, Ca. 2002-3. hazardous materials, worker safety/fire protection,
- Palomar Energy Center, Escondido, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Project, Rancho Seco, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Project, Tesla, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- San Joaquin Valley Energy Center, San Joaquin, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management
- Morro Bay Power Plant, Morro Bay, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Potrero Power Plant Unit 7, San Francisco, Ca., 2001-2: hazardous materials, worker safety/fire protection
- El Segundo Power Redevelopment Project, El Segundo, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Rio Linda Power Project, Rio Linda, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Pastoria II Energy Facility Expansion, Grapevine, Ca., 2001: hazardous materials, worker safety/fire protection
- East Altamont Energy Center, Byron, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Magnolia Power Project, Burbank, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Russell City Energy Center, Hayward, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Woodbridge Power Plant, Modesto, Ca., 2001: hazardous materials, worker safety/fire protection, waste management
- Colusa Power Plant Project, Colusa County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health

- Valero Refinery Cogeneration Project, Benicia, Ca., 2001: hazardous materials, worker safety/fire protection
- Ocotillo Energy Project, Palm Springs, Ca., 2001: hazardous materials, worker safety/fire protection
- Gilroy Energy Center Phase II Project, Gilroy, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Los Esteros Critical Energy Facility, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Roseville Energy Facility, Roseville, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Spartan Power, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- South Star Cogeneration Project, Taft, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Plant, Eastern Alameda County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tracy Peaker Project, Tracy, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Henrietta Peaker Project, Kings County, Ca., 2001: hazardous materials, worker safety/fire protection, waste management, public health
- Central Valley Energy Center, San Joaquin, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Plant, Rancho Seco, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Los Banos Voltage Support Facility, Western Merced County, Ca., 2001-2: waste management, public health
- Palomar Energy Project, Escondido, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Metcalf Energy Center, San Jose, Ca., 2000-1: hazardous materials
- Blythe Power Plant, Blythe, Ca., 2000-1: hazardous materials
- San Francisco Energy Co. Cogeneration Project, San Francisco, Ca., 1994-5: hazardous materials
- Campbell Soup Cogeneration Project, Sacramento, Ca., 1994: hazardous materials
- Proctor and Gamble Cogeneration Project, Sacramento, Ca., 1993-4: hazardous materials
- San Diego Gas and Electric South Bay Project, Chula Vista, Ca., 1993: hazardous materials
- SEPCO Project, Rio Linda, Ca., 1993: hazardous materials
- Shell Martinez Manufacturing Complex Cogeneration Project, Martinez, Ca., 1993: hazardous materials and review and evaluation of EIR

DECLARATION
OF
RICK TYLER

I, **Rick Tyler**, declare as follows:

1. I am presently employed by The California Energy Commission in the Engineering Office of the Systems Assessments and Facilities Siting Division as a Sr. Mechanical Engineer.

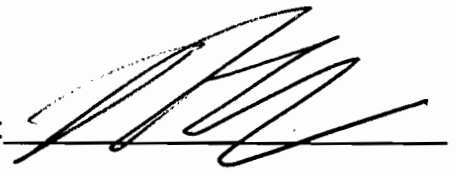
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Hazardous Material Management, and Worker Safety and Fire Protection**, for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 3, 2007 Signed: 

At: Sacramento, CA

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION

EDUCATION B.S., Mechanical Engineering, California State University, Sacramento. Extra course work in Statistics, Instrumentation, Technical Writing, Management; Toxicology, Risk Assessment, Environmental Chemistry, Hazardous Materials Management, Noise Measurement, and regulations regarding control of toxic substances.

Near completion of course work necessary to obtain a certificate in hazardous materials management from University of California, Davis.

EXPERIENCE

Jan. 1998-
Present

California Energy Commission - Senior Mechanical Engineer
Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permitting) for large power plants including the review of handling practices associated with the use of hazardous and acutely hazardous materials, loss prevention, safety management practices, design of engineered equipment and safety systems associated with equipment involving hazardous materials use, evaluation of the potential for impacts associated with accidental releases and preparation and presentation of expert witness testimony and conditions of certification. Review of compliance submittals regarding conditions of certifications for hazardous materials handling, including Risk Management Plans Process Safety Management.

April 1985-
Jan. 1998

California Energy Commission - Health and Safety
Program Specialist; Energy Facility Siting and Environmental Protection Division.

Responsible for review of Public Health Risk Assessments, air quality, noise, industrial safety, and hazardous materials handling of Environmental Impact Reports on large power generating and waste to energy facilities, evaluation of health effects data related to toxic substances, development of recommendations regarding safe levels of exposure, effectiveness of measures to control criteria and non-criteria pollutants, emission factors, multimedia exposure models. Preparation of testimony providing Staff's position regarding public health, noise, industrial safety, hazardous materials handling, and air quality issues associated with proposed power plants. Advise Commissioners, Management, other Staff and the public regarding issues related to health risk assessment of hazardous materials handling.

Nov. 1977-
April 1985

California Air Resources Board - Engineer (last 4 years Associate level)

Responsible for testing to determine pollution emission levels at major industrial facilities; including planning, supervision of field personnel, report preparation and case development for litigation; evaluate, select and acceptance-test instruments prior to purchase; design of instrumentation systems and oversight of their repair and maintenance; conduct inspections of industrial facilities to determine compliance with applicable pollution control regulations; improved quality assurance measures; selected and programmed a computer system to automate data collection and reduction; developed regulatory procedures and the instrument system necessary to certify and audit independent testing companies; prepared regulatory proposals and other presentations to classes at professional symposia and directly to the Air Resources Board at public hearings. As state representative, coordinated efforts with federal, local, and industrial representatives.

PROFESSIONAL AFFILIATIONS/ LICENSES

Past President, Professional Engineers in California Government Fort Sutter Section;
Past Chairman, Legislative Committee for Professional Association of Air Quality Specialists. Have passed the Engineer in Training exam.

PUBLICATIONS, PROFESSIONAL PRESINTATIONS AND ACCOMPLISHMENTS

Authored staff reports published by the California Air Resources Board and presented papers regarding continuous emission monitoring at symposiums.

Authored a paper entitled "A Comprehensive Approach to Health Risk Assessment", presented at the New York Conference on Solid Waste Management and Materials Policy.

Authored a paper entitled "Risk Assessment A Tool For Decision Makers" at the Association of Environmental Professionals AEP Conference on Public Policy and Environmental Challenges.

Conducted a seminar at University of California, Los Angeles for the Doctoral programs in Environmental Science and Public Health on the subject of "Health Risk Assessment".

Authored a paper entitled "Uncertainty Analysis -An Essential Component of Health Risk Assessment and Risk Management" presented at the EPA/ORNL expert workshop on Risk Assessment for Municipal Waste Combustion: Deposition, Uncertainty, and Research Needs.

Presented a talk on off-site consequence analysis for extremely hazardous materials releases. Presented at the workshop for administering agencies conducted by the City of Los Angeles Fire Department.

Evaluated, provided analysis and testimony regarding public health and hazardous materials management issues associated with the permitting of more than 20 major power plants throughout California.

Developed Departmental policy, prepared policy documents, regulations, staff instruction, and other guidance documents and reference materials for use in evaluation of public health and hazardous materials management aspects of proposed power plants.

Project Manager on contracts totaling more than $500,000.

RES.RT

DECLARATION OF
Amanda Stennick

I, **Amanda Stennick**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facility Siting Division** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use** for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 20, 2007 Signed: Amanda Stennick

At: Sacramento, CA

AMANDA STENNICK

EDUCATION

B.A. 1986 University of California, Davis, Urban and Economic Geography

WORK EXPERIENCE

April 1998 to present **Planner II.** California Energy Commission, Energy Facilities Siting and Protection Division.

Provide technical analysis of proposed energy planning, conservation, and development programs on land use and socioeconomic resources. Specific tasks include the analysis of potential land use and socioeconomic impacts, identification of mitigation measures, presentation of oral and written testimony for hearings on siting cases, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations. Recent work includes preparation of agenda and other materials for staff's environmental justice training seminar; research in the areas of demographics and poverty for environmental justice in siting cases; review of environmental justice legislation; research on energy and environmental justice issues specific to US/Mexico Border; as part of a team, authored the 2000 Quality Control Responsibilities for Division Products; authored the Environmental Justice sections for the 2001, 2003, and 2005 Environmental Performance Report; technical lead for land use section for 2005 Environmental Performance Report; CEQA review and comment on Cabrillo LNG Deepwater Port Facility NOI/NOP, City of Pittsburg Trans Bay Cable Project, and EIS/EIR for LNG facility in the Port of Long Beach.

Oct. 1993 to April 1998 **Planner I.** California Energy Commission, Energy Facilities Siting and Protection Division.

Provide technical analysis of proposed energy planning, conservation, and development programs on land use and socioeconomic resources. Specific tasks include the analysis of potential impacts, identification of mitigation measures, presentation of oral and written testimony for public hearings on siting cases, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations. Other work includes participation in the environmental justice task force; preparation of environmental justice white paper presented to Commissioners; research and preparation of discussion on discount rates and net present value for the SFEC siting project; preparation of socioeconomic section on 1996 Quincy Library Group Report; preparation of forestry section on 1997 CEC Global Climate Change Report; demographic research for environmental justice issues in siting cases.

1992 to 1993 **Project Manager/Environmental Analyst/Planner.** Beak Consultants.

Environmental Planner for EIR/EA for the Mammoth County Water District. Analyzed potential impacts resulting from lake water transfers and maintenance of in-stream flows in the Mammoth Lakes Basin; prepared land use, socioeconomics, recreation, and public services and utilities sections of EIR/EA; provided team project management.

Environmental Planner for an Effluent Treatment Plant EIR for Simpson Paper Company in Humboldt County. Authored land use, socioeconomics, recreation, public services and utilities, cumulative impacts sections, and mitigation monitoring; provided team project management.

Environmental Planner for Folsom/SAFCA Reoperation. Work involved determining parameters of project description with respect to water modeling, project geographic boundaries, and agency jurisdictional boundaries; ensured compliance with federal, state, and local plans and policies; provided team project management.

1990 to 1992 **Environmental Analyst/Project Manager.** ECOS. Inc.

Project Manager/Planner. EIR for a Planned Development, General Plan Amendment, and rezone request for a 504-acre Business and Industrial Park expansion for the Port of Sacramento. Prepared work scope and budget for Public Improvements Plan and Specific Plan for an 80-acre Mixed Use/Water Related development, including a Mitigation Monitoring Plan and Statement of Overriding Considerations for the City of West Sacramento. Specific tasks included coordination with subcontractors on technical sections of EIR, meetings with Assistant Port Director and City staff to present Public Improvements Plan, Specific Plan, tentative parcel map, and critical project phasing; and discussion with CDFG and Port staff on regional approach to mitigation for project-impacted endangered species.

Project Manager/ Planner. EIR for the Wildhorse Residential/Recreational Planned Development for the City of Davis. Specific tasks included CEQA compliance, writing technical sections on land use, project alternatives, and cumulative impacts, and determining appropriate project alternatives based on traffic models and allowable housing densities.

Project Manager. Yolo County Powerline Ordinance. Project tasks included developing siting policies and mitigation measures for placement of powerlines and substations in Yolo County.

1989 to 1990 **Assistant Planner.** Sacramento County Planning Department.

Principal Author. Energy Component of the Public Services and Facilities Element of the Sacramento County General Plan. Coordinated work efforts with the CEC, SMUD, and PG&E to develop environmental and siting policies for energy facilities and transmission lines; identified environmental impacts and appropriate mitigation measures.

1987 to 1989 **Planner/Assistant Planner.** Yolo County Community Development

Planning liaison for Homestake Mining Company's McLaughlin Mine. Conducted meetings on the Technical Review Panel's environmental monitoring of HMC's McLaughlin Mine; prepared staff reports on the implementation of use permit phasing on water quality and impacts of the tailings pond on biologic resources; organized site visits to monitor the revegetation plan and other mitigation measures as specified in the use permit; presented oral and written staff reports to the Planning Commission.

1988 **Consultant.** Pan Pacific Energy Development Corporation.

Consulting job to develop a regional energy plan for rural areas of developing countries including decentralized non-fossil fuel power plants in agricultural regions. Attended IREC and AWEA International Conference in Honolulu.

PROFESSIONAL AND CONTINUING EDUCATION

1988	California Environmental Quality Act (UC Davis)
1989	Subdivision Map Act (UC Davis)
1991	Fiscal Impact Analysis (UC Davis)
1994	APA Conference (San Francisco)
1994	Environmental Justice Conference (UC Berkeley)
1998	California Environmental Quality Act (California Energy Commission)
1999	Roundtable on Environmental Justice US/Mexico Border
2000	Local Agency Formation Commission - LAFCO (UC Davis)
2005	Geographic Information System – GIS (UC Davis)
2006	Mapping Your Community GIS and Community Analysis (Sacramento, CA)

PROFESSIONAL AFFILIATIONS

Association of Environmental Professionals
American Planning Association

DECLARATION OF
SHAHAB KHOSHMASHRAB

I, **SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.

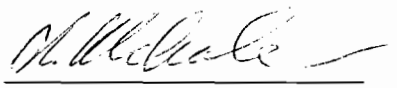
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimonies on **FACILITY DESIGN** and **NOISE AND VIBRATION**, for the **Starwood Power Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 20, 2007 Signed: 

At: Sacramento, California

Shahab Khoshmashrab
Mechanical Engineer

Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2004--Mechanical Engineer, Systems Assessment and Facilities Siting– California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

1998-2001--Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998--Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF
Dr. Obed Odoemelam

I, **Obed Odoemelam**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facilities Siting Division** as a **Staff Toxicologist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Transmission Line Safety and Nuisance** for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/20/07 Signed: Odoemelam

At: Sacramento, CA

DECLARATION OF
Dr. Obed Odoemelam

I, **Obed Odoemelam**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facilities Siting Division** as a **Staff Toxicologist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Public Health** for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/20/07 Signed: O Odoemelam

At: Sacramento, CA

RESUME

DR. OBED ODOEMELAM

EDUCATION:

1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989
The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

DECLARATION OF
Joseph Diamond

I, **Joseph Diamond**, declare as follows:

1. I am presently employed by The California Energy Commission as a **Planner II-Economist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Socioeconomics,** for the Starwood Power Project based on my analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/19/2007 Signed: Joseph Diamond, D

At: Sacramento, California

Joseph Diamond Ph. D.
Work:(916)654-3877

Ph.D. with experience in economic policy.

BUSINESS AFFILIATION

California Energy Commission
1516 9th St. MS-40
Sacramento, CA 95814

EDUCATION

Michigan State University	Ph.D.	Resource Development
University of Rhode Island	M.A.	Economics
University of New Hampshire	B.A.	Economics

DECLARATION OF
Somer Goulet M.S.E.L.

I, **Somer Goulet M.S.E.L.**, declare as follows:

1. I am presently contracted by The California Energy Commission as an environmental planner consultant.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Soils and Water Resources,** for the Starwood Power Project with Dick Anderson based on our independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/19/07 Signed: 

At: Aspen; Sacramento, CA

Aspen
Environmental Group

SOMER GOULET M.S.E.L.
Environmental Planner

ACADEMIC BACKGROUND
B.A., Environmental Studies, Pacific Lutheran University, 2005
B.A., Communication – P.R., Pacific Lutheran University, 2005
M.S.E.L., Environmental Law, Vermont Law School, 2006
UC Davis Extension: Water Quality Regulation & Permitting
UC Davis Extension: Environmental Review of California Water Projects: Legal Requirements, Approaches and Techniques

PROFESSIONAL EXPERIENCE

Ms. Goulet is an environmental planner with a multidisciplinary background in environmental studies that includes academic and professional experience in technical environmental writing, analytical environmental research, and technical data analysis. She has experience preparing environmental documents pursuant to the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA), specifically with Environmental Impact Reports (EIR) and Environmental Impact Statements (EIS). Additionally, Ms. Goulet has experience preparing water resources and alternatives analysis for large energy infrastructures.

Aspen Environmental Group **September 2006 to present**
Selected project experience at Aspen includes the following:

- **California Energy Commission –** Aspen has a multi-year contract to provide support to the Energy Facility Planning and Licensing Programs. Under this contact Ms. Goulet has participated in the following projects:
  - **Eastshore Energy Center –** Ms Goulet is co-author of the staff analysis alternatives section for the proposed 116 MW power plant consisting of 14 natural gas-fired engine generators in Hayward, Alameda County.
  - **Russell City Energy Center Amendment #1 -** Ms Goulet is co-author of the staff analysis of the alternatives section for the petition to amend the Commission Decision in order to move the project location 1,300 feet from the original location in Hayward, Alameda County.
  - **Panoche Energy Center (PEC) –** Ms Goulet is co-author of the staff analysis of the water and soils section for the proposed PEC simple-cycle electrical generation facility consisting of four General Electric LMS100 natural gas-fired combustion turbine generators (CTGs) in western Fresno County near the Cities of Mendota and Firebaugh.
  - **Starwood-Midway Power Plant -** Ms Goulet is co-author of the staff analysis of the soils and water section for the proposed 120 MW simple-cycle peaker power plant in western Fresno County near the Cities of Mendota and Firebaugh.
  - **Walnut Creek Energy Park –** Ms. Goulet is co-author of the staff analysis of the alternatives section for the proposed nominal 500 MW simple-cycle power plant in the City of Industry, Los Angeles County.

- **Project Management Assistance for the CEC.** Ms. Goulet is assisting with project management tracking of over 17 Aspen sub-contractor projects with the CEC. Ms. Goulet tracks and updates project deliverables, presentations, and status reports under the directions of Dr. Carl Linvill.
- **Technical Studies for CEC.** Ms. Goulet also assists the California Energy Commission on special studies of energy issues affecting California
    - **2006 Committee Draft Report, Integrated Energy Policy Report Updates –** Ms. Goulet provided technical assistance to a primary author of the IEPR Update on Smart Growth and Green Communities as well as Land Use.

For the **California Public Utilities Commission**:

- **Sunrise Powerlink Transmission Line Project –** Under contract to the California Public Utilities Commission (CPUC), Aspen is preparing an EIR/EIS for a 150-mile proposed transmission line from Imperial Valley Substation, near El Centro, California, to Peñasquitos Substation in northwestern San Diego County. The Proposed Project would potentially deliver renewable resources from the Imperial Valley via a 500 kV transmission line to a new 500/230 kV substation, and from the new substation to western San Diego via 230 kV overhead and underground transmission lines. Ms. Goulet is analyzing the impacts to, as well as writing, the Transportation and Traffic, Future Connected Actions, and Comparison Sections for Transportation and Traffic. Additionally, Ms. Goulet is preparing the Environmental Justice, Cumulative Analysis, non-wires alternative sections on Biomass/Biogas and San Diego Community Power Plant. Ms. Goulet is also providing technical support for the Policy Consistency Report as well as baseline research on federal, state, and local jurisdictions of a 500kV transmission line project and land use.

For the **Western Area Power Administration:**

- **Sacramento Area Voltage Support (SVS) –** Under contract to Western, Aspen is preparing a SEIS and EIR for a double-circuit 230 kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. Ms. Goulet is currently providing project support to the Project Manager and has facilitated two public forums, team meetings, as well as production of numerous project documents and mailings.
- **North Area ROW Maintenance Project** – Ms. Goulet is currently providing project support to prepare an Environmental Assessment associated with the change in operation and maintenance procedures along Western's transmission line ROWs between Sacramento (Sutter/Yuba County line) and the Oregon border. This project also includes a detailed survey of the natural resources along 434 miles of North Area ROW, 342 miles of COTP ROW, and several hundred miles of access and maintenance roads. Ms. Goulet is working closely with project management and resource specialists to assist with the technical sections for Air, Noise, Transportation, and Compliance with Environmental Laws and Regulations as well as provided backup support for biological impact reports and GIS data program development.

For the **Marina Coast Water District/Bureau of Reclamation:**

- **Marina Coast Water District (MCWD) Regional Urban Recycled Water Project (RWP) –** Ms. Goulet researched, analyzed, and prepared the socioeconomics/environmental justice section of the Marina Coast Water District's EIR for the construction of a recycled water distribution system to provide recycled water from the Monterey Regional Water Pollution Control Agency (MRWPCA) Salinas Valley Reclamation Project tertiary wastewater treatment facility (SVRP) to urban users within the Cities of Marina, Seaside, and Del Rey Oaks, and the County of Monterey.

PREVIOUS EXPERIENCE

Ross & Associates Environmental Consulting, Ltd. **May to July 2006**
Research Associate, Intern

- Research on state legislation and policies regarding the promotion of renewable fuels, blending requirements, tax exemption, vehicle fleet requirements, and many other policy approaches
- Research and analysis on conservation trading, water, carbon, ecological, and other TMDL trading approaches
- Compiled a broad clearinghouse of state activities and identified leading – edge examples of environmental approaches which could be used in federal, state and local governmental programs

DECLARATION OF
Richard L. Anderson

I, **Richard L. Anderson**, declare as follows:

1. I am presently employed by The California Energy Commission in the Systems Assessment and Facilities Siting Division as a consulting water and soil specialist.

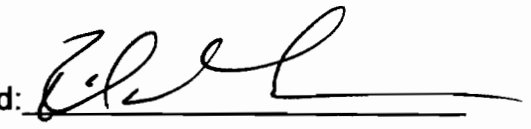
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Water and Soil Resources, for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/19/07 Signed: 

At: Davis California

RICHARD L. ANDERSON

2850 Layton Dr.
Davis, CA 95616
530.758.4672
Danderson@cal.net

EDUCATION

1976 B.S. Biological Sciences, University of California at Davis

EXPERIENCE

March 2005 – Current Retired from California Energy Commission March 15, 2005. Currently consulting with special expertise in wind energy and wildlife interactions, transmission lines and wildlife interactions, power plant biological resource issues/impacts, and power plant soil and water resource issues/impacts.

March 2001 – March 2005 Energy Facilities Siting Planner lll---Supervised the Biology, Water, and Soil Resources Unit of the Systems Assessment and Facilities Siting Division. Responsible for biology, water, and soil staff and related products regarding energy planning, policy, and siting. This included the responsibility for marine and terrestrial biology, water quality and water supply, and soil resource assessments on numerous power plant projects including once-through cooled power plants such as Moss Landing, Moro Bay, Potrero, El Segundo, and South Bay.

August 1979- March 2001 Planner l and Planner ll---Staff Biologist, California Energy Commission Developed and reviewed planning and policy objectives for California's energy facility siting program. Worked on interdisciplinary teams responsible for review and preparation of Environmental Impact Reports, environmental planning projects, and locational analyses. Provided expert testimony in the area of biological resources. Acted as project manager and contract manager for field research. Organized and directed workshops. Surveyed existing and proposed energy facility sites. Coordinated biological resource issue evaluation and mitigation planning with Federal, State; and local agencies and other interested parties. Managed several complex multi-year research projects.

October 1977- July 1979 Environmental Specialist ll, California State Resources Control Board Responsible for environmental documents produced in the Division of Water Right's application unit. Analyzed and evaluated impacts of direct diversion and/or water storage (reservoir) on the environment. Coordinated and communicated with other State, Federal and local agencies, and the general public. Trained new employees.

PROFESSIONAL AFFILIATIONS/

Raptor Research Foundation
The Wildlife Society---Certified Wildlife Biologist, TWS

CERTIFICATION	American Ornithological Union Coopers Society American Field Ornithologists Swainson's Hawk Technical Advisory Committee International Erosion Control Association National Wind Coordinating Committee
AWARDS AND RECOGNITION	The Raymond F. Dasmann Award for ***PROFESSIONAL OF THE YEAR*** in 2000---*awarded by the* Western Section of The Wildlife Society ***Dedicated Service Award*** for Chairing the California Interagency Wildlife Task Group in 1991-1992
PUBLICATIONS	Author of numerous staff testimonies for the California Energy Commission including for extremely complicated and complex marine biology and water quality issues associated with once-through cooling power plants. Author of numerous environmental assessments for water diversion and impoundment projects. Author of numerous reports and papers regarding conservation of T&E species, wind energy/bird interactions, and standard metrics and methods for monitoring bird interactions with wind turbines/utility structures.
REFERENCES	Terrence O"Brien, Deputy Director of California Energy Commission, In charge of Systems Assessment and Facilities Siting Division. Address: California Energy Commssion,1516 Ninth Street, Sacramento CA, 95814. Phone: 916.654.3924. Roger E. Johnson, Manager of Siting Office, California Energy Commission. Address: California Energy Commission, 1516 Ninth Street, Sacramento CA, 95814. Phone: 916.654.4162.

DECLARATION OF
James Adams

I, **James Adams**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Environmental Office** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Traffic and Transportation,** for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 20, 2007 Signed: 

At: Sacramento, California

James S. Adams, M.A.
Environmental Protection Office
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5504
PH (916) 653-0702, FAX (916) 651-8868
jadams@energy.state.ca.us

5/1999
Present **Environmental Planner**
Review applications for certification to acquire permits from the California Energy Commission to build electric generating power plants. Specific technical fields include socioeconomics, traffic and transportation, land use and visual resources. Work on special projects as requested.

11/1997
Present **Energy and Resource Consultant**
Provide clients with technical expertise on various issues related to natural resource use and development. Current activities include managing an intervention by the Surfrider Foundation before the California Public Utilities Commission regarding decommissioning issues concerning Humboldt Bay, Diablo Canyon and San Onofre nuclear reactors.

9/1994--
10/1997 **Senior Analyst - Safe Energy Communication Council (SECC)**
Responsible for developing and/or implementing campaigns on various energy issues involving the promotion of energy efficiency and renewable energy and advocating less reliance on nuclear power. Managed educational outreach efforts to newspaper editorial writers throughout the U.S. to encourage coverage of energy issues. Participated in meetings and negotiations with key Clinton administration officials, members of Congress and staff, national coalitions, and grassroots organizations on important energy issues (e.g. U.S. Department of Energy Budget for Fiscal Years 1996-1998). Successfully raised $140,000 from private foundations to support SECC activities.

6/1978--
12/1992 **Principal Consultant - Redwood Alliance**
Provided consulting services to the Alliance; a renewable energy/political advocacy organization. Major responsibilities included managing and/or participating in several interventions/appearances before the California Public Utilities Commission, California Energy Commission, California Legislature, U.S. Congress and the U.S. Nuclear Regulatory Commission. Issues included electric utility planning options, greater reliance on energy efficiency and renewable energy, nuclear power economic analyses, decommissioning cost estimates, and nuclear waste management and disposal.

2/1983--
8/1986 **Natural Resource Specialist**
Assisted private consulting, firms, non-profit corporations and government agencies in various projects related to the enhancement and protection of national forests in Northern California and Southern Oregon. This included contracts with the U.S. Forest Service, Fish and Wildlife Service, National Park Service, the California Coastal Conservancy, and private landowners.

6/1978--
present Consultant/Journalist/Paralegal/Lobbyist
Throughout the period of work outlined above, I have written a considerable amount of news articles and reports connected to ongoing-projects and issues of personal interest. The leg, al/administrative interventions have required extensive paralegal work to support attorneys, and technical expertise to identify and assist consultants. In addition, many of the projects required consulting services and lobbying, at the local, state and federal level whenever necessary, as well as working with the print and television media as appropriate.

From 1978 through 1984 1 served on the Board of Directors for two locals non-profit agencies devoted to sustainable community development, Redwood Community Development Council and Redwood Community Action Agency (RCAA). I also was hired on staff at RCAA as a natural resource specialist which is explained more fully above. I am proficient with computers, printers, fax machines and related equipment.

EDUCATION

M.A. Social Science. Political science and natural resources emphasis. California State University at Humboldt. Graduated December 1988.

B.A. Political Science. Political and economic aspects of natural resource development, with a particular emphasis in forest ecology and appropriate technology. California State University at Humboldt. Graduated June 1978.

Academic
Honors. Member of PI GAMMU MU Honor Society since 1986.

MILITARY SERVICE

7/1969--
9/1975 U.S. Navy. Air Traffic Controller.
Honorable Discharge.

DECLARATION OF
Mark R. Hamblin

I, **Mark R. Hamblin** declare as follows:

I am presently employed by the California Energy Commission in the Environmental Protection Office of the Energy Facilities Siting Division as a Planner II.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I prepared the staff testimony for the Visual Resources section for the proposed Starwood Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Sept. 19, 2007 Signed: Mark R. Hamblin

At: Sacramento, California

MARK R. HAMBLIN

Summary

Public administrator/land use planner with 15 years experience addressing land use development matters of concern to citizens and government leaders. Expertise in interpreting public policy pertaining to land use and environmental assessment. Demonstrated ability in working with individuals, and on teams involved in the development permitting process.

Professional Experience

California Energy Commission, Sacramento, CA.
Planner II November 2000 to present.
Prepares an independent technical analysis in the area(s) of land use, traffic & transportation, and visual resources to inform interested persons and to make recommendations to the Energy Commission regarding the consequences of a natural gas fired power generation plant proposal; reviews information provided by the applicant and other sources to assess the environmental effects of a proposal as required by the California Environmental Quality Act (CEQA), and the California Energy Commission siting regulations; evaluates project in accordance with federal, state and local laws, ordinances, regulations, standards (LORS); coordinates proposal with federal, state and local agencies; conducts field studies; oversees technical consultant(s); participates in public workshop(s) on proposal; presents sworn testimony during evidentiary hearings; implements compliance monitoring programs for projects approved by the Energy Commission to ensure that power plants are constructed and operated according to the conditions of certification of their license.

Yolo County Planning and Public Works Department, Woodland, CA.
Associate Planner June 1992 to October 2000.
Advised and assisted individuals in the processing of land use requests (general plan amendments, conditional use permits, subdivision maps, etc.); reviewed information provided by the applicant and other sources for consistency with the state zoning and planning law, the county General Plan, the county government code, and the requirements of the CEQA; collected and analyzed information pertaining to a land use request and presented it in a staff report for consideration by the county planning commission and/or county board of supervisors; board of supervisors liaison, and planning department staff person to citizen and inter-agency committees (county airport advisory committee, county habitat conservation plan steering committee, and community general plan citizen advisory committee(s); drafted zoning ordinances and regulations; prepared environmental assessment documents in accordance with CEQA and NEPA (National Environmental Protection Act); hired and supervised consultants; executed county zoning administrator duties; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use issues and development proposals in the County.

Yolo County Community Development Agency, Woodland, CA.
Assistant Planner January 1991 to June 1992.
Advised and assisted individuals in the processing of land use requests; reviewed information provided by the applicant and other sources for consistency with the county

General Plan, the state and county government code, and the requirements of CEQA; collected and analyzed information pertaining to a land use request and presented it in a staff report for consideration by the county planning commission; drafted zoning ordinances; prepared environmental assessment documents in accordance to the CEQA; supervised consultants; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use and development in the County.

Tulare County Planning and Development Department, Visalia, CA.
Planning Technician II March 1988 to January 1990.
Advised and assisted individuals in the processing of land use requests, specifically special-use permits, variances, parcel and subdivision maps; reviewed information provided by the applicant and other sources for consistency with the county General Plan, the state and county government code, and the requirements of CEQA; collected and evaluated information for presentation in a staff report on the proposed land use request for consideration by the county zoning administrator, site plan review committee, or planning commission; prepared environmental assessment documents in accordance with CEQA; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use and development in the County.

Education

University of California, Davis Extension. Coursework in California Land Use Planning and the California Environmental Quality Act 1988 to 1995.
Cosumnes River College. Coursework in Television and Radio Broadcasting1990 to 1991.
California State University, Bakersfield. Master of Public Administration; August 1988. Concentration in Public Policy. Coursework in Business Administration and Political Science.
California State University, Sacramento. Bachelor of Science in Public Administration; May 1984. Concentration in Human Resources Management.
Porterville College. Associate in Arts Social Science; May 1982. Coursework in Administration of Justice.

Awards

2001 Superior Accomplishment Award - Recognition of outstanding performance and contribution as a Team Member of the “21 Day, 4, 6, and 12 Month Processes Team.” California Energy Commission.

2001 Superior Accomplishment Award - Recognition of outstanding performance and contribution as a Team Member of the “Expedited 4 Month AFC/SPPE Team,”
California Energy Commission.

DECLARATION OF
Ellen Townsend-Hough

I, **Ellen Townsend-Hough** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Siting Office of the Energy Facilities Siting Division as an Associate Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Waste Management for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/24/07 Signed: Ellen Townsend-Hough

At: Sacramento, California

Ellen Townsend-Hough

SUMMARY

I am a chemical engineer with over 20 years of experience. My professional career has afforded me many unique growth and development opportunities. Working knowledge of the California Environmental Quality Act. Strength in analyzing and performing complex engineering analyses. Also worked as a policy advisor to a decision-maker for three years.

PROFESSIONAL EXPERIENCE

Writing

- Write letters, memos, negative declarations, environmental impact reports that require technical evaluation of mechanical engineering and environmental aspects of pollution control systems, environmental impacts, public health issues and worker safety.

Technical Analysis and Presentation

- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems

- Review and process compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects

- Provides licensing recommendations and function as an expert witness in regulatory hearings.

- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.

- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure

- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts

Technical Skills

- Establish mitigation that reduces the potential for human exposure to levels which would not result in significant health impact or health risk in any segment of the exposed population.

- Assist with on-site audits and inspection to assure compliance with Commission decisions.

- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.

- Work with the following software applications: WORD, Excel, and PowerPoint.

Policy Advisor

- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission's power plant licensing, research and development and export programs.

- Track and provide research on varied California Energy Commission (CEC) programs. Prepare analysis of economic, environmental and public health impacts of programs, proposals and other Commission business items.

- Represent Commissioner's position in policy arenas and power plant siting discussions.

- Write and review comments articulating commission positions before other regulatory bodies including Air Resources Board, California Public Utilities Commission, and the Coastal Commission.

- Wrote speeches for the Commissioner's presentations.

EMPLOYMENT HISTORY

2002-Present	Associate Mechanical Engineer	CEC Sacramento CA
1999-2002	Advisor to Commissioner	CEC Sacramento CA
1989-1999	Associate Mechanical Engineer	CEC Sacramento CA
1992-1993	Managing Partner	EnvironNet Sacramento CA
1988-1989	Sales Engineering Representative	Honeywell Inc Commerce CA
`1987-1988	Chemical Engineer	Groundwater Technology Torrance CA
1985-1986	Technical Marketing Engineer	Personal Computer Engineers Los Angeles CA
1985-1985	Energy Systems Engineer	Southern California Gas Company Anaheim CA
1980-1985	Design and Cogeneration Engineer	Southern California Edison Rosemead CA
1975-1980	Student Chemical Engineer	Gulf Oil Company Pittsburgh PA

EDUCATION

Bachelor of Science, Chemical Engineering
Drexel University, Philadelphia Pennsylvania

Continuing Education

Hazardous Material Management Certificate, University California Davis
Urban Redevelopment and Environmental Law, University of California Berkley
Analytical Skills, California Department of Personnel Administration (DPA) Training Center
Legislative Process/Bill Analysis, DPA Training Center
Federally Certified Environmental Justice Trainer

References furnished upon request.

DECLARATION OF
PATRICK A. PILLING, Ph.D., P.E., G.E.

I, **Patrick A. Pilling**, declare as follows:

1. I am presently employed by Black Eagle Consulting, Inc. under contract with the California Energy Commission Facilities Siting and Environmental Protection Division as a Geotechnical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **GEOLOGY AND PALEONTOLOGY,** for the **Starwood Power Project** based on my independent analysis of the Application for Certification, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 20, 2007 Signed: _____

At: Reno, Nevada

PATRICK A. PILLING, Ph.D., P.E., G.E.
Executive Vice President
Principal Geotechnical Engineer

Education

- $ B.S. B Civil Engineering B1986 B Santa Clara University
- $ M.S. B Civil Engineering B 1991 B San Jose State University
- $ Ph.D. B Civil Engineering B 1997 B University of Nevada, Reno

Registrations

- P.E. - Civil - Nevada – No. 9153
- P.E. - Civil – California – No. C 49578
- P.E. - Geotechnical – California – No. GE 2292
- P.E. - Civil - Oregon – No. 19675PE
- P.E. – Geotechnical – Oregon – No. 19675PE
- P.E. - Civil – Arizona – No. 35310
- P.E. - Civil – Utah – No. 971338-2202

Associated Experience

- University of Nevada, Reno - Course Instructor - CE 771 - Mining Waste Containment Design
- University of Nevada, Reno - Course Instructor - CE 771 - Practical Foundation Engineering

Experience

1997 to Present: Black Eagle Consulting, Inc.; Executive Vice President. Dr. Pilling maintains over 18 years of construction, geotechnical, transportation, and mining engineering experience, and has supervised the engineering and construction of such projects throughout the western United States and South America. As Executive Vice President, Dr. Pilling oversees daily office operations, including personnel and accounting issues, coordinates company marketing efforts, and performs project management, engineering and laboratory analyses, and report preparation on most projects. Dr. Pilling presently serves as our project manager of the Reno Retrack construction management team reviewing geotechnical design submittals for this rail project.

1996 to 1997: SEA, Incorporated; Senior Geotechnical Engineer. Dr. Pilling provided project coordination, management, supervision, and development, and performed field exploration, engineering analyses, and report preparation.

1990 to 1996: WESTEC; Project Manager. Mr. Pilling was responsible for general geotechnical analyses on most projects, as well as design, management, and permitting of heap leach and tailings storage facilities projects. His experience varied from foundation design recommendations for small pump house structures to detailed liquefaction and seepage/slope stability analyses for large earthen embankments.

1986 to 1990: Case Pacific Company; Project Manager. Mr. Pilling provided cost estimating, project management, and contract negotiation on a wide variety of projects. Responsibilities included design and

construction of drilled shafts, earth retention, and underpinning systems, in addition to construction scheduling and cost control.

Affiliations

- $ American Public Works Association
- $ American Concrete Institute: Concrete Field Testing Technician Grade I
- $ National Society of Professional Engineers
- $ Secretary/Treasurer - National Society of Professional Engineers, Northern Nevada Chapter
- $ American Society of Civil Engineers
- $ International Association of Foundation Drilling
- $ National Council of Examiners for Engineering and Surveying
- $ American Society of Engineering Education
- $ Deep Foundations Institute

Publications

Ashour, M., P. A. Pilling, G. M. Norris, and H. Perez, June 1996, ADevelopment of a Strain Wedge Model Program for Pile Group Interference and Pile Cap Contribution Effects,@ Report No. CCEER-94-4, University of Nevada, Reno; Federal Study No. F94TL16C, Submitted to State of California Department of Transportation (CalTrans).

Ashour, M., P. A. Pilling, and G. M. Norris, March 1997, ADocumentation of the Strain Wedge Model Program for Analyzing Laterally Loaded Isolated Piles and Pile Groups,@ Proceedings, 32nd Symposium on Engineering Geology and Geotechnical Engineering, Boise, Idaho, pp. 344-359.

Ashour, M., P. Pilling, and G. Norris, 1998, "Updated Documentation of the Strain Wedge Model Program for Analyzing Laterally Loaded Piles and Pile Groups," Proceedings, 33rd Engineering Geology and Geotechnical Engineering Symposium, University of Nevada, Reno, pp. 177-178.

Ashour, M., G. Norris, and P. Pilling, April 1998, ALateral Loading of a Pile in Layered Soil Using the Strain Wedge Model,@ Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 124, No. 4, pp. 303-315.

Ashour, M., G. M. Norris, S. Bowman, H. Beeston, P. Pilling, and A. Shamsabadi, March 2001, "Modeling Pile Lateral Response in Weathered Rock," Proceeding 36th Engineering Geology and Geotechnical Engineering Symposium, University of Nevada, Las Vegas, 2001.

Ashour, M., G. Norris, and P. Pilling, July/August 2002, "Strain Wedge Model Capability of Analyzing the Behavior of Laterally Loaded Isolated Piles, Drilled Shafts, and Pile Groups," Journal of Bridge Engineering, ASCE, Vol. 7, No 4, pp. 245-354.

Ashour, M., P. Pilling, and G. M. Norris, March 26 – 31, 2001, "Assessment of Pile Group Response Under Lateral Load," Proceedings, 4th International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, University of Missouri – Rolla, MO, Paper 6.11.

Norris, G. M., M. Ashour, P. A. Pilling, and P. Gowda, March 1995, AThe Non-Uniqueness of p-y Curves for Laterally Loaded Pile Analysis,@ Proceedings, 31st Symposium on Engineering Geology and Geotechnical Engineering, Logan, Utah, pp. 40-53.

Norris, G. M., P. K. Gowda, and P. A. Pilling, February 1993, AStrain Wedge Model Formulation for Piles,@ Report No. CIS 91-11, University of Nevada, Reno.

Pilling, P. A., 1997, AThe Response of a Group of Flexible Piles and the Associated Pile Cap to Lateral Loading as Characterized by the Strain Wedge Model,@ Doctoral Dissertation, University of Nevada, Reno.

Pilling, P. A. and P. V. Woodward, March 1995, ADependent Facility Closure in California,@ Proceedings, Mine Closure: Creating Productive Public and Private Assets, Sparks, Nevada, pp. 315-326.

Pilling, P.A. and H. E. Beeston, March 1998, AExpansion Testing of Clay Soils in Forensic Investigations,@ Proceedings, 33rd Symposium on Engineering Geology and Geotechnical Engineering, Reno, Nevada, pp. 119-127.

Pilling, P.A., M. Ashour, and G.M. Norris, 2001, "Strain Wedge Model Hybrid Analysis of a Laterally Loaded Pile Group," Journal of the Transportation Research Board, Transportation Research Record No. 1772, Paper No. 01-0174, pp. 115-121.

Pilling, P.A., July 2002, "Assessing the Liquefaction Potential of Sand Deposits Containing an Appreciable Amount of Gravel," Program with Abstracts 2002 Annual Meeting Association of Engineering Geologists and American Institute of Professional Geologists, Reno, Nevada, p35.

Awards

- Hugh B. Williams Industry Advancement Scholarship, International Association of Foundation Drilling (ADSC), 1993-94.

- National Society of Professional Engineers, Northern Nevada Chapter, Young Engineer of the Year, 1996.

DECLARATION OF
Steve Baker

I, **Steve Baker,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Facilities Siting Division as a **Senior Mechanical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Power Plant Efficiency** and **Power Plant Reliability** and supervised preparation of the staff testimony on **Facility Design**, **Noise and Vibration**, and **Geology and Paleontology** for the **Starwood Power Project** based on my independent analysis of the Application, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 20, 2007 Signed: _____

At: Sacramento, California

STEVE BAKER, P.E.
Senior Mechanical Engineer

Experience Summary

Thirty-two years experience in the electric power generation field, including mechanical design, QA/QC, construction/startup and business development/licensing of nuclear, coal-fired, hydroelectric, geothermal and windpower plants; and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Long Beach--Master of Business Administration
- California State Polytechnic University, Pomona--Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California — No. M27737 expires 6/30/06

Professional Experience

1990 to Present--Senior Mechanical Engineer, Facilities Siting Division - California Energy Commission

Technical lead person for the analysis of generating capacity, reliability, efficiency, noise, geology, paleontology and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases. Key contributor to Commission's investigation into market impediments to the deployment of advanced high-efficiency generating technologies.

1987 to 1990--Generation Systems/Facility Design Unit Supervisor, Siting & Environmental Division - California Energy Commission

Responsible for supervising the analysis of generating capacity, reliability, efficiency, safety, and mechanical, civil/structural, and geotechnical engineering aspects of power plant siting cases.

1981-1986--Operations Manager, Alternate Energy - Santa Fe Pacific Realty Corporation

Participated in and supervised identification, evaluation and feasibility analysis, licensing and permitting of hydroelectric, geothermal, windpower and biomass power projects.

1974-1981--Mechanical Engineer, Quality Engineer - Bechtel Power Corporation and Bechtel National, Inc.

Wrote equipment specifications, drew flow diagrams and P&ID's, performed system design and safety analysis for nuclear power plants and nuclear fuel processing plant. Wrote and implemented QA/QC procedures for nuclear power plant. Participated in construction/startup of large coal-fired power plant.

DECLARATION OF
LAIPING NG

I, Laiping Ng declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Energy Facilities Siting Division as an Associate Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Transmission System Engineering, for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/19/2007 Signed: Laiping Ng

At: Sacramento, California

Laiping Ng
Associate Electrical Engineer

Education:

Master of Science: Electrical Engineering - Power
California State University, Sacramento. December 1997.

Bachelor of Science: Electrical Engineering - Power
California State University, Sacramento. May 1991.

Power Certificate – EPRI, May 1991

Experience:

April 1999 – Present:

- Review and evaluate electrical transmission system sections of the application to ensure that the transmission engineering aspects of the power plant, switchyards, substations, and the related facilities comply with applicable laws, ordinances, regulations, and standards (LORS).

- Prepare written analysis, which address the issues of the adequacy of proposed projects to meet applicable LORS.

- Perform load flow studies and fault analysis.

- Coordinate with CAISO, WSCC and other regulatory agencies and coordinate with utilities companies in the review and evaluation of the power plant siting process.

May 1991 – April 1999:

- Prepared engineering bid specifications for recommended lighting and HVAC projects. Evaluated contractor bids and recommended contractors to customers. Reviewed RFPs and RFQs. Evaluated, selected, and managed engineering consultants. Administrated and coordinated contracts.

- Designed electrical systems for indoor and outdoor lighting and lighting controls. Assisted in design cooling systems and controls for school buildings and office buildings. Reviewed and checked electrical lighting designs and drawings. Analyzed designs and made recommendations for effective actions.

- Performed facility energy audits and field surveys on schools, offices, hospitals and county jail facilities to identify energy efficiency improvements and cost estimate with respect to lighting and HVAC systems. Inspected lighting and HVAC system equipment installation.

- Worked with regulatory agencies to conduct day-to-day basis works such as participated in Nonresidential Energy Efficiency Standards development teams. Prepared and updated Standards concentrating on interior building illumination and indoor and outdoor flood lighting.

DECLARATION OF
Mark Hesters

I, **Mark Hesters**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Systems Assessment and Facilities Siting Division** as a **Senior Electrical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Transmission System Engineering,** for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Sept 20, 2007 Signed: _____

At: Sacramento

Mark Hesters
Associate Electrical Engineer

Mark Hesters has fourteen years of experience in electric power regulation. He worked in the Engineering Office of the California Energy Commission's Energy Facilities Siting & Environmental Protection Division since 1998 providing analysis of California transmission systems and testimony on transmission systems in several Commission power plant certification processes. Prior to that Mark worked in the CEC's Electricity Analysis Office providing lead analysis on Southern California Edison resource issues and modeling support for all areas of California. He holds a B.S. degree from the University of California at Davis in Environmental Policy Analysis and Planning.

DECLARATION
OF
JAMES W. REEDE, JR., Ed.D

I, **James W. Reede, JR., Ed.D**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Energy Facility Siting Division** as a **Project Manager**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Alternatives** for the Starwood Power Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 28, 2007 Signed: 

At: Sacramento, CA

JAMES W. REEDE, JR., Ed.D

EDUCATION

Organization & Leadership in Public Mgmt.	University of San Francisco	Ed.D	2003
Public Policy & Administration	California State University – Sacramento	MPPA	1998
Organizational Behavior	University of San Francisco	BS	1979
Electrical & Electronics Technology	Community College of the Air Force	Certificate	1973
General Engineering	U.S. Military Academy		1971

PROFESSIONAL TRAINING

Process Control Engineering	General Electric Technical Training Services	1974-1976
Manufacturing Management	General Electric Management Training Services	1978-1980
Boardsmanship Academy	California School Boards Association	1982-1987
Contract Management	U.S. Air Force Institute of Technology at WPAFB	1986-1988
	Professional Designation - National Contract Mgmt Assoc.	1988
Federal Managers Training Institute	U.S. Office of Personnel Management	1986-1989
City Management Academy	City of Sacramento	1995
Adjunct Faculty Academy	University of San Francisco	1999
California Environmental Quality Act	UC Davis Extension	2000-2006
Planning for Higher Education Facilities	UC Davis Extension	2002
CEQA Advanced Workshop	Association of Environmental Professionals	2007

PROFESSIONAL EXPERIENCE

ENERGY FACILITY SITING PROJECT MANAGER II

California Energy Commission Feb 2000-Present

I plan, organize, direct and manage the state regulatory licensing process for electric generating plants from the Application for Certification through the issuance of the final operating permit. I plan, organize, direct, and manage the efforts of 23 multidisciplinary environmental and engineering staff and coordinate over 35 outside agencies for environmental review, project certification, permitting, construction, compliance, and enforcement actions related to the California Environmental Quality Act (CEQA) requirements. I recommend actions, policies and procedures affecting the project and commission program direction. I conduct community outreach, public workshops and hearings related to proposed projects. I compile, edit, and issue Staff environmental assessments and other CEQA related documents. I have collateral duties that include legislative analysis of energy and environmental related bills, siting policy and regulations, nuclear power, renewable technology integration, budget development, and state infrastructure improvement. I updated and revised the Commission's Rules of Practice and Procedures & Power Plant Site Certification Regulations.

PUBLIC UTILITIES REGULATORY ANALYST III

California Public Utilities Commission Aug 99-Jan 2000

I performed technical and analytical research as well as consultative and advisory services in the areas of utility operations, economics, finance and policy. I analyzed, evaluated, developed and recommended research methodologies and alternatives on energy related regulatory issues. Reviewed utilities' applications for revenue in various proceedings. Evaluated proposed legislation and advised Commission on potential impacts. Provided expert advice on electricity deregulation issues and testimony in support of, and on behalf of the Commission.

PART-TIME PROFESSOR

CSU Sacramento - Environmental Science & Business Administration Depts. Sept 03-Present

I instruct undergraduate and graduate students in Environmental Science, Environmental Impact Analysis CEQA / NEPA, Fundamentals of Business Strategy, State & Local Government, Public Administration and Policy, Operations & Production Management, and Land Use courses.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

A. Senior Contract Administrator Jan 92-Jan 99

I developed and issued a variety of construction and professional services solicitations and evaluated responses. I negotiated, awarded, and managed contracts. Reviewed and approved invoices and developed the database to track contracts. I was responsible for all general services, facilities and construction contracts and budgets. Reviewed pending legislation to determine impact on District activities.

B. Key Accounts Contract Specialist (Temp Assignment) Feb 98-Oct 98

Develop customized power contracts for use with the District's medium and large Commercial and Industrial customers. Negotiated customer rate agreements and implemented deregulation requirements into customer service contracts. Identify potential customers for Key Account targeting and develop profiles for retention.

EDUCATION & MANAGEMENT CONSULTANT (*Self-Employed*) June 90-June 99

I provided statewide outreach and technical assistance for the California Department of Education, Vocational Education Division, Gender Equity Section at various school districts in the areas of minority populations, non-traditional careers, entrepreneurship, and At-Risk Youth. Successfully wrote grant proposals for Carl D. Perkins Vocational & Applied Technology Education Act funding. Developed a Manufacturing Studies curriculum for the Vocational Education Division of the California State Department of Education. Served on the CDE Editorial Advisory Board for the textbook "Visions: Rites of Passage for Young African-American Men." Advised and assisted small businesses in the development and submittal of bids and aided in contract and business management.

DEFENSE LOGISTICS AGENCY March 87-May 90

A. Chief, Production & Industrial Resources

I managed the Production and Industrial Resources Branch in San Diego, which monitored 835 contractors and 6,400 contracts worth $28 Billion. I was responsible for production related matters such as pre-award surveys, technical analysis of cost proposals, contract performance, and progress payment reviews. I supervised the work of 27 multidisciplinary staff that included 18 Industrial Engineers & Specialists, 7 Contract Mgmt. Assistants and 2 clerks. I interfaced with the Pricing, Engineering, Property, Contract Administration, and Transportation Branches on a daily basis. Reviewed a wide range of technical reports and analyzed data to identify production trends. Performed employee appraisals. Developed annual budget for staff and operations. Collateral duties were to establish the new San Diego Headquarters which included the site search, solicitation of lessors, the office design and layout, procurement of furniture, coordination of utilities installation, and logistics of the agency move.

B. Industrial Specialist Nov 85-Mar 87

Managed the contracts at the GTE residency office in Mt. View, CA. Performed in-plant production surveillance, witnessed RADAR & SONAR Systems testing, analyzed cost proposals, performed pre-award surveys, reviewed progress payment requests, verified proper use of Government owned equipment, and was part of the contract negotiation team.

CALIFORNIA PUBLIC UTILITIES COMMISSION Jun 84-Dec 84

QA Engineer - SEA Consultants

Reviewed a utility's electricity rate hike request to determine costs to be borne by users from a QA/QC cost avoidance perspective. The contract involved review of a utility's construction documents for a 2-unit nuclear plant and determining what costs could have been avoided had QA/QC and management oversight activities been timely or properly implemented.

GE3 CORPORATION May 81-Nov 85

Project Manager / VP Projects / Principal

Planned, designed, budgeted, constructed, and operated Wind-Farm projects valued in excess of $30 million. Negotiated utility contracts for the sale of electricity. Supervised the Architect-Engineer for the site civil, transmission interconnection, and electrical project requirements design and construction. Responsible for land leasing, planning, development, governmental interface, construction bids and contracts, procurement, utility coordination, and public relations. Responsible for compliance with regulatory requirements of CEQA and other state and federal laws.

GENERAL ELECTRIC NUCLEAR DIVISION Jun 74-May 81

Process Control Engineer / Supervising

Responsibilities were in the fields of electrical/electronic nuclear control and instrumentation manufacture and test. Duties included writing Quality Plans, Inspection & Test Instructions, Material Review Board Chair, Process Monitoring, Test Technician training and liaison with the Nuclear Regulatory Commission staff during audit to verify compliance with 10CFR50. Beginning in 1978, I supervised 79 electro-mechanical inspectors, electrical/electronic testers and 2 test directors. This three-year assignment was for the assembly, factory test, shipment, construction, and on-site start-up testing of the control rooms for the Perry Nuclear Power Stations I & II (Ohio) and the Clinton Nuclear Generating Station (Illinois).

U. S. AIR FORCE Honorable Discharge May 10, 1974 Service-Connected Disabled Veteran

PAPERS PRESENTED

2004 FALL SYMPOSIUM "*Environmental Impacts of Infrastructure Demands in California."* CSU Sacramento, October 2004, Sacramento, CA.

2003 DOCTORAL DISSERTATION "*Environmental Obstacles to Construction of Educational Facilities in California*." University of San Francisco, May 2003, San Francisco, CA. Council of Graduate Schools 2003 Honorable Mention.

1998 MASTER'S THESIS "*A Comparative Case Study of the Response by the Sacramento Municipal Utility District to the Deregulation of the California Electric Utility Industry*." CSU Sacramento, Fall 1998, Sacramento, CA.

1998 *"California Special Districts, - History, Policies and Future Problems."* CSU - Sacramento, Spring 1998, Graduate Studies Symposium, Sacramento CA.

1997 "*The Best Kept Secret in America - The Genius of the African-American Inventor*." National Alliance of Black School Educators, Workshop Presenter, National Convention, Reno, Nevada.

1997 "*Black Creativity and Science-The Genius of the African-American Inventor*." International Conference on Black Creativity, Presenter, Morgan State University, Baltimore MD.

1997 "*African-American Contributions to Railroad Development in the US."* California State Railroad Museum, Guest Lecture Series, Sacramento, CA.

1997 "*The Best Kept Secret in America - The Genius of the African-American Inventor*." Portland Community College, Black History Month Guest Lecturer, Portland, OR.

1997 "*Black Inventors Won the West."* Black Cowboy Museum, Guest Lecturer, Denver, CO.

1996 "*African-American Women Inventors*." Annual Convention of the National Postal Women's Network, Oakland, CA.

1995 "*The Nuts and Bolts of Conference Planning, A How-to Guide*." California Department of Education,

1996 "*African-American Inventors - The Legacy*." University of the Pacific, Black History Month Lecturer, Stockton, CA.

1992 "*The 1991 Redistricting Project, Reapportionment Success in Sacramento County*." UC Berkeley, Guest Lecturer, Berkeley, CA.

1989 "*Production Management Techniques for Monitoring of Large Defense Contractors*." Defense Logistics Agency, Alexandria, VA.

1982 "*Utilization of a Public Domain Design in the Manufacture of Wind Electric Generators*." American Wind Energy Association, National Convention, Portland, OR.

1981 "*Blacks in Energy-In or Out?"* Congressional Black Caucus Energy Braintrust, Washington, DC.

1981 "*Blacks in Energy-In or Out?"* American Assoc. of Blacks in Energy, National Convention, Denver, CO.

1978 "*Process Control Techniques in the Manufacture of Nuclear Control Rooms*." American Society for Quality Control, Portland, OR.

1977 "*Compliance with 10CFR50 in the Manufacture of Nuclear Controls and Instrumentation*." American Society for Quality Control, Los Angeles, CA

AWARDS

2003 Outstanding Doctoral Student	University of San Francisco	May 2003
1996 Community Service Award	Sacramento Urban League	Oct. 1996
1995 Human Rights Award	Human Rights / Fair Housing Comm., City & County of Sacto.	Sept.1995
1994 Outstanding Community Leader	County of Sacramento	Feb. 1994
1993 Alumni Achievement Award	Kappa Alpha Psi Fraternity	Mar. 1993
1992 NAACP Achievement Award	Region IX NAACP Annual Conference	Oct. 1992

COMMUNITY SERVICE

Planning Advisory Council **Vice Chairman**	Sacramento County Franklin-Laguna Planning Area	2000-2004
Committee Member	Teacher Recruitment Committee Elk Grove Unified School District	1999-2004
Advisory Board	Manufacturing & Product Technology Academy Elk Grove Unified School District	1994-1998
Board of Directors	North Laguna Creek Neighborhood Association	1994-Present
Board of Directors	FamiliesFirst Foster Care Agency	1993-2007
Board of Directors	Habitat for Humanity	1993-1995
Vice-President	Sacramento NAACP	1994-1996
Chairman	Dance Theater of Harlem U.C. Davis Community Outreach Campaign	1992 & 1994
Member	Vocational Education Advisory Council Sacramento City Unified School District	1992-1997
Member	Minority Advisory Council KCRA-3, KXTV-10, & KOVR-13	1992-1998
Chairman	Community Advisory Committee Sacramento Regional Transit South Line	1992-1996
Co-Chairman	Black College Faire	1992-2000
Commissioner & **Vice-Chair**	Human Rights/Fair Housing Commission City & County of Sacramento	1991-1995
Advisor/Consultant	Gender Equity Division California Dept. of Education	1991-1995
Co-Chairman	No. Calif. African-American Young Male Conference	1991-1997
Chairman	United Negro College Fund Northern California Campaign	1992-2000
Chairman	African-American Student Career Conference	1991-1996
Co-Chairman	1991 Redistricting Project	1991-1993
Board of Directors	Western Province Kappa Alpha Psi Fraternity	1991-1994
Polemarch (President)	Kappa Alpha Psi Fraternity	90/96-00/01
Political Action Chair	Sacramento Branch NAACP	1990-1994
Chairman, Member	Relocation Appeals Hearing Board City of San Jose	1985-1987
Committee Member	California School Boards Association Legislative & Small School Districts Committee	1983-1987
Director & Officer	California Coalition of Black School Board Members	1982-1987
Board Member	Mt. Pleasant School District San Jose, Calif.	1982-1987
Housing Commissioner	City of San Jose	1981-1987

INSTRUCTIONAL HISTORY
COURSES TAUGHT

COLLEGE LEVEL COURSES

1. Operations & Production Management	National University	Mar 99, Oct 00 & Jan 01
2. Performance Measurement Systems	National University	April 1999
3. Training for Organizations	National University	June 1999
4. Public Policy Analysis	Univ. of San Francisco	June/Aug 1999
5. Personnel Procurement & Placement	National University	July 1999
6. State & Local Government	National University	Sept 99, Apr 01 & May 01
7. Government & Community Relations	National University	Oct 1999
8. Public Finance & Grants Admin	National University	Feb & Nov 2000
9. Managing for Productivity & Quality	National University	Mar & May 2000
10. Urban Planning & Technology	National University	Sept 00 & May 01
11. Seminar in Urban Land Uses	National University	Sept 99, May 00 & Apr 01
12. Intro to Environmental Science	CSU – Sacramento	F03, F04, F05, Sp06, Sm06, F06
13. Fundamentals of Business Strategy	CSU – Sacramento	F05, Sp06, F06, Sp07
14. Environmental Impact Analysis	CSU – Sacramento	Sp06 & Sp07

WORKSHOPS AND TEACHER IN-SERVICE

1. Inclusion of Black Inventors into Social Science, History and Science curricula.	1994 - 2005
2. Teaching the Patent and Trademark Process to Students.	1994 - 2005
3. Inclusion of Careers in Technology into Life Skills lesson plans.	1991 - 1995
4. Non-Traditional Careers	1991 - 1995
5. Organizing Non-Traditional Career Fairs	1991 - 1995
6. The Integration of Career and Life Planning with academics.	1991 - 1995
7. Understanding the Young African-American Male in the School Environment	1991 - 1995

PROFESSIONAL TRAINING COURSES TAUGHT

1. Basic & Advanced Contract Administration	DLA	1988 - 1990
2. Principles of Contract Pricing	DLA	1988 - 1990
3. Basic & Advanced Defense Contract Negotiations	DLA	1987 - 1990
4. Operations and Production Management I & II	DLA	1987 - 1990
5. Operating Costs, Budgets & Measurements	DLA	1987 - 1990
6. Developing a Permitting Process for Wind Generators.		1981 - 1984
7. Nuclear Control Room Testing	GE	1974 - 1981
8. Inspection techniques for Nuclear Control and Instrumentation	GE	1974 - 1981

DLA – Defense Logistics Agency / USAF Inst. of Tech, Satellite Campus, transferable for college credit
GE – General Electric Nuclear Division

California CBEST Passed	February 1999
USF Adjunct Academy	Oct / Dec 1999
CSU – Sacramento Faculty Training	Sep 2003 - Present

DECLARATION
OF
Paula David

I, **Paula David,** declare as follows:

1. I am presently employed by the California Energy Commission in the Siting and Compliance Office of the Energy Facilities Siting Division as a Compliance Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **General Conditions including Compliance Monitoring and Closure Plan** for the **Starwood Power Plant Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

   I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/28/07 Signed: Paula David

At: Sacramento, California Paula David

Resume - Paula David
Compliance Project Manager/Planner II

Paula David has worked for the State of California since 1994, and joined the Energy Commission's Energy Facilities Siting Division in August 2007. Starting in the public information office of the California Air Resources Board, she has also worked in regulatory, planning, and grant programs for the Department of Consumer Affairs and the Department of Parks and Recreation. Her responsibilities have included policy development; communications; outreach; supervision; project management; policy development; training; program implementation, management, and compliance; and contract management.

Prior to her State of California service, Paula worked for processors and equipment manufacturers serving the food, beverage, and pharmaceutical industries. She graduated with honors from California State University, Sacramento with a B.A. in English, and earned a Corporate Communications certification from American River College, Sacramento.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE *STARWOOD POWER PLANT*	**Docket No. 06-AFC-10** **PROOF OF SERVICE** **(Revised 3/16/07)**

INSTRUCTIONS: All parties shall either (1) send an original signed document plus 12 copies or (2) mail one original signed copy AND e-mail the document to the address for the Docket as shown below, AND (3) all parties shall also send a printed or electronic copy of the document, which includes a proof of service declaration to each of the individuals on the proof of service list shown below:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 06-AFC-10
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

APPLICANT

Ron Watkins
Calpeak Power
7365 Mission Gorge Road, Suite C
San Diego, CA 92120

Rich Weiss
2737 Arbuckle St.
Houston, TX 77005 USA

APPLICANT'S CONSULTANTS

Angela Leiba, URS
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108

COUNSEL FOR APPLICANT

Allan Thompson
21 "C" Orinda Way, No. 314
Orinda, CA 94563
allanori@comcast.net

INTERESTED AGENCIES

Larry Tobias
Ca. Independent System Operator
151 Blue Ravine Road
Folsom, CA 95630
LTobias@caiso.com

Electricity Oversight Board
770 L Street, Suite 1250
Sacramento, CA 95814
esaltmarsh@eob.ca.gov

INTERVENORS

ENERGY COMMISSION

JOHN L. GEESMAN
Associate Member
jgeesman@energy.state.ca.us

JEFFREY D. BYRON
Presiding Member
jbyron@energy.state.ca.us

Garret Shean
Hearing Officer
gshean@energy.state.ca.us

Dick Ratliff
Staff Counsel
dratliff@energy.state.ca.us

Che McFarlin
Project Manager
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DECLARATION OF SERVICE

I, Terry Piotrowski, declare that on October 10, 2007, I deposited copies of the attached Final Staff Assessment for the Starwood Power Plant Project (06-AFC-10), in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

Original Signed by
Terry Piotrowski
Siting Office