Final Staff Assessment

CANYON POWER PLANT

Application For Certification (07-AFC-9)
Orange County

CALIFORNIA
ENERGY
COMMISSION

DOCKET 07-AFC-9	
DATE	
RECD.	10/08/09

STAFF REPORT

SEPTEMBER 2009
(07-AFC-9)
CEC-700-2009-008-FSA

PROOF OF SERVICE (REVISED 2/25/09) FILED WITH
ORIGINAL MAILED FROM SACRAMENTO ON 10/8/09
MS

Final Staff Assessment

CALIFORNIA
ENERGY
COMMISSION

CANYON POWER PLANT

Application For Certification (07-AFC-9)
Orange County

STAFF REPORT

SEPTEMBER 2009
(07-AFC-9)
CEC-700-2009-008-FSA

CALIFORNIA ENERGY COMMISSION

SITING OFFICE

Eric Solorio
Project Manager

Eileen Allen
Manager, Siting and Docket Office

SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

Terrence O'Brien
Deputy Director

CANYON POWER PLANT PROJECT
(07-AFC-9)
FINAL STAFF ASSESSMENT

EXECUTIVE SUMMARY

Testimony of Eric K. Solorio

INTRODUCTION

This Final Staff Assessment (FSA) contains the California Energy Commission staff's independent evaluation of the Southern California Public Power Authority's Application for Certification (07-AFC-9) for the proposed Canyon Power Plant (CPP). The FSA examines engineering, environmental, public health and safety aspects of the proposed CPP project, 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 license, 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 identify the potential impacts on the environment, the public's health and safety, and determine whether the project conforms to all applicable laws, ordinances, regulations and standards (LORS). Upon identifying any potentially significant environmental impacts, staff recommends mitigation measures in the form of conditions of certification for construction, operation and eventual closure of the project.

This FSA will serve as staff's formal testimony in evidentiary hearings to be held by the Energy Commission Committee assigned to hear this case. The Committee will hold evidentiary hearings and will consider the recommendations presented by staff, applicant, interveners, government agencies, and the public prior to proposing its decision. In the last step, the full Energy Commission will issue the final decision.

PROJECT LOCATION AND DESCRIPTION

The Los Angeles Basin in which the proposed site is located is bordered by mountain ranges to the north, east, and south, with the Palos Verde Peninsula and coastline to the west. The proposed project site's elevation is about 218 feet above mean sea level, and the topography of the immediate vicinity is generally flat. The area within 5 miles of the project site has a gradual east-west slope, with the terrain rising sharply to the north and east approximately 6 miles from the site where the Chino Hills and Santa Ana Mountains begin.

The proposed 10-acre project site is located in the City of Anaheim, about 3.25 miles northeast of downtown at 3071 East Miraloma Avenue. Land in the vicinity of the proposed project is designated for industrial, commercial, and residential uses, with industrial uses representing the majority. The primary access point to the CPP site would be at the southeast corner of the property coming off of East Miraloma Avenue. A second gated entrance would be accessible via East Miraloma Avenue with a third gate off the alley to the east of the site.

POWER GENERATION EQUIPMENT AND PROCESS

The proposed CPP project would be a nominal 200 megawatt (MW) peaking power plant using four simple-cycle natural gas-fired General Electric LM 6000PC Sprint Combustion Turbine Generators. Each combustion turbine generator would utilize a mechanical inlet air chiller to maintain maximum output and efficiency. The power generation process would combust natural gas to rotate a turbine which drives an electrical generator. The electrical generator would deliver power to a step-up transformer which would be connected to underground electrical conductors leading to the local transmission grid.

The major equipment and facilities would include the following:

1. General Electric LM 6000PC Sprint combustion turbines equipped with inlet air evaporative coolers,
2. A four cell mechanical-draft cooling tower,
3. Step-up transformers,
4. Electrical switchyard,
5. Air emissions control equipment,
6. Aqueous ammonia storage tank,
7. Water storage tanks, and
8. Underground utility lines (electrical transmission lines, natural gas pipeline, potable and fire water pipelines, sewer pipeline, and a reclaimed water pipeline).

OFFSITE INFRASTRUCTURE IMPROVEMENTS

The proposed power plant would interconnect with two existing transmission lines via four new underground transmission cables which would exit the project site from a new on-site 69 kilovolt (kV) switchyard. Two of the new underground transmission cables would interconnect to the Vermont-Yorba line on East Miraloma Avenue directly south of the project site. The other two new underground transmission cables would interconnect to the Dowling-Yorba line at East La Palma Avenue approximately 7,000 feet away.

Natural gas for the CPP project would be supplied from a new 12-inch, 3,240-foot-long natural gas pipeline to be owned and maintained by SoCal Gas Company. From the CPP site, this new pipeline would run approximately 580 feet east in East Miraloma Avenue to Kraemer Boulevard, then north 2,660 feet in Kraemer Boulevard to East Orangethorpe Avenue to connect into SoCal Gas Company’s line L-1218 in East Orangethorpe Avenue.

The primary source of process water for the project would be reclaimed water supplied from the Orange County groundwater replenishment system (GWRS) via a new 2,185-foot-long, 14-inch pipeline utilizing a new offsite booster pump station. The water pipeline would run east of the site on the north side of East Miraloma Avenue for 1,850 feet to the new pumping station located north of the curb in an easement owned by the City of Anaheim, then north 210 feet in new easement from the Orange County Water District (OCWD), then 125 feet easterly in new easement to the GWRS line on the western side of the Carbon Canyon Diversion Channel. There, the pipeline would connect to the GWRS recycled water line at an existing stub. Municipal water would be used as a backup water supply.

PUBLIC AND AGENCY COORDINATION

On January 17, 2008, the Energy Commission staff issued a notification of receipt of the Application for Certification (AFC), together with a project description, to property owners within 1,000 feet of the proposed project and those located within 500 feet of the linear facilities. Staff sent a similar notification and a copy of the AFC to a comprehensive list of agencies and libraries. Staff's notification letters requested public and agency review and comment on the AFC, and invited continued participation in the Energy Commission's certification process.

The Energy Commission's Public Adviser's Office (PAO) reviewed information available from the applicant and others and then conducted its own, extensive outreach efforts to identify certain local officials, as well as interested entities within a six-mile radius around the proposed site for the Canyon Power Plant. These entities include schools, churches, community, cultural and health-care facilities, and day-care and senior-care centers, as well as business, environmental, governmental, and ethnic organizations. By means of mailing letters and bilingual (English and Spanish) notices, the PAO notified these entities of the Committee's Informational Hearing and Public Site Visit for the project, held on April 15, 2008, in Anaheim, California. The PAO also identified and similarly notified local officials with jurisdiction in the project area.

The PAO placed a notice in 175,000 copies of the April 6, 9, and 12, 2008 issues of the Orange County Register newspaper inviting the public to attend the April 15, 2008 Informational Hearing and Site Visit. Additionally a notice was placed in 50,000 copies of the April 11, 2008 issue of the Excelsior, the Spanish-language weekly publication of the Orange County Register. To further publicize the Information Hearing and Site Visit, seven radio stations (3 Spanish and 4 English), 5 television stations (4 English and 1 Spanish) were also contacted and requested to run public service announcements. Also, six weekly local newspapers were requested to help publicize the event in their papers and websites.

Comments on the proposed project which were provided by agencies and individuals have been considered in staff's analysis. This FSA is intended to provide agencies and the public with an opportunity to review the Energy Commission staff's final analysis of the proposed project.

PUBLIC WORKSHOPS

On June 13, 2008, staff conducted a publicly noticed Data Response and Issue Resolution workshop in the City of Anaheim at City Hall West and discussed the topics of air quality, biological resources, cultural resources, hazardous materials, socioeconomics, traffic and transportation, soil and water resources, and waste management. The purpose of the workshop was to provide members of the community and governmental agencies an additional opportunity to obtain project information, and to offer comments they may have had regarding those aspects of the proposed project.

On May 21, 2009, staff conducted a publicly noticed Preliminary Staff Assessment workshop in the City of Anaheim at City Hall West. The purpose of the workshop was to provide members of the community and governmental agencies an additional opportunity to obtain project information, and to offer comments they may have had regarding the proposed project.

ENVIRONMENTAL JUSTICE

California law defines environmental justice as "the fair treatment of people of all races, cultures and income with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (Government Code Section 65040.12 and Public Resources Code Section 72000).

All Departments, Boards, Commissions, Conservancies and Special Programs of the Resources Agency must consider environmental justice in their decision-making process if their actions have an impact on the environment, environmental laws, or policies. Such actions that require environmental justice consideration may include:

- Adopting regulations;
- Enforcing environmental laws or regulations;
- Making discretionary decisions of taking actions that affect the environment;
- Providing funding for activities affecting the environment; and
- Interacting with the public on environmental issues

In considering environmental justice in energy facility siting cases, staff uses a demographic screening analysis to determine whether a low-income and/or minority population exists within the potentially affected area of the proposed site. The demographic screening is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality, December, 1997) and *Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses* (U.S. Environmental Protection Agency, April, 1998). The screening process relies on Year 2000 U.S. Census data to determine the presence of minority and below-poverty-level populations.

Environmental Justice: Guidance Under the National Environmental Policy Act, defines minority individuals as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is identified when the minority population of the potentially affected area is (1) greater than 50 percent; or (2) or when one or more U.S. Census blocks in the potentially affected area have a minority population of greater than 50 percent.

In addition to the demographic screening analysis, staff follows the steps recommended by the U.S. EPA's guidance documents which are: outreach and involvement; and if warranted, a detailed examination of the distribution of impacts on segments of the population.

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. Over the course of the analysis for each of the 11 areas, staff considered potential impacts and mitigation measures and whether there would be a significant impact on an environmental justice population.

As a result of staff's analysis, staff determined there are no environmental justice issues for the proposed Canyon Power Plant. Staff identified the following economic benefits from the project: capital costs; construction and operation payroll; property taxes, sales taxes; and school impact fees.

STAFF'S ASSESSMENT OF THE PROPOSED PROJECT'S IMPACTS

Staff concludes that with implementation of staff's recommended mitigation measures described in the conditions of certification, the CPP would comply with all applicable laws, ordinances, regulations, and standards (LORS), and that significant adverse direct, indirect, and cumulative impacts will not occur. For a more detailed review of potentially significant impacts and the related mitigation measures, please refer to each chapter of the FSA. The conclusions reached in each technical area (chapter) are summarized in the table below.

Executive Summary Table 1
Summary of Impacts to Each Technical Area

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	Yes	Yes
Biological Resources	Yes	Yes
Cultural Resources	Yes	Yes
Efficiency	Not Applicable	Not Applicable
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	Yes	Yes
Noise	Yes	Yes
Public Health	Yes	Yes
Reliability	Not Applicable	Not Applicable
Socioeconomic Resources	Yes	Yes
Soil & Water Resources	Yes	Yes
Traffic & Transportation	Yes	Yes
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

NOTEWORTHY PUBLIC BENEFITS

If approved by the California Energy Commission, the proposed CPP would provide additional quick-start peaking electric generation capacity for the City of Anaheim to support local peak demand and meet resource adequacy requirements as identified by AB 380 (Resource Adequacy) and the California Independent System Operator (CAISO). Additional gross public benefits from the proposed CPP include capital costs and sales taxes.

CONCLUSIONS

In summary staff has reached the following final conclusions:

- The project is in conformance with all Laws, Ordinances, Regulations and Standards (LORS) with the exception of the City of Anaheim General Plan.
- By implementing the proposed conditions of certification included in the Final Staff Assessment, the project’s construction and operation impacts can be mitigated to a less than significant level.
- Staff and the South Coast Air Quality Management District each have separately concluded the proposed project would comply with the appropriate rules and requirements of the District and would not contribute to the degradation of the air quality.

- Alternative project sites have been evaluated and staff concluded that none of the alternative sites would avoid or reduce any of the project's significant impacts.
- Alternative technologies have been evaluated and staff concluded that none of the alternative technologies would avoid or reduce any of the project's significant impacts.

INTRODUCTION

Eric K. Solorio

PURPOSE OF THIS REPORT

This Final Staff Assessment (FSA) is the California Energy Commission staff's independent analysis of the proposed Canyon Power Plant (CPP). This FSA is a staff document. It is neither a Committee document, nor a draft decision. The FSA describes the following:

- the proposed project;
- the existing environment;
- 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;
- the potential cumulative impacts of the project in conjunction with other existing and known planned developments;
- mitigation measures proposed by the applicant, staff, interested agencies, local organizations and intervenors which may lessen or eliminate potential impacts;
- the proposed conditions under which the project should be constructed and operated, if it is certified; and
- project alternatives.

The analyses contained in this FSA are based upon information from the: 1) Application for Certification (AFC), 2) responses to data requests, 3) supplementary information from local, state, and federal agencies, interested organizations and individuals, 4) existing documents and publications, 5) independent research, and 6) comments at workshops. 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 FSA presents staff's conclusions about potential environmental impacts and conformity with LORS, as well as proposed conditions that apply to the design, construction, operation and closure of the facility.

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

ORGANIZATION OF THE FINAL STAFF ASSESSMENT

The FSA begins with an Executive Summary, Introduction and Project Description. The next 20 chapters contain the environmental, engineering, public health and safety and alternatives analyses of the proposed project. 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 20 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 Energy Commission has the exclusive authority to certify the construction, modification, 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 thermal power plant applications for certification (AFC) to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts, and compliance with applicable governmental laws or standards (Pub. Resources Code, § 25519 and § 25523(d)).

The Energy Commission's siting regulations require staff to independently review the AFC and assess whether all of the potential environmental impacts have been properly identified, and whether additional mitigation or other more effective mitigation measures are necessary, feasible, and available (Cal. Code Regs., tit. 20, § 1742 and § 1742.5(a)).

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

Staff conducts its environmental analysis in accordance with the requirements of CEQA. No additional environmental impact report (EIR) is required because the Energy Commission's site certification program has been certified by the California Resources Agency as meeting all requirements of a certified regulatory program (Pub. Resources Code, § 21080.5 and Cal. Code Regs., tit. 14, § 15251 (j)). The Energy Commission is the CEQA lead agency.

The staff prepares a Preliminary Staff Assessment (PSA) that presents for the applicant, intervenors, organizations, agencies, other interested parties, and members of the public the staff's analysis, conclusions, and recommendations. Where it is appropriate, the PSA incorporates comments received from agencies, the public, and parties to the siting case and comments made at the workshops.

After publishing the PSA staff provides a comment period to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the comment period staff will conduct one or more workshops to discuss its findings, proposed mitigation, and proposed compliance-monitoring requirements. Based on the workshops and written comments, staff may refine its analysis, correct errors, and finalize conditions of certification to reflect areas where agreements have been reached with the parties and will then publish a Final Staff Assessment (FSA).

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

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Member's 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. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision.

AGENCY COORDINATION

As noted above, the Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). However, the Commission typically seeks comments from and works closely with other regulatory agencies that administer LORS that may be applicable to proposed projects. These agencies may include as applicable the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, California Coastal Commission, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, and the California Air Resources Board.

OUTREACH

The Energy Commission's outreach program is primarily facilitated by the Public Adviser's Office (PAO). This is an ongoing process that to date has involved the following efforts:

LIBRARIES

On January 17, 2008, the Energy Commission staff sent the CPP AFC to libraries in Anaheim, Eureka, Fresno, Garden Grove, Los Angeles, Orange, Placentia, Sacramento, San Diego, and San Francisco.

INITIAL OUTREACH EFFORTS

The PAO reviewed related information available from the applicant and others and then conducted its own, extensive outreach efforts to identify certain local officials, as well as interested entities within a six-mile radius around the proposed site for the CPP. These entities include schools; churches; community, cultural and health-care facilities; and day-care and senior-care centers, as well as business, environmental, governmental, and ethnic organizations. By means of mailing letters and bilingual (English and Spanish) notices, the PAO notified these entities of the Informational Hearing and Site Visit for the project, held on April 15, 2008, in Anaheim, California. The PAO also identified and similarly notified local officials with jurisdiction in the project area.

In addition, the PAO placed a notice in 175,000 copies of the April 6, 9, and 12, 2008 issues of the Orange County Register newspaper for the April 15, 2008 Informational Hearing and Site Visit held in Anaheim for this project. Additionally a notice was placed in 50,000 copies of the April 11, 2008 issue of the Excelsior, the Spanish-language weekly publication of the Orange County Register.

Energy Commission regulations require staff to notice, at a minimum, property owners within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines, and water lines). This was done for the CPP project. Staff's ongoing public and agency coordination activities for this project are discussed under the Public and Agency Coordination heading in the **Executive Summary** section of the PSA.

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 (U.S. EPA) 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 EPA's NEPA (National Environmental Policy Act) 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." Staff's specific activities, with respect to environmental justice for the CPP project, are discussed in the **Executive Summary**.

PROJECT DESCRIPTION

Eric K. Solorio

INTRODUCTION

The Southern California Public Power Authority filed an Application for Certification to the California Energy Commission on December 28, 2007, to construct and operate a simple cycle peaking power plant. The proposed Canyon Power Plant (CPP) would be a nominally rated 200 megawatt (MW) peaking power plant using four natural gas-fired General Electric LM 6000PC Sprint Combustion Turbine units. The proposed CPP project would be located in the City of Anaheim at 3071 East Miraloma Avenue on a 10-acre parcel within an industrial area.

PROJECT PURPOSE AND OBJECTIVES

As described in the Application for Certification (07-AFC-9), the proposed CPP would be owned by the Southern California Public Power Authority and be operated by the City of Anaheim to provide additional quick-start peaking electric generation capacity in the City of Anaheim to support local peak demand and meet resource adequacy requirements as identified by AB 380 (Resource Adequacy) and the California Independent System Operator (California ISO).

The AFC describes the proposed CPP project objectives as follows:

1. To construct and operate a nominal 200-MW, natural gas-fired, simple cycle generating facility specifically designed to serve the electricity demand in the City of Anaheim.

2. To develop a site consistent with community planning at a location that is supported by the local community.

3. To site the proposed CPP with ready access to natural gas and transmission interconnection.

4. Safely produce electricity without creating significant environmental impacts.

5. Reduce reliance on out-of-state imported energy.

6. Provide a back-up for as-available wind energy.

7. To build new generation that requires minimal additional project-specific transmission system upgrades.

PROJECT SETTING AND LOCATION

The Los Angeles Basin in which the proposed site is located is bordered by mountain ranges to the north, east, and south, with the Palos Verde Peninsula and coastline to the west (CofA 2007a, Sections 3.3.1 and 3.3.2). The site’s elevation is about 218 feet above mean sea level, and the topography of the immediate vicinity is generally flat.

The area within 5 miles of the project site has a gradual east-west slope, with the terrain rising sharply to the north and east approximately 6 miles from the site where the Chino Hills and Santa Ana Mountains begin (CofA 2007a Section 6.16.1).

The proposed 10-acre project site is located about 3.25 miles northeast of downtown Anaheim at 3071 East Miraloma Avenue. The primary access point to the CPP site would be at the southeast corner of the property coming off of East Miraloma Avenue. A second gated entrance would be accessible via East Miraloma Avenue with a third gate off the alley to the east of the site.

Land in the vicinity of the proposed project is designated for industrial, commercial, and residential uses, with industrial uses representing the majority, see **Project Description Figure 1.** The nearest sensitive receptor is a residence located at 2983 East Miraloma Avenue, approximately 887 feet west of the site boundary. This residence is planned to be redeveloped for commercial use, but a caretaker unit would still exist at this location (CofA 2007a, Section 6.16.1).

PROJECT FEATURES

POWER GENERATION EQUIPMENT AND PROCESS

The proposed CPP project would be a nominal 200 megawatt (MW) peaking power plant using four simple-cycle natural gas-fired General Electric LM 6000PC Sprint Combustion Turbine Generators. Each combustion turbine generator would utilize a mechanical inlet air chiller to maintain maximum output and efficiency. The power generation process would combust natural gas to rotate a turbine which drives an electrical generator. The electrical generator would deliver power to step up transformer which is connected to an underground electrical conductor leading to the local transmission grid.

The major equipment and facilities include the following:

1. General Electric LM 6000PC Sprint combustion turbines,
2. Inlet air evaporative coolers,
3. A four cell mechanical-draft cooling tower,
4. Step up transformers,
5. Electrical switchyard,
6. Air emissions control equipment,
7. Aqueous ammonia storage tank,
8. Water storage tanks, and
9. Underground utility lines (electrical transmission lines, natural gas pipeline, potable and fire water pipelines, sewer pipeline, and a reclaimed water pipeline).

Project Description Figure 2 shows the general arrangement and layout of the proposed facility.

AIR POLLUTION CONTROL

The CPP's four General Electric LM 6000PC Sprint Combustion Turbine Generators (CTGs) air pollution emission controls are designed to meet the stringent standards required by the State and the South Coast Air Quality Management District (SCAQMD). The CPP would utilize water injection to control nitrogen oxides (NOx) emissions, and power augmentation. A Selective Catalytic Reactor system (SCR) and associated support equipment would be used for further NOx control. An oxidation catalyst would also be provided for carbon monoxide (CO) control. Plant auxiliary equipment would include a packaged chilled water system with associated heating ventilation and air conditioning (HVAC)-type, four-chambered cooling tower for CTG power augmentation as well as SCR emission control systems necessary to meet the proposed emission limits. NOx emissions would be controlled to 2.3 parts per million by volume, dry (ppmvd) basis corrected to 15 percent oxygen by a combination of water injection in the CTGs and SCR systems in the exhaust stack transition. CO would be controlled to 6 ppmvd at 15 percent oxygen in the CTG combustors with an oxidation catalyst system. Volatile organic compound (VOC) emissions would be controlled to 2 ppmvd at 15 percent oxygen.

ELECTRIC TRANSMISSION AND COMMUNICATIONS

The CPP would include generator step-up transformers, and a 69 kilovolt (kV) switchyard that would interconnect with two existing transmission lines via four new underground transmission cables which would exit the project site from a new on-site 69 kV switchyard. Underground 69 kV cables would connect from generator step-up (GSUs) to the onsite switchyard. There would be four new underground 69 kV circuits leaving the site. Two would proceed underneath and to the south side of East Miraloma Avenue approximately 100 feet to rise up and connect to the existing 69 kV overhead Vermont-Yorba lines via two new transition structures. The second two 69 kV underground circuits would proceed eastward approximately 4,000 feet in East Miraloma Avenue, turn south on Miller, then proceed approximately 3,000 feet to connect to the Dowling-Yorba 69 kV line at East La Palma Avenue, see **Project Description Figure 3**.

A fiber optic cable would run in a common trench with the approximately 7,000-foot 69 kV electric cables, where it would tie into existing underground fiber optic cable for the supervisory control and data acquisition system.

NATURAL GAS SUPPLY

Natural gas for the CPP project would be supplied from a new 12-inch, 3,240-foot-long natural gas pipeline to be owned and maintained by SoCal Gas Company. The pipeline would be connected to onsite fuel gas compressors. From the CPP site, this new pipeline would run approximately 580 feet east in East Miraloma Avenue to Kraemer Boulevard, then north 2,660 feet in Kraemer Boulevard to East Orangethorpe Avenue to connect into SoCal Gas Company's line L-1218 in East Orangethorpe Avenue, see **Project Description Figure 3**.

WATER DEMAND AND SOURCE OF SUPPLY

The proposed CPP would require up to 650 acre feet of water, per year. The primary source of process water for the project would be reclaimed water supplied from the Orange County Groundwater Replenishment System (GWRS) via a new 2,185-foot-long, 14-inch pipeline utilizing a new offsite booster pump station. The water pipeline would run east of the site on the north side of East Miraloma Avenue for 1,850 feet to the new pumping station located north of the curb in an easement owned by the City of Anaheim, then north 210 feet in new easement from the Orange County Water District (OCWD), then 125 feet easterly in new easement to the GWRS line on the western side of the Carbon Canyon Diversion Channel. There, the pipeline would connect to the GWRS recycled water line at an existing stub up, see **Project Description Figure 3**.

WASTEWATER DISCHARGE

The CPP's process wastewater such as blowdown from the chilled water system cooling tower, reject water from the reverse osmosis system, and domestic sanitary wastewater, would be directed to a wastewater oil-water separator. Equipment areas that may contain oily residue would be located within concrete spill-containment berms that also drain to the oil-water separator. After passing through the oil-water separator, the wastewater would be combined to discharge into the Orange County Sanitation District (OCSD) sewer system connection located on East Miraloma Avenue.

CTG water wash waste can contain solvents or biodegradable detergents. This wastewater stream can be considered hazardous when it contains solvent-based cleaning solutions and would not be sent to the sanitary sewer system. Underground 2,000-gallon-capacity water wash tanks would be provided to collect and store CTG solvent-based wastewater. The hazardous waste water would be temporarily stored on site, transported off site by licensed hazardous waste haulers, and recycled or disposed at authorized disposal facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, CCR, §§ 66262.10 et seq.). When the cleaning solution is not harzrdous but instead contains a biodegradable detergent then the CTG water wash waste would be sent directly to the sanitary sewer..

STORMWATER HANDLING

Stormwater from the site that has the potential to come into contact with plant equipment would flow through an underground piping system to an underground multi-chamber treatment device that removes sediment, coarse materials, and oil from the water before being directed to an underground percolation vault. Stormwater that does not have the potential to come into contact with plant equipment and is therefore not required to be treated would flow directly into the underground percolation vault. The percolation vault would include an overflow outlet and pipe to allow for stormwater in excess of the 25-year storm event to flow to the municipal storm drain system.

PROJECT CONSTRUCTION AND OPERATION

If approved by the Energy Commission, the applicant proposes to initiate construction of the CPP in late 2009. The project is expected to take 12 months for construction and startup testing, and could begin commercial operation by December 2010. Required construction personnel would consist of craftspeople and supervisory, support, and construction management workers on-site during construction. There will be an average of approximately 145 daily construction workers, with a peak daily workforce of 225, depending on the month and the work required. According to AFC Section 6.10 (Socioeconomics), the peak construction labor force would be a total of 225 construction workers daily during the fifth month of construction. The plant would employ one full-time maintenance technician/operator for onsite operations. The construction storage and lay down areas would be confined to the existing site. 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 would 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) would be disposed of according to LORS in effect at the time of the closure. Facility security would 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 would have value beyond its expected life.

Closure Mitigation

At the time of facility closure, decommissioning would 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 would 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 would 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 would 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 would 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 would 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 would meet with the Energy Commission's Compliance Project Manager and local agencies and submit a detailed decommissioning closure plan in a timely manner.

There would not be a decommissioning plan submitted for a temporary shutdown.

NOTEWORTHY PUBLIC BENEFITS

If approved by the California Energy Commission, the proposed CPP would provide additional quick-start peaking electric generation capacity for the City of Anaheim to support local peak demand and meet resource adequacy requirements as identified by AB 380 (Resource Adequacy) and the California Independent System Operator (California ISO).

REFERENCES

CofA 2007a - City of Anaheim/S. Sciortino (tn 43903). Application for Certification Volume I & II, dated 12/27/07. Submitted to CEC/Docket Unit on 12/28/07.

CofA 2007b - City of Anaheim/S. Sciortino (tn 43905). Air Quality and Public Health Modeling Files, dated 12/27/07. Submitted to CEC/Docket Unit on 12/28/07.

CofA 2008a - City of Anaheim/L. Nguyen (tn 47115). Grant Deed for the City of Anaheim, dated 4/24/07. Submitted to CEC/Docket Unit on 7/18/08.

CofA 2008b - City of Anaheim/S. Sciortino (tn 48477). Notification of Change in Scope, dated 9/18/08. Submitted to CEC/Docket Unit on 10/8/08.

CofA 2009a – City of Anaheim/S. Sciortino (tn 49909). Information Regarding the Status of Anaheim Renewable Portfolio Standards, dated 1/28/08. Submitted to CEC/Docket Unit on 1/28/09.

CofA 2009b – City of Anaheim/S. Sciortino (tn 49917). Change in the Fuel Use and Sox/PM10 Emission Factors Used During Commissioning, dated 1/28/09. Submitted to CEC/Docket Unit on 1/28/09.

CofA 2009c – City of Anaheim/S. Wilson (tn 49918). May 8, 2008 Letter Regarding the AFC, dated 7/02/08. Submitted to CEC/Docket Unit on 1/208/09.

CofA 2009d – City of Anaheim/S. Sciortino (tn 49929). Change in Scope, dated 1/28/09. Submitted to CEC/Docket Unit on 1/28/09.

PROJECT DESCRIPTION - FIGURE 1
Canyon Power Project - Existing & Proposed Aerial Views of CPP Facility

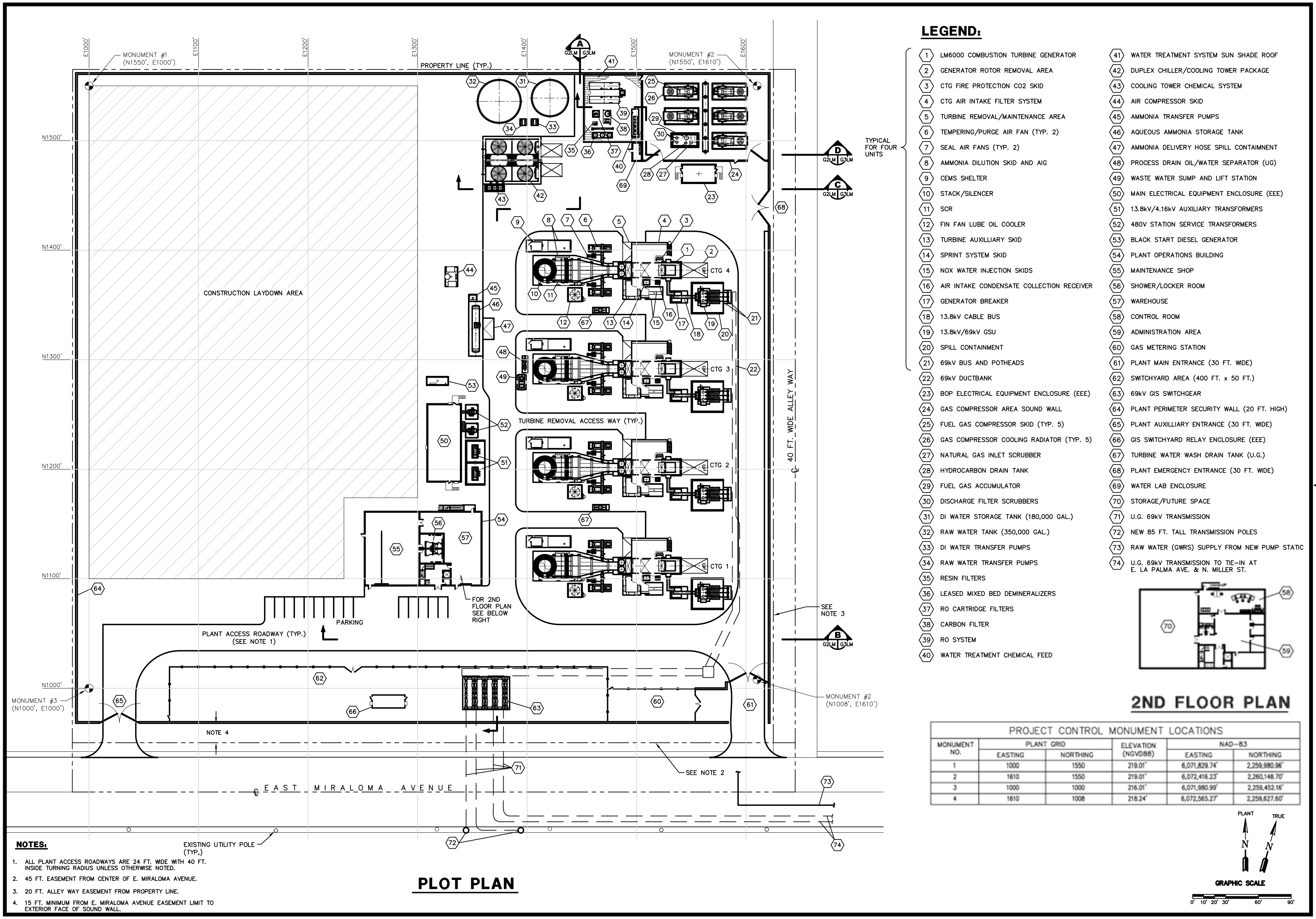
Existing

Proposed

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION, SEPTEMBER 2009
SOURCE: AFC Figure 1-2

PROJECT DESCRIPTION - FIGURE 2

Canyon Power Project - Plot Plan



PROJECT CONTROL MONUMENT LOCATIONS

MONUMENT NO.	PLANT GRID		ELEVATION (NGVD88)	NAD-83	
	EASTING	NORTHING		EASTING	NORTHING
1	1000	1550	219.01'	6,071,829.74'	2,259,980.96'
2	1610	1550	219.01'	6,072,416.23'	2,260,148.70'
3	1000	1000	216.01'	6,071,980.99'	2,259,452.16'
4	1610	1008	218.24'	6,072,565.27'	2,259,627.60'

SOURCE: AFC Figure 3-7

PROJECT DESCRIPTION - FIGURE 3

Canyon Power Project - Site and Linear Facilities Location Map

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: AFC Figure 3-1

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of William Walters P.E

SUMMARY OF CONCLUSIONS

The Canyon Power Plant (CPP) Project should comply with all applicable laws, ordinances, regulations, and standards 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 applicant has proposed the use of Best Available Control Technology and has obtained emission reduction credits[1] to fully offset all nonattainment pollutants and their precursors at a minimum ratio of 1:1.

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.

Global climate change and greenhouse gas (GHG) emissions from the project are discussed and analyzed in Appendix AIR-1. The Canyon Power Plant Project, as a peaking project with an enforceable operating limitation less than 60 percent of capacity, is not subject to the requirements of SB1368 (Perata, Chapter 598, Statutes of 2006) and the Emission Performance Standard. The project may be subject to additional reporting requirements and GHG reduction or trading requirements as these regulations become more fully developed and implemented.

INTRODUCTION

This analysis evaluates the expected air quality impacts of the emissions of criteria air pollutants due to Southern California Public Power Authority's (applicant or SCPPA) proposed construction and operation of the Canyon Power Plant (CPP) for which the City of Anaheim (CofA) is acting as project manager and operator once the project is completed. 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), carbon monoxide (CO), ozone (O_3), and particulate matter (PM10 and PM2.5). In addition, volatile organic compounds (VOC) emissions are analyzed because they are precursors to both ozone (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.

[1] With the exception of 1 lb/day of VOC and SO2 ERCs that were determined to be necessary by the District after publication of the PDOC, where the applicant will be required to obtain this minimal additional offset mitigation before the District will issue the Permit to Construct for the project. A requirement for compliance demonstration for this additional District ERC requirement is included in staff proposed condition **AQ-SC7**.

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

- Whether the CPP project is likely to conform with applicable federal, state and South Coast Air Quality Management District (SCAQMD or District) air quality laws, ordinances, regulations and standards (Title 20, California Code of Regulations, section 1744 (b));
- Whether the CPP project is likely to cause significant 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 the CPP project is adequate to lessen any potentially significant impacts to a less than significant level (Title 20, California Code of Regulations, section 1742 (b)).

LAWS, ORDINANCES, REGULATION, 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 SCAQMD. 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 the CPP project would not exceed 250 tons per year, PSD does not apply.
40 CFR 60 Subpart IIII	Regulates emissions and provides other operating and recordkeeping requirements for 2007 model year and later emergency stationary compression ignition internal combustion engine with a maximum engine power less than or equal to 2,237 kW (3,000HP). Enforcement delegated to SCAQMD.
40 CFR 60 Subpart KKKK	New Source Performance Standard for gas turbines: 25 parts per million (ppm) NOx at 15 percent O_2 and fuel sulfur limit of 0.060 lbs SOx per million Btu heat input for gas turbines with heat input > 50 MMBtu/hr and ≤ 850 MMBtu/hr. BACT will be more restrictive. Enforcement delegated to SCAQMD.

Applicable Law	Description
40 CFR Part 70	Title V: Federal permit assuring compliance with all applicable Clean Air Act requirements. Title V permit application required within one year of start of operation. Permitting and enforcement delegated to SCAQMD.
40 CFR Part 72 et. Seq.	Acid Rain Program. Requires permit and obtaining sulfur oxides allowances. Permitting and enforcement delegated to SCAQMD.
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.
California Code of Regulations (CCR) Section 93115	Airborne Toxics Control Measure for Stationary Compression Ignition Engines. Limits the types of fuels allowed, established maximum emission rates, establishes recordkeeping requirements.
Local – South Coast Air Quality Management District (SCAQMD)	
Regulation II: Permits	This regulation sets forth the regulatory framework of the application for issuance of construction and operation permits for new, altered and existing equipment.
Regulation IV: Prohibitions	This regulation sets forth the restrictions for visible emissions, odor nuisance, fugitive dust, various air emissions, fuel contaminants, start-up/shutdown exemptions and breakdown events.
Regulation VII: Emergencies	Establishes the procedures for reporting emergencies and emergency variances.
Regulation IX: Standards of Performance for New Stationary Sources	Regulation IX 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 combustion turbines (Subpart KKKK) and for stationary compression ignition internal combustion engines (Subpart IIII). These subparts establish emission limits as well as monitoring and test method requirements.
Regulation XI: Source Specific Standards	Specifies the performance standards for stationary engines larger than 50 brake horse power (bhp).
Regulation XIII: New Source Review	Establishes the pre-construction review requirements for new, modified or relocated facilities 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 SCAQMD is not unnecessarily restricted. However, this regulation does not apply to NOx or SOx emissions from certain sources, which are addressed by Regulation XX (RECLAIM).
Regulation XVII: Prevention of Significant Deterioration	This regulation sets forth the pre-construction requirement for stationary sources to ensure that the air quality in clean air areas does not significantly deteriorate while maintaining a margin for future industrial growth.

Applicable Law	Description
Regulation XX: Regional Clean Air Incentives Market (RECLAIM)	RECLAIM is designed to allow facilities flexibility in achieving emission reduction requirements for NOx and SOx through controls, equipment modifications, reformulated products, operational changes, shutdowns, other reasonable mitigation measures or the purchase of excess emission reductions.
Regulation XXX: Title V Permits	The Title V federal program is the air pollution control permit system required by the federal Clean Air Act as amended in 1990. Regulation XXX defines the permit application and issuance as well as compliance requirements associated with the program. Any new or modified major source which qualifies as a Title V facility must obtain a Title V permit prior to construction, operation or modification of that source. Regulation XXX also integrates the Title V permit with the RECLAIM program such that a project cannot proceed without the other.
Regulation XXXI Acid Rain Permits	Title IV of the federal Clean Air Act provides for the issuance of acid rain permits for qualifying facilities. Regulation XXXI integrates the Title V program with the RECLAIM program. Regulation XXXI requires a subject facility to obtain emission allowances for SOx emissions as well as monitoring SOx, NOx, and carbon dioxide (CO_2) emissions from the facility.

SETTING

CLIMATE AND METEOROLOGY

The semi permanent high-pressure system centered off the west coast of the United States has a dominating influence on California's general climate. In the summer, this system results in low inversion layers with clear skies inland and typically early morning fog by the coast. In winter, this system promotes wind and rainstorms originating in the Gulf of Alaska and funneling these toward Northern California.

The large-scale wind flow patterns in the South Coast air basin are a diurnal cycle driven by the differences in temperature between the land and the ocean in addition to the channeling effect of the mountainous terrain surrounding the basin. The Tehachapi and Temblor mountains physically separate the air shed in the South Coast and San Joaquin Valley air basins. The San Bernardino, San Gabriel, and Santa Rosa mountain ranges generally make up the eastern boundary of the South Coast air basin. The Santa Monica and Santa Ana coastal mountain ranges make up the northern and southern boundaries respectively.

The proposed project would be located in the City of Anaheim, Orange County, in the southwestern part of the South Coast Air Basin (Basin). The area surrounding the project site is primarily light industrial and commercial use. The winter high temperatures average approximately 70 degrees F, while the summer high temperatures average 86 degrees F. The diurnal temperature differences (the temperature difference between night and day) ranges normally from 19 to 24 degrees F. The annual precipitation totals approximately 11 inches, primarily in the winter months between November and March (WC 2009).

The wind patterns near the project site are based on meteorological data from John Wayne Airport collected between 2002 through 2006 and are dominated by winds greater than 11 knots from the southwest, with a nighttime drainage pattern yielding occasional mild air flow from the northeast at night. Calm conditions prevailed for 27.4 percent of the time (CofA 2007a).

The mixing height, a parameter that defines the height through which pollutants released to the atmosphere are mixed, was recorded at the John Wayne Airport and will be used for the modeling analysis. Ground based inversion (a mixing height of 0 feet) occurred from 2 days per month in June to 22 days per month in December; a mixing height of 2,500 feet or less occurs approximately 20 days per month year round and a mixing height of 3,500 feet or less occurs 191 days per year.

AMBIENT AIR QUALITY STANDARDS

The United States Environmental Protection Agency (U.S.EPA) and the California Air Resource Board (ARB) have both established allowable maximum ambient concentrations of criteria air pollutants based on public health impacts, called ambient air quality standards (AAQS). The state AAQS, established by ARB, are typically lower (more stringent) than the federal AAQS, established by the U.S.EPA. The state and federal air quality standards are listed in **Air Quality Table 2**. As indicated, the averaging times for the various air quality standards (the duration over which all measurements taken are averaged) range from one hour to one year (annual). The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per unit volume of air, in milligrams (10^{-3} g, 0.001 g, or mg) or micrograms (10^{-6} g, 0.000001 g, or µg) of pollutant in a cubic meter (m^3) of air, averaged over the applicable time period.

Air Quality Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard	Federal Standard
Ozone (O_3)	1 Hour	0.09 ppm (180 μg/m^3)	--
	8 Hour	0.07 ppm (140 μg/m^3)	0.075 ppm (157 μg/m^3)
Respirable Particulate Matter (PM10)	24 Hour	50 μg/m^3	150 μg/m^3
	Annual	20 μg/m^3	--
Fine Particulate Matter (PM2.5)	24 Hour	--	35 μg/m^3
	Annual	12 μg/m^3	15 μg/m^3
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
	8 Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
Nitrogen Dioxide (NO_2)	1 Hour	0.18 ppm (339 μg/m^3)	--
	Annual	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)
Sulfur Dioxide (SO_2)	1 Hour	0.25 ppm (655 μg/m^3)	--
	3 Hour	--	0.5 ppm (1300 μg/m^3)
	24 Hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)
	Annual	--	0.03 ppm (80 μg/m^3)
Lead	30 Day Average	1.5 μg/m^3	--
	Calendar Quarter	--	1.5 μg/m^3
Sulfates	24 Hour	25 μg/m^3	--
Hydrogen Sulfide (H_2S)	1 Hour	0.03 ppm (42 μg/m^3)	--
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 μg/m^3)	--
Visibility Reducing Particulates	24 hours	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.	--

Source: ARB 2009a

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

The ambient air quality standards shown in **Air Quality Table 2** define the maximum amount of a pollutant that can be present in outdoor air without harm to the public's health. These standards 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, and include a margin of safety.

EXISTING AMBIENT AIR QUALITY

The project site is located at 3071 East Miraloma Avenue, in a City of Anaheim (CofA)-designated industrial zone in Orange County and is under the jurisdiction of the SCAQMD. **Air Quality Table 3** lists the attainment and non-attainment status of the district for each criteria pollutant for both the federal and state ambient air quality standards.

Air Quality Table 3
Attainment / Non-Attainment Classification
South Coast Air Quality Management District (SCAQMD)

Pollutants	**Federal Classification**	**State Classification**
Ozone	Extreme Non-Attainment	Extreme Non-Attainment
PM10	Serious Non-Attainment	Non-Attainment
PM2.5	Non-Attainment	Non-Attainment
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment

Source: ARB 2009b, U.S.EPA 2009

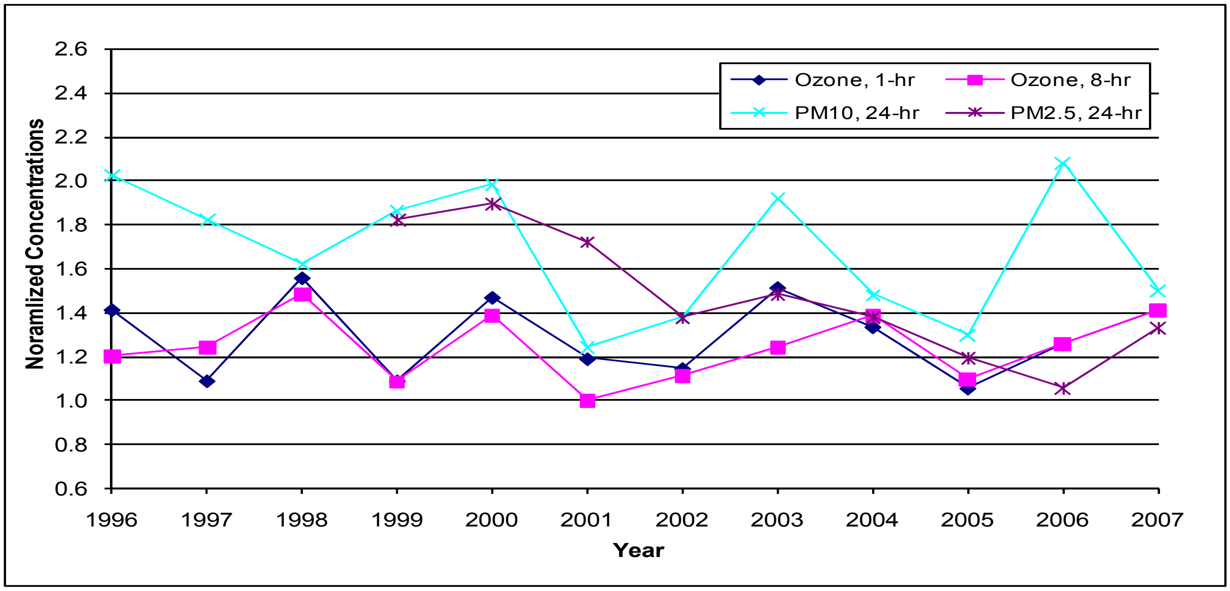
Ambient air quality data has been collected extensively in the air basin. **Air Quality Table 4** lists a summary of maximum ambient measurements for the years 2001 through 2007 at the Anaheim-Pampas Lane monitoring station, the closest monitoring station located approximately 4.8 miles west-southwest of the proposed site. The Anaheim-Pampas monitoring station measures all criteria pollutant concentrations except SO_2 and SO_2 concentrations are collected from the Costa Mesa-Mesa Verdes Drive monitoring station, located approximately 13.2 miles south southwest of the project site. **Air Quality Figure 1** presents historical ozone and PM air quality data compared to the most stringent air quality standards over the years 1996-2007.

Air Quality Table 4
Criteria Pollutant Summary
Maximum Short Term Ambient Concentrations (ppm or μg/m^3)

Pollutant	Averaging Period	Units	2001	2002	2003	2004	2005	2006	2007	Limiting AAQS
Ozone	1 hour	ppm	0.107	0.103	0.136	0.120	0.095	0.113	0.127	0.09
Ozone	8 hours	ppm	0.040	0.078	0.087	0.097	0.077	0.088	0.099	0.07
PM10 [a]	24 hours	μg/m^3	62	69	96	74	65	104	75	50
PM10	Annual	μg/m^3	21.9	33.5	32.8	34	28.2	33.4	31	20
PM2.5 [a, b]	24 hours	μg/m^3	60.2	48.1	51.8	48.2	41.9	40.5	46.5	35
PM2.5	Annual	μg/m^3	18.6	18.6	17.3	17.0	14.7	14.1	14.5	12
NO_2	1 hour	ppm	0.120	0.100	0.127	0.122	0.089	0.114	0.10	0.18
NO_2	Annual	ppm	--	0.024	0.024	0.020	0.021	0.020	0.020	0.03
CO	1 hour	ppm	7.3	7.4	6.1	5.3	4.1	4.5	4	20
CO	8 hours	ppm	3.76	5.26	3.78	4.09	3.27	3.0	2.91	9.0
SO_2 [c]	1 hour	ppm	0.013	0.027	0.021	0.031	0.012	0.012	0.01	0.25
SO_2 [c]	24 hours	ppm	0.005	0.011	0.012	0.008	0.008	0.004	0.004	0.04
SO_2 [c]	Annual	ppm	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.03

Source: ARB 2009c, ARB 2008
Notes:
[a] Exceptional PM concentration events, such as those caused by wind storms are not shown where obvious; however, some exceptions events may still be included in the data presented.
[b] State arithmetic mean is not available. Instead, national annual average PM2.5 data are used.
[c] All data for SO_2 are collected from the Costa Mesa-Mesa Verde Drive monitoring station.

Air Quality Figure 1
1996-2007 Historical Ozone and PM Air Quality Data
Anaheim-Pampas Lane Monitoring Station, Orange County



Source: ARB 2009c
Notes: The highest measured ambient concentrations of various criteria air contaminants were divided by their applicable standard and provided as a graphical point. Any point on the chart that is greater than one means that the measured concentrations of such air contaminant exceed the standard, and any point that is less than one means that the respective standard is not exceeded for that year. For example the 1-hour ozone concentration in 2007 is 0.127 ppm/0.09 ppm standard = 1.41.
All data for the years 1996-2000, and 2001-2007 are from the Anaheim-Harbor Blvd monitoring station, and from the Anaheim-Pampas Lane monitoring station, respectively.

Air Quality Table 4 and **Air Quality Figure 1** clearly shows that ozone, PM10, and PM2.5 continue to violate applicable standards while CO, NO_2 and SO_2 do not violate the standards.

Attainment Criteria Pollutants

Although both NO_2 and SO_2 are classified as in attainment with all state and federal AAQS, they remain of significant concern since they are precursors to PM10, and NO_2 is a precursor to ozone. Because NO_2 and SO_2 are precursors to non-attainment pollutants, the district will require full offset mitigation for both.

Nitrogen Dioxide (NO_2)

Most combustion activities and engines emit significant quantities of nitrogen oxides (NOx), a term used in reference to combined quantities of nitrogen oxide (NO) and NO_2. Most of the NOx emitted from combustion sources is NO. Although only NO_2 is a criteria pollutant, NO is readily oxidized in the atmosphere into NO_2. In urban areas, the ozone concentration level is typically high. That level will drop substantially at night as NO is oxidized into NO_2, and increase again in the daytime as sunlight disassociates NO_2 into NO and ozone. This reaction explains why urban ozone concentrations at ground level can be relatively low, while downwind rural areas (without sources of fresh NO emissions) are exposed to higher ozone concentrations as arriving NO_2 dissociates into NO and ozone in the presence of sunlight.

Sulfur Dioxide (SO_2)

Sulfur dioxide is typically emitted as a result of the combustion of fuels containing sulfur. In significant ambient quantities, SO_2 can lead to acid rain and sulfite particulate formation. Natural gas contains very little sulfur and consequently results in very little SO_2 emissions when combusted. By contrast, fuels high in sulfur, such as lignite (a type of coal), emit large amounts of SO_2 when combusted. Sources of SO_2 emissions within the basin come from every economic sector and include a wide variety of gaseous, liquid and solid fuels.

Carbon Monoxide (CO)

CO is generated from most combustion engines and other combustion activities. CO is considered a local pollutant, as it will rapidly oxidize. It is thus found in high concentrations only near the source of emissions. Automobiles and other mobile sources are the principal source of CO emissions. High levels of CO emissions can also be generated from fireplaces and wood-burning stoves. Industrial sources, including power plants, typically constitute less than 10 percent of the ambient CO levels in the South Coast region (ARB 2006).

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. Because the mobile sector (ships, cars, trucks, busses and other vehicles) is the main source of CO, ambient concentrations of CO are highly dependent on traffic patterns. Carbon monoxide concentrations in 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 counties in California are in compliance with the state CO AAQS.

Non-Attainment Criteria Pollutants

The following sections provide background for the non-attainment criteria pollutants: ozone, PM10, and PM2.5.

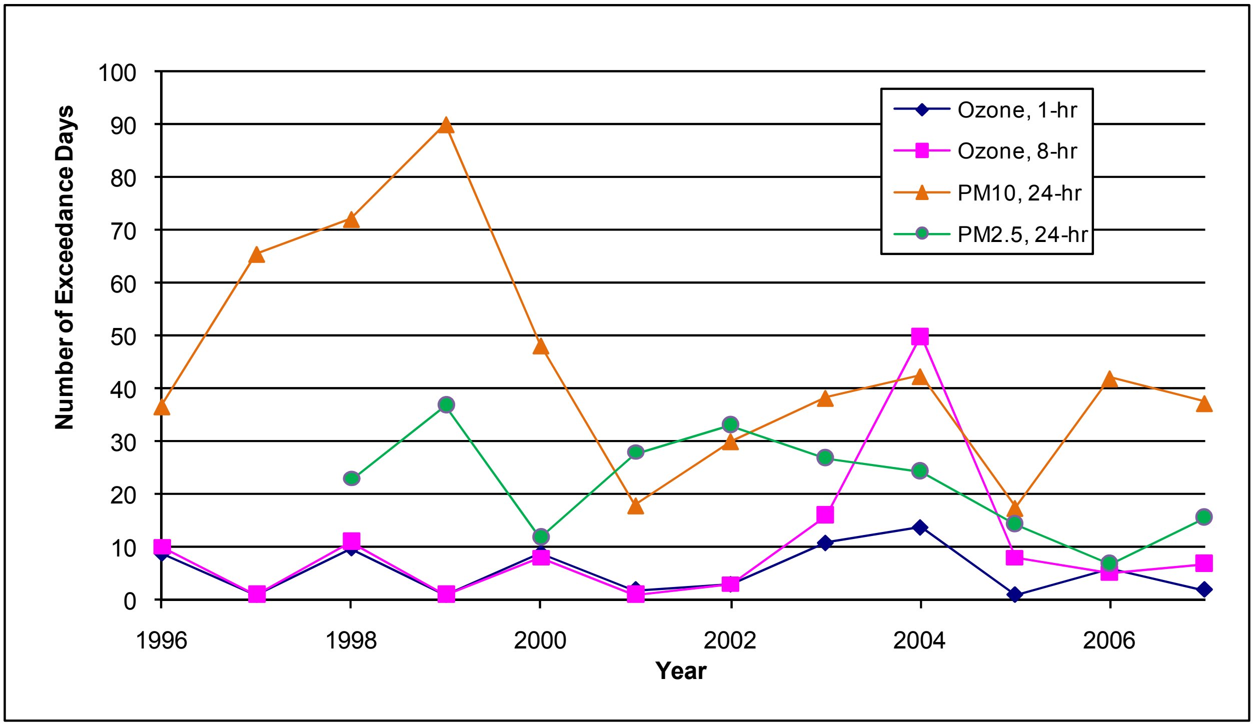
Ozone (O_3)

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between precursor air pollutants. The primary ozone precursors are NOx and VOC, both of which interact in the presence of sunlight to form ozone.

The SCAQMD is being re-classified as a federal extreme non-attainment area and is classified as a state extreme non-attainment area for ozone (the worst possible classification). Efforts to achieve ozone attainment typically focus on controlling the ozone precursors NOx and VOC. SCAQMD-published state implementation plans (SIP) rely on the ARB to control mobile sources, the U.S.EPA to control emission sources under federal jurisdiction, and SCAQMD to control local industrial sources. Through these control measures, California and the SCAQMD will be required to reach attainment of the federal ozone ambient air quality standard by 2024.

Exceedances of the national and state ozone ambient air quality standards occur in the region both up wind and downwind of the project site. **Air Quality Figure 2** shows the number of days each year on which exceedances of the state 1-hour and 8-hour ozone standards, the 24-hour state PM10 standard, and the 24-hour federal PM2.5 standard occurred for the closest representative monitoring site.

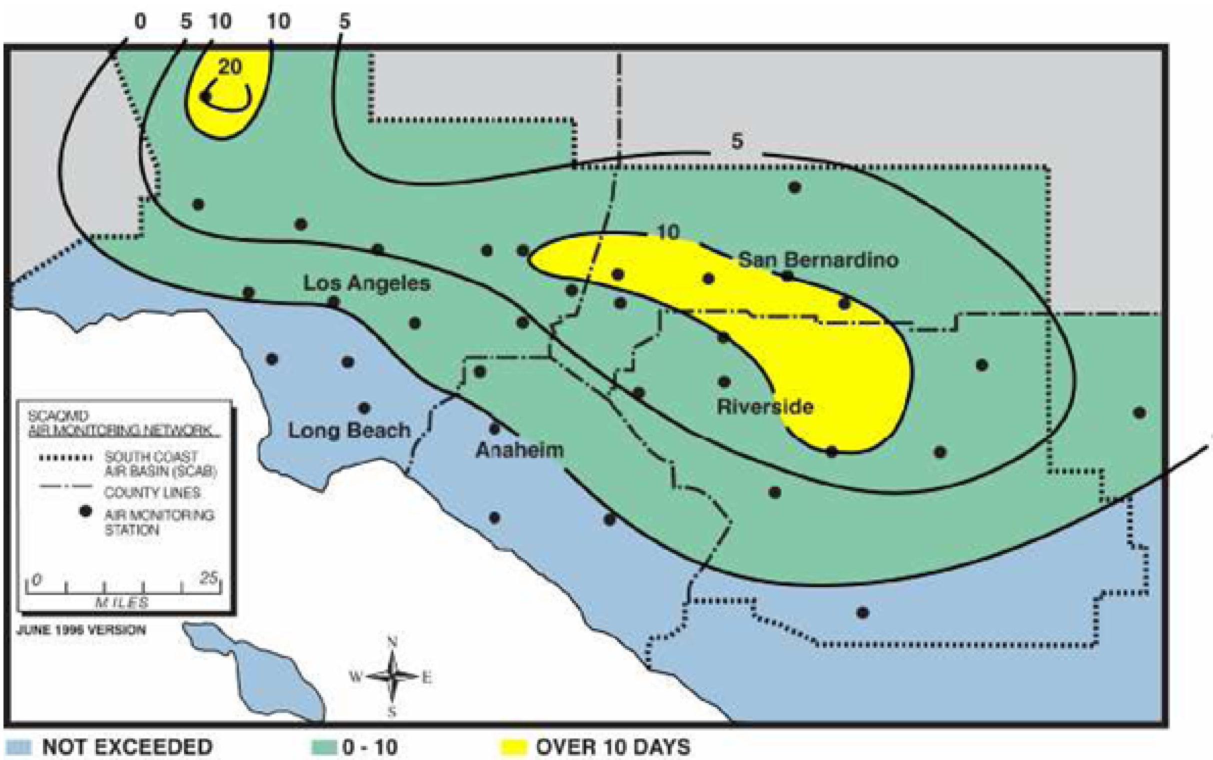
Air Quality Figure 2
Ozone, PM10 and PM2.5 1996-2007
Number of Days Exceeding the Ozone, PM10 State AAQS & PM2.5 Federal AAQS



Source: ARB 2009c

The proposed project area (represented in **Air Quality Figure 2** by the Anaheim-Pampas monitoring station) is in an area very near the coastal regions of the SCAQMD. The ambient air quality data in SCAQMD shows the characteristic trend to higher ambient ozone concentrations farther away from the coast, due to prevailing onshore airflow. **Air Quality Figure 3** provides a graphical representation of this effect for a single year, showing how the onshore airflow pushes pollution inland and thus focuses regional violations away from the coast. The project site is located approximately 5 miles east northeast of the shown Anaheim monitoring station location and is within the 0 to 5 day exceedance area of **Air Quality Figure 3.**

Air Quality Figure 3
Ozone – 2006
Number of Days Exceeding 1-hour Federal Standard
(1-hour average ozone > 0.12 ppm)



Source: SCAQMD 2006

Though there are a significant number of exceedances of the ozone ambient air quality standards throughout the district, it is important to consider the improvements that have occurred in recent years. The SCAQMD leads the nation in air quality management methods and regulatory programs. These programs have significantly improved the air quality in spite of the growing population and industrial and commercial enterprises. However, **Air Quality Figure 1** shows limited improvement in peak ozone concentrations near the site; so the overall ambient air quality for ozone in the area remains a concern.

Respirable Particulate Matter (PM10)

PM10 is emitted directly and also generated downwind of a source when various emitted precursor pollutants chemically interact in the atmosphere to form solid precipitates. These solids are called secondary particulates, because they are not directly emitted, but are still generated as a consequence of secondary chemical reactions of emitted gaseous pollutants. Gaseous emissions of pollutants such as NOx, SO_2, and VOC from turbines, and ammonia (NH_3) from NOx control equipment can form particulate nitrates, sulfates, and organic solids.

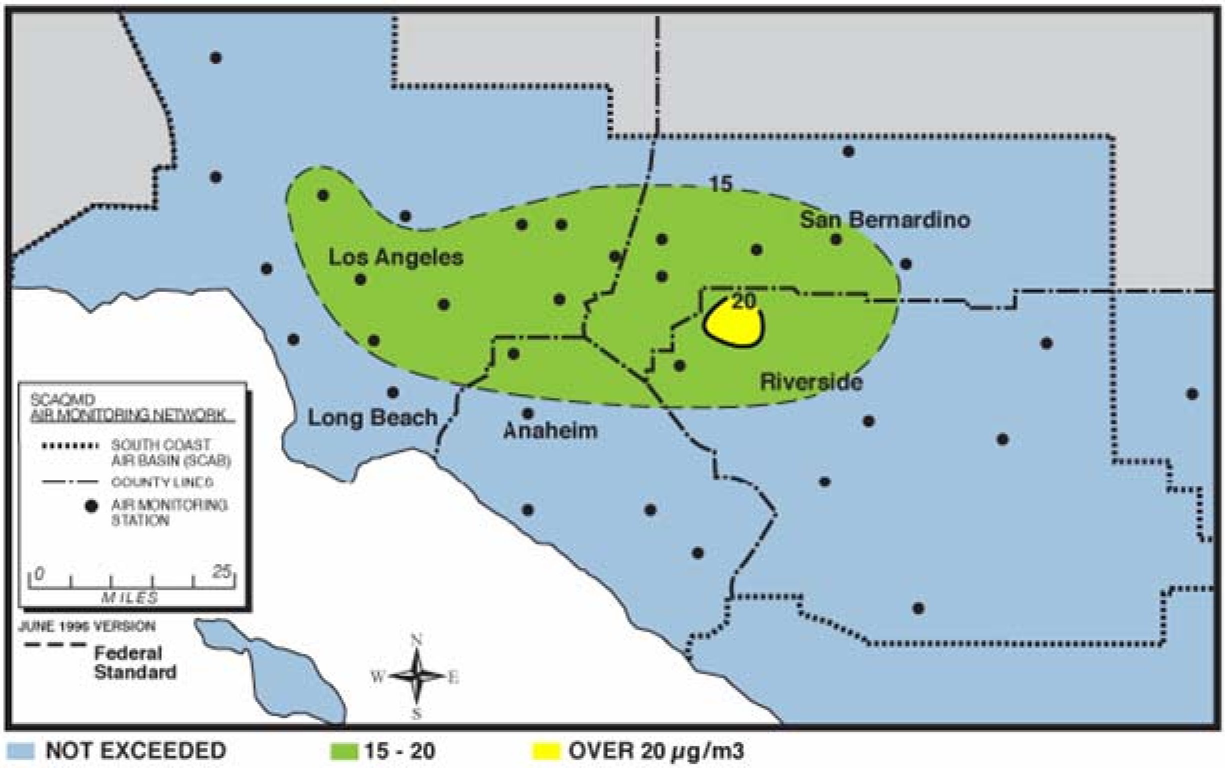
The entire South Coast Air Basin has been designated a non-attainment zone for the federal annual PM10 ambient air quality standards. The South Coast Air Basin has been designated as a non-attainment zone for the state 24-hour and annual PM10 ambient air quality standards. **Air Quality Figure 2** above shows the number of days each year on which exceedances of the state 24-hour PM10 standard occurred for Anaheim-Pampas monitoring station. The data shows a fluctuating pattern, but overall PM10 concentration has been decreased since 1999.

Fine Particulate Matter (PM2.5)

PM2.5, a subset of PM10, consists of particles with an aerodynamic diameter less than or equal to 2.5 microns. Particles within the PM2.5 fraction penetrate more deeply into the lungs, and can be much more damaging by weight than larger particulates. PM2.5 is primarily a product of combustion and secondary particulate formation and includes nitrates, sulfates, organic carbon (ultra fine dust) and elemental carbon (ultra fine soot). **Air Quality Figure 2** above shows the number of days each year on which exceedances of the federal 24-hour PM2.5 standard of 35 $\mu g/m^3$ (there is no separate short-term state standard) occurred for the Anaheim-Pampas monitoring station. **Air Quality Figure 2** shows the slowly decreasing trend of PM10 concentrations over the period.

The highest concentrations of PM2.5 in the SCAQMD occur within the counties of San Bernardino and Riverside (similarly to PM10), with relatively lower concentrations of PM2.5 (similarly to PM10) extending west toward the project site located closer to the coastal region. This effect is shown graphically in **Air Quality Figure 4** below. The project site is located approximately 5 miles east northeast of the shown Anaheim monitoring station location and is within the 15 to 20 $\mu g/m^3$ area of **Air Quality Figure 4.**

Air Quality Figure 4
PM2.5 – 2006
Annual Arithmetic Mean, μg/m³



Source: SCAQMD 2006

PM2.5 standards were first adopted by U.S.EPA in 1997, and were upheld by the United States Supreme Court in 2001 over a challenge from the American Trucking Association. Though SCAQMD is designated as non-attainment for all state and federal PM2.5 AAQS, the SCAQMD has not yet finished preparing a PM2.5 State Implementation Plan (SIP). The SCAQMD has submitted a PM2.5 SIP, and once the plan is approved by U.S.EPA, the SCAQMD will prepare revised NSR rules that will likely require offsetting of PM2.5 emissions. The SCAQMD is thus unlikely to address PM2.5 in their rules within the schedule of this proposed project. Staff, however, has a California Environmental Quality Act (CEQA) responsibility to address PM2.5 emissions since there are current ambient air quality standards in effect and the proposed project region is not in compliance with those standards.

Existing Ambient Air Quality Summary

Based on the above analysis of background ambient air quality, staff recommends the use of background ambient air concentrations in **Air Quality Table 5** for the purpose of modeling and evaluating potential ambient air quality impacts from the proposed project.

Air Quality Table 5
Staff Recommended Background Concentrations (µg/m^3)

Pollutant	Averaging Time	Recommended Background	Limiting Standard	Percent of Standard
NO_2	1 hour	214.7	339	63%
	Annual	39.9	57	70%
CO	1 hour	5,175	23,000	23%
	8 hour	3,633	10,000	36%
PM10	24 hour	104	50	208%
	Annual	33.4	20	167%
PM2.5	24 hour	46.5	35	133%
	Annual	14.7	12	123%
SO_2	1 hour	31.4	655	5%
	24 hour	10.5	105	10%
	Annual	2.7	80	3%

Source: ARB 2009c, ARB 2008 and Energy Commission Staff Analysis

PROJECT DESCRIPTION AND PROPOSED EMISSIONS

The proposed CPP project's major air emissions sources are:

- Four General Electric (GE) LM 6000PM Sprint Combustion Turbine generators (CTGs);
- Oxidation catalyst and selective catalytic reduction (SCR) equipment;
- A four-cell chiller cooling tower;
- A 1,141 hp black start diesel engine;
- A 10,000 gallon 19 percent aqueous ammonia tank;
- A 550 gallon underground oil/water separator;
- Linear Construction Elements consisting of:
    - 3,240 foot long (0.61 miles) natural gas pipeline;
    - 2,185 foot long (0.41 miles) process water supply pipeline;
    - 7,100 foot long (1.34 miles) electrical transmission line for interconnection;
    - 7,000 foot long (1.33 miles) fiber optic cable line;

The potential emissions from the facility are classified in three categories: construction, initial commissioning, and operation.

Construction Emissions

Facility construction is expected to take about 12 months. The power plant project construction consists of three major areas of activity: 1) the civil/structural construction 2) the mechanical construction, and 3) the electrical construction. The projected maximum daily and annual emissions, based on the highest monthly emissions over the entire construction period, are shown in **Air Quality Table 6**.

Air Quality Table 6
Estimated Daily Maximum Construction Emissions (lbs/day)

	NOx	CO	VOC	SO_2	PM10	PM2.5
Max. Onsite Construction	79.5	66.6	14.3	0.1	124.0	26.0
Max. Linear Construction	29.1	17.6	4.8	0.03	3.0	2.5

Source: CofA 2007b

During 12-month construction period, the proposed onsite construction areas and linear line construction areas would be disturbed at different times. The maximum construction emissions for onsite construction would occur during Month 1 due to demolition of existing buildings and asphalt at the site, in addition to grading and drainage activities. The construction activities during the first month require the use of larger equipment, which have higher emission rates than any other construction month. The maximum emissions from linear line construction would occur during the 5th month, during which the gas pipeline would be constructed. The proposed natural gas pipeline would involve the use of jack and bore construction techniques under Carbon Creek, with the construction of one pit on each side of the creek to facilitate the operation of the jack and bore equipment. Therefore, the fifth month was chosen for the daily maximum emission for linear construction.

Initial Commissioning Emissions

New power generation facilities must go through an initial firing and commissioning phase before being deemed commercially available to generate power. During this period, short-term (hourly) emissions may exceed normal operating permitted levels due to numerous startups and shutdowns, periods of low load operation, and other testing required before emission control systems are fine-tuned for optimum performance.

A series of six commissioning activities was considered for the combustion turbine commissioning. Commissioning of each CTG would require maximum of 156 hours of operation, and total commissioning duration would be between 1 and 2.5 months as necessary to maintain monthly emissions below permitted limits. The applicant proposes a commissioning period of approximately 6 months during which all installed equipment would be run and tested. The worst-case CTG commissioning emissions were conservatively estimated by assuming that the control efficiency of the applicable abatement systems would be essentially zero during the commissioning tests. Emissions of SO_2 are estimated by assuming full sulfur conversion in the natural gas to SO_2, and vary based on the amount of natural gas burned. Since the commissioning activities occur at low loads, SO_2 emissions would be higher from full load normal operations. The six different scenarios of commissioning emissions estimates and the maximum hourly commissioning emissions are presented in **Air Quality Table 7 and 8**.

Air Quality Table 7
Estimated Initial Commissioning Emissions Per Turbine (lbs)

Activity	Hours	NOx	CO	VOC	SO_2	PM10
First fire the unit and then shutdown to check for leaks, etc.	24	200	822	27	1.4	12.3
Synchronization and check e-stop	18	150	617	20	1.0	9.2
Additional automatic voltage regulator (AVR) commissioning	18	261	329	8	1.3	11.4
Break-in-run	12	174	219	5	0.9	7.6
Dynamic commissioning of AVR and commission water injection and SPRINT	60	1,636	819	42	11.4	103.8
Base Load AVR commissioning	24	1,023	409	30	7.6	67.2
Total Commissioning Emissions	156	3,443	3,213	131	23.9	211.5

Source: CofA 2008b, CofA 2009b

The SCR and oxidation catalyst control systems for NOx and CO, respectively, may not be installed until very late in the commissioning period, and the applicant's assumed emission values shown in **Air Quality Table 7**, as also noted above, conservatively do not assume control from these two devices. However, the SCR and Oxidation Catalyst will be installed, tested, and fully functional upon completion of the initial commissioning period for each turbine.

Air Quality Table 8
Maximum Hourly Commissioning Emissions per Turbine (lbs/hr)

	NOx	CO	VOC	SO_2	PM10
Maximum Hourly Commissioning Emissions	42.63	34.27	1.25	0.32	2.8

Source: CofA 2008b, CofA 2009b

Operation Emission Controls

NOx Controls

Each combustion turbine generator (CTG) exhaust would be treated by an ammonia injected selective catalytic reactor (SCR) system before release to the atmosphere. SCR refers to a process that chemically reduces NOx to elemental nitrogen and water vapor by injecting ammonia into the flue gas stream in the presence of a catalyst and excess oxygen. The process is termed selective because the ammonia preferentially reacts with NOx rather than oxygen. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or noble metals are also used. Regardless of the type of catalyst used, efficient conversion of NOx to nitrogen and water vapor requires uniform mixing of ammonia into the exhaust gas stream and a catalyst surface large enough to ensure sufficient time for the reaction to take place.

VOC and CO Controls

VOC and CO would be controlled at the CTG combustor and by an oxidation catalyst. An oxidation catalyst system chemically reacts organic compounds and CO with excess oxygen to form nontoxic carbon dioxide and water. Unlike the SCR system for reducing NOx, an oxidation catalyst does not require any additional chemicals.

PM10 and SO_2 Controls

The exclusive use of natural gas, an inherently clean fuel that contains very little noncombustible solid residue, would limit the formation of SO_2 and PM10. Natural gas does contain small amounts of naturally occurring reduced sulfur compounds, such as H_2S, and a sulfur-based scenting compound known as mercaptan which result in sulfur dioxide emissions when combusted. However, in comparison to other fuels used in modern thermal power plants, such as fuel oil or coal, the amount of sulfur dioxide produced from the combustion of natural gas is very low. Like SO_2, the emission level of PM10 from natural gas combustion is also very low compared to the combustion of fuel oil or coal. It is assumed in these calculations that the natural gas has a maximum short term sulfur content of 0.75 gr/100scf (grains per 100 cubic feet at standard temperature and pressure), and an annual average sulfur content of 0.25 gr/100scf, based on a monthly gas sampling requirement at the CPP project.

The majority of the emissions from cooling towers are pure water vapor; however, a small amount of liquid water can escape and is known as "drift". Cooling tower drift consists of a mist of very small water droplets, which can generate particulate matter that originates from the dissolved solids in the circulating water once the water evaporates. To limit these particulate emissions, cooling towers use drift eliminators to capture these water droplets, and cooling tower operators are required to monitor the total dissolved solids (TDS) in the cooling tower recirculation water to ensure that it does not exceed a SCAQMD specified value. The applicant intends to use drift eliminators on the cooling towers designed to limit drift to 0.001 percent of the circulating water.

Proposed Operation Emissions

Air Quality Table 9 shows applicant estimated gas turbine startup and shutdown event emissions and worst case hourly emissions. The maximum hourly emissions reflect 35-minutes to complete a full startup, then a turbine trip occurs followed by 5-minute purge, and then the first 20 minutes of a restart.

Air Quality Table 9
Maximum Short-term Emissions Rates Per Turbine (lbs)

	NOx	CO	VOC	SO_2	PM10
Startup [a] (lbs/event)	10.09	4.06	0.79	0.14	1.29
Shutdown [b] (lbs/event)	0.69	0.62	0.27	0.02	0.18
Maximum Hourly Emissions [c] (lbs/hr)	14.27	6.30	1.29	0.20	1.84

Source: CofA 2008b
Notes: [a] Startup event is 35 minutes in duration.
[b] Shutdown event is 10 minutes in duration.
[c] Maximum hourly emissions are a startup followed by a turbine trip, a 5 minute purge cycle, and a partial restart where the entire sequence is 72 minutes.

NOx, CO and VOC for startup and shutdown events have elevated emissions due to the SCR and oxidation catalyst not being fully functional during these events and reduced combustion performance CO. All other criteria pollutants emissions have the highest emissions rates during normal operation.

Air Quality Table 10 presents the maximum hourly operating emissions during normal full load gas turbine operations.

Air Quality Table 10
Maximum Normal Operational Emissions Rates Per Turbine (lbs/hr)

Process Description	NOx	CO	VOC	SO_2	PM10
Hourly Normal Operating Emission (lbs/hr)	3.98	4.24	1.20	0.34	3.00

Source: CofA 2008b

Air Quality Table 11 presents the facility total maximum hourly emissions including emissions from the black start engine, which would be operated for non-emergency use and tested for an hour, and the cooling tower.

Air Quality Table 11
Maximum Hourly Operational Emissions Rates (lbs/hr)

Process Description	NOx	CO	VOC	SO_2	PM10
4 CTGs	57.08	25.2	5.16	1.36	12.00
Black Start Engine	12.06	5.79	0.05	0.006	0.05
Cooling Towers (4 cells)	--	--	--	--	0.04
Total Facility Max. Hourly Emissions (lbs/hr)	69.14	145.91	5.21	1.37	12.09

Source: CofA 2007b Appendix, CofA 2008b, ASPEN 2009b

In general, higher emissions of NOx, VOC and CO would occur during the startup and shutdown of a large CTG than during operation because the turbine combustors are designed for maximum efficiency during full load, steady state operation. During startup, combustion temperatures and pressures change rapidly, resulting in less efficient combustion and higher emissions. Also, flue gas emission controls (the catalysts discussed above), operate most efficiently when a turbine operates at or near full load temperatures.

The applicant estimated the maximum daily emissions for NOx, CO, and VOC based on 2 startup/warmup events, 2 shutdown events, and remaining time at normal operation for 22 hours and 30 minutes. The maximum daily emission rates for PM10 and SO_2 were based instead on 24 hours of full load operation, since PM10 and SO_2 emissions are proportional to fuel use. The total project maximum daily emissions are then conservatively estimated as the sum of the emissions from all four CTGs, 24-hour operation of the cooling tower, and a single hour of black start engine operation for required testing purposes. These estimates are presented in **Air Quality Table 12** below.

Air Quality Table 12
Maximum Daily Emissions (lbs/day)

Process Description	NOx	CO	VOC	SO_2	PM10
Per Turbine					
Startup (lbs/day, per turbine)	20.18	8.12	1.58	--	--
Shutdown (lbs/day, per turbine)	1.38	1.24	0.54	--	--
Normal Operation (lbs/day, per turbine)	89.55	95.4	27	24.48	72
Total Facility					
Startup (lbs/day, for 4 CTGs)	80.72	32.48	6.32	--	--
Shutdown (lbs/day, for 4 CTGs)	5.52	4.96	2.16	--	--
Normal Operation (lbs/day, for 4 CTGs)	358.2	381.6	108	97.92	288.00
Black Start Engine	12.06	5.79	0.05	0.006	0.05
Cooling Towers (4 cells)	--	--	--	--	0.96
Total Facility Max. Daily Emission (lbs/day)	456.50	424.83	116.53	97.93	289.01

Source: CofA 2007b Appendix, CofA 2008b, CofA 2009 d

Air Quality Table 13 provides the SCAQMD's calculated 30 day average emissions per turbine that is used to determine District offset requirements for VOC, SO_2 and PM10.

Air Quality Table 13
SCAQMD 30-Day Average
Daily Emissions (lbs/day per turbine)

VOC	SO_2	PM10
4.31	1.13	9.98

Source: SCAQMD 2009f

The 30-day average daily emissions shown in Air Quality Table 13, even after multiplying by four to get an equivalent turbine number basis, are considerably lower than the maximum daily emissions shown in Air Quality Table 12 because the 30-day average daily emissions have been based on the applicant's proposed maximum operation limit basis of 90 hours of full-load operation and 20 startup and 20 shutdown events per month per turbine. This is equivalent to approximately 3 hours of full-load operation and 2/3rds of a startup and shutdown event per day, in comparison to the worst-case day assumptions of 22.5 hours of full-load operation and 2 startup and 2 shutdown events per day.

The expected normal annual operating emissions for the total facility are summarized in **Air Quality Table 14**. The estimates assume 1,080 hours of normal operation per year per turbine, plus 240 startup and 240 shutdown events per turbine. The facility annual emissions further assume 4,320 hours of 4-cell cooling tower operation and the black start engine would be operated for 200 hours for testing and emergency purposes.

Air Quality Table 14
Project Annual Emissions (tons per year - tpy)

Process Description	NOx	CO	VOC	SO_2	PM10
Normal Operation (for 4 CTGs)	13.77	11.40	3.10	0.81	7.19
Black Start Engine	1.21	0.58	0.005	0.0006	0.005
Cooling Towers (4 cells)	--	--	--	--	0.078
Total Facility Max. Annual Emissions (tpy)	14.98	11.98	3.11	0.81	7.27

Source: CofA 2007b Appendix, CofA 2008b, ASPEN 2009b

Ammonia Emissions

To control NOx emissions from the combustion turbines, ammonia is injected into the flue gas stream as part of the SCR system. In the presence of the catalyst, the ammonia and NOx react to form harmless elemental nitrogen and water vapor. However, not all of the ammonia reacts with the flue gases to reduce NOx; a portion of the ammonia passes through the SCR and is emitted unaltered from the stacks. These ammonia emissions are known as ammonia slip. It should be noted that a maximum permitted ammonia slip rate only occurs after significant degradation of the SCR catalyst, usually five years or more after commencing operations. At that point, the SCR catalysts are removed and replaced with new catalysts in order to maintain compliance with the permitted ammonia slip limit. During the majority of the operational life of the SCR system, actual ammonia slip would be between 10 to 50 percent of the permitted limit. The applicant proposes an ammonia emission limit of five ppm at 15 percent oxygen averaged over one hour. The maximum hourly emission concentration limit is equal to 3.64 lbs/hr of emissions per turbine and the annual emissions potential would be total of 8.3 metric tons/year for all four turbines assuming a total of 1,260 operating hours per turbine (ASPEN 2009b).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses potential impacts from the construction and operation of the proposed project, and also analyzes the cumulative effects of this project with past, present, and reasonably foreseeable projects that are sources of similar emissions. Construction impacts result from the emissions occurring during the construction of the project. The operation impacts result from the emissions over the proposed lifetime of the project. The cumulative impacts analysis includes projections regarding the conditions contributing to cumulative impacts as reflected in the district’s adopted attainment plan, a summary of expected environmental impacts from related projects in the region, and an analysis of those impacts from a cumulative standpoint.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff has used two main significance criteria in evaluating this project. First, all project emissions of nonattainment criteria pollutants and their precursors (NOx, VOC, CO, PM10, PM2.5, 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 are considered significant and must be mitigated. For construction emissions, the mitigation is limited to controlling construction equipment tailpipe emissions and fugitive dust emissions to the maximum extent feasible. For operating emissions, the mitigation includes both the best available control technology (BACT) and the use of emission reduction credits (ERC) or other valid emission reductions 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, and include 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 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 a complex series of mathematical equations, which are repeatedly evaluated by a computer for many different sets of ambient conditions and input parameters. The model results are often described as a maximum theoretical concentration of pollutant in the air to which people could be exposed, or units of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

In general, the input parameters 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 the modeling of this project, the hourly surface data for the years 2002-2006 are measured at the John Wayne Airport meteorological monitoring station located approximately 12 miles south of the project site, and the upper air data are measured at the Miramar Naval monitoring station located approximately 78 miles southeast of the proposed site (CofA 2007b). In addition, background criteria pollutant measurements from Anaheim-Pampas Lane monitoring station and Anaheim-Harbor Blvd monitoring station are integrated into the modeling results.

The applicant used the U.S.EPA approved American Meteorological Society/Environment Protection Agency Regulatory Model Improvement Committee Model (AERMOD), as both a screening and refined model to estimate the direct impacts of the project's PM10, CO, and SO_2 emissions resulting from project construction and operation. Additionally, the applicant obtained hourly ozone and NO_2 ambient data from the Anaheim-Pampas Lane monitoring station for 2002 to 2006 that was used in a more refined NO_2 impact modeling analysis using the Ozone Limiting Method (OLM) option that is available with AERMOD. A description of the modeling analysis and its results are provided in the Application for Certification (AFC) (CofA 2007b and CofA 2008b). AERMOD is a generally accepted model for this type of project, and the meteorological input data is sufficient. Staff added the applicant's modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations. The results were then compared with the ambient air quality standards for each respective air contaminant to conservatively determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or contribute to an existing violation.

Construction Impacts and Mitigation

Construction Impact Analysis

The construction air quality impact analyses prepared by the applicant considered both fugitive dust generated from the construction activity and combustion emissions produced by construction equipment for onsite construction work.

The maximum short-term impacts were modeled based on the worst-case onsite emissions estimated by the applicant. Annual impacts were modeled with the combined emissions that would occur over the entire 12-month construction period. The construction modeling results were added to the assumed maximum background values and compared to the most restrictive AAQS, and are presented in **Air Quality Table 15**.

Air Quality Table 15
Maximum Construction Impacts (µg/m^3)

Pollutant	Averaging Time	Modeled Project Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	1 hour	105.2	214.7	319.9	339	94%
	Annual	5.8	39.9	45.7	57	80%
CO	1 hour	63.0	5,175	5238	23,000	23%
	8 hour	32.9	3,633	3665.9	10,000	37%
PM10	24 hour	43.7	104	147.7	50	295%
	Annual	2.4	33.4	35.8	20	179%
PM2.5	24 hour	10.11	46.5	56.6	35	162%
	Annual	0.75	14.7	15.5	12	129%
SO_2	1 hour	0.10	31.4	31.5	655	5%
	24 hour	0.02	10.5	10.5	105	10%
	Annual	0.006	2.7	2.7	80	3%

Source: CofA 2007b

As **Air Quality Table 15** shows, the project's construction emissions would not cause a new violation of the NO_2, CO and SO_2 ambient air quality standards, and thus staff does not find these impacts to be significant. Staff believes that the particulate emissions from the construction of the project create a potentially significant impact because they would contribute to existing violations of the annual and 24-hour standards for PM10 and PM2.5. Those emissions can and should be mitigated to a level of insignificance by implementing all feasible emission mitigation measures.

Construction Mitigation

Applicant's Proposed Mitigation

The applicant proposes a number of mitigation and emissions control measures for use during the construction of the project. The applicant specifically proposes the following measures to control exhaust emissions from heavy diesel construction equipment (CofA 2007a):

- Use of diesel fuel with an ultra-low fuel sulfur content of 0.0015 percent by weight (15 ppm).

The applicant proposes to maintain a dust control efficiency of 85 percent for activities within the proposed project site. The applicant further proposes the following measures to control fugitive dust emissions during construction of the project:

- Use of water or chemical dust suppressants on unpaved surfaces;
- Use of vacuum or water flushing on paved surfaces;
- Covering or maintaining freeboard on haul vehicles;
- Limiting traffic speed on unpaved areas to 15 mph;
- Installation of erosion control measures;
- Re-plantation of disturbed areas as soon as possible;
- Use of gravel pads and wheel washers as needed; and
- Use of wind breaks and dust suppression as needed to control wind erosion.

Staff Proposed Mitigation

Staff agrees with the applicant's proposed mitigation measures. However, because of the predicted significant contribution to both the short- and long-term PM10 and PM2.5 problems, staff believes some additional construction mitigation measures are necessary.

Staff recommends construction PM10 and NOx emission mitigation measures as articulated in Conditions of Certification **AQ-SC1** through **AQ-SC5** that include modified versions of similar conditions proposed by the applicant in the AFC. In particular, the there are slight modifications to the fugitive dust controls necessary to control the higher fugitive dust emission potential for this type of project, and modifications to the off-road equipment mitigation measure to update it to both current staff standards and again in consideration of the high unmitigated emission potential for the construction of this project.

Staff recommends **AQ-SC1** to require the applicant to have an on-site construction mitigation manager who would 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**. Recommended Condition of Certification **AQ-SC3** formalizes the fugitive dust control requirements. Recommended Condition of Certification **AQ-SC4** would limit the potential offsite impacts from visible dust emissions, to respond to situations when the control measures required by **AQ-SC3** are not working effectively to control fugitive dust from leaving the construction site area.

Staff recommends Condition of Certification **AQ-SC5** to mitigate the PM and NOx emissions from the large diesel-fueled construction equipment. Implementation of this mitigation measure would provide additional primary and secondary PM mitigation to supplement the recommended fugitive dust mitigation measures. This condition requires the use of U.S.EPA/ARB Tier 2 engine compliant equipment for equipment over 100 horsepower where available, a good faith effort to find and use available U.S.EPA/ARB Tier 3 engine compliant equipment over 100 horsepower, and also includes equipment idle time restrictions and engine maintenance provisions. The Tier 2 standards include engine emission standards for NOx plus non-methane hydrocarbons, CO, and PM emissions, while the Tier 3 standards further reduce the NOx plus non-methane hydrocarbons emissions. The Tier 2 and Tier 3 standards became effective for engine/equipment model years 2001 to 2003 and models years 2006 to 2007, respectively, for engines between 100 and 750 horsepower.

Operation Impacts and Mitigation

While the construction and commissioning impacts are both relatively short lived, the operation impacts from the project would continue throughout the life of the facility. The operation impacts are thus subject to a more refined level of analysis. The following sections discuss the air quality impacts of project operation during normal full load conditions, including startup and shutdown events, and the commissioning phase operations.

Operation and Startup Impact Analysis

The applicant provided a refined modeling analysis (CofA 2008b), using the AERMOD model with OLM option to quantify the potential impacts of the project during both full load operation and startup conditions. Startup impacts (NOx and CO) are much larger than full load impacts not only because the emissions are greater, but also because the flue gas stream is at a lower velocity and temperature. This reduced emissions velocity means the pollutants will settle faster and thus have less time to dilute before reaching the ground. The modeling emission rate assumptions are very conservative, based on worst case startup emission estimates from the turbine manufacturer. Typical startup events are likely to generate significantly fewer emissions and impacts. This analysis is additionally conservative in regards to the assumed background measurements. The assumption is that the highest background measurements, from the last three years, coincide (in both location and timing) with the maximum project emission impacts. Because such a high background level is unlikely to occur at the same time and location as the maximum impacts from the project, these modeled conditions are considered worst case, conservative, and not likely to occur.

The worst case (maximum) results of this modeling analysis are shown in **Air Quality Table 16**.

Air Quality Table 16
Refined Modeling Maximum Operating Impacts (µg/m^3)

Pollutant	Averaging Time	Modeled Project Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	1 hour	107.39	214.7	322.1	338	95%
	Annual	0.406	39.9	40.3	56	72%
CO	1 hour	77.37	5,175	5,252	23,000	23%
	8 hour	6.36	3,633	3,639	10,000	36%
PM10	24 hour	1.83	104	105.8	50	212%
	Annual	0.02	33.4	33.4	20	167%
PM2.5	24 hour	1.83	46.5	48.3	35	138%
	Annual	0.039	14.7	14.7	12	123%
SO_2	1 hour	2.28	31.4	33.7	655	5%
	24 hour	0.039	10.5	10.5	105	10%
	Annual	0.004	2.7	2.7	80	3%

Source: CofA 2008b, URS 2009a

Air Quality Table 16 shows that during worst case startup and full load operations, the facility would potentially contribute to the existing PM10 and PM2.5 violations. Staff uses the federal and state ambient air quality standards, which are health based standards, as the indication of a possible ambient air quality impacts. Since the project PM10/PM2.5 emission impacts would contribute to an existing exceedance of the PM10 and PM2.5 state and federal ambient air quality standards, staff presumes that these impacts may thus also contribute to existing human health impacts (generally in the form of respiratory impacts). Thus, staff considers the project PM10/PM2.5 emission impacts to be significant if left unmitigated.

Since the project's impacts alone do not cause a violation of any NO_2, CO, or SO_2 ambient air quality standards under such conservative assumptions, staff concluded that the project's direct impacts for those pollutants are less than significant.

However, in light of the existing PM10, PM2.5, and ozone non-attainment status for the project site area, and because NOx, VOC, and SOx are precursors to these non-attainment pollutants, staff considers the potential operating emissions to be potentially significant and, therefore, staff is recommending that the NOx, VOC, PM, and SOx emissions be mitigated at a minimum 1:1 offset ratio.

Please see the "Operations Mitigation" section below for a detailed discussion of the proposed mitigation.

Commissioning Modeling Impact Analysis

The initial commissioning of a power plant refers to the time frame between completion of construction and the consistent production of electricity for sale on the market. Normal operating emission limits usually do not apply during initial commissioning procedures, and higher short-term emission limits generally apply during the initial commissioning period, as is the case for this project based on the District's Condition of Certification **AQ-2**. The CPP project would go through several tests during initial commissioning. During the first set of tests, post-combustion controls would not be operational (i.e., the SCR and oxidation catalyst).

Impacts modeling analysis for commissioning was conducted for CO and NOx, of which impacts would be expected to be significantly higher than during normal operations because the SCR and oxidation catalyst emission control systems may not be operating during portions of the commissioning tests. Modeling was conducted for the test that was expected to produce the highest offsite concentrations at ground level. For the CO maximum impacts, the activity labeled as "Synch and check e-stop" in **Air Quality Table 8** was used. In NOx maximum impacts modeling, the emissions rates during the activity labeled as "Base load AVR commissioning" in **Air Quality Table 8** was used.

The modeling was conservatively run to determine if all 4 CTGs could be tested simultaneously, and the results show that all four CTGs could undergo testing without causing the NO_2 or CO ambient standards to be exceeded. However, each CTG is expected to be tested individually. The commissioning modeling results demonstrate that when the maximum incremental commissioning impacts are added to applicable background concentrations and compared with the most stringent state or national ambient standards, no violation of the applicable AAQS for CO and NO_2 is predicted to occur. The modeling results estimated by AERMOD are presented in **Air Quality Table 17**.

Air Quality Table 17
CTG Commissioning Modeling
Maximum 1 hour Impacts – All Four Turbines (μg/m^3)

Pollutant	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2, 1-Hr	58.48	214.7	273.2	338	81%
CO, 1- Hr	122.5	5,175	5,298	23,000	23%
CO, 8- Hr	103.95	3,633	3,737	10,000	37%

Source: CofA 2008b, URS 2009a

Chemically Reactive Pollutant 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.

Ozone Impacts

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, the emissions of NOx and VOC from the CPP project do have the potential (if left unmitigated) to contribute to higher ozone levels in the region. These impacts would be significant because they would contribute to ongoing violations of the state and federal ozone ambient air quality standards.

PM2.5 Impacts

Secondary particulate formation, which is assumed to be 100 percent 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 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.” In the case of “ammonia rich,” 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 project site’s ammonia rich or ammonia poor status does not appear to have been established through comprehensive monitoring studies, such as those performed within the San Joaquin Valley. While areas near the coast may be ammonia poor, areas downwind of the project where livestock based agriculture exists are known to be ammonia rich. Therefore, there is some potential for the project’s ammonia emissions to create secondary particulate. However, there is currently no regulatory model that can predict the conversion rate. Therefore, staff is not able to reasonably estimate what impacts, if any, there would be from the project’s ammonia emissions.

Additionally, the actual ammonia emissions from the CPP project would be approximately 10 to 50 percent of the ammonia limit being imposed (5 ppm at 15 percent O_2 averaged over one hour). The point at which the project begins to emit at greater than 50 percent of the limit is typically the indicator to the operator that the SCR requires a major overhaul. Once this major overhaul is completed the SCR performance is typically returned to near new levels (approximately 1 ppm or better). It is in the best interest of the project owner to perform these overhauls as required so that the cost of ammonia stays low for the project. Thus for the vast majority of the project life, the ammonia emission would be below 2 ppm. An emission of any type of pollutant at this level has a very low potential to cause a significant impact.

Staff finds that it is not reasonably possible to estimate the impacts from the CPP project emissions of ammonia, but that these emissions are small and well controlled so that it is reasonable to assume that they are not likely to cause or significantly contribute to an exceedance of the PM10 or PM2.5 ambient air quality standards. Thus, staff concludes that with proper monitoring and enforcement of the SCR operations and ammonia concentrations the CPP project ammonia emissions do not have the potential to cause a significant impact on the ambient air quality.

The emissions of NOx and SOx from the CPP project do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region. These impacts would be significant because they would contribute to ongoing violations of the state and federal PM2.5 ambient air quality standards. The mitigation of the project NOx and SOx emissions is discussed in the Operations Mitigation section below.

Applicant's Proposed Mitigation

Emission Controls

As discussed in the air quality section of the AFC (CofA 2007b and CofA 2008b), the applicant proposes the following emission controls on the stationary equipment associated with the Canyon operation:

Turbines

The applicant's proposed Best Available Control Technology (BACT) for the four CTGs would include ultra-low NOx burners, water injection, selective catalytic reduction (SCR) with ammonia injection (for NOx), an oxidation catalyst, operate exclusively on pipeline quality natural gas (for VOC, PM and SOx) to limit emission levels. The AFC (CofA 2008b) and FDOC conditions (SCAQMD 2009f) provides the following BACT emission limits, each for the four CTGs:

- NOx: 2.5[2] ppmvd at 15 percent O_2, 3.98 lbs/hour (1-hour average)
- CO: 4.0 ppmvd at 15 percent O_2, 4.24 lbs/hour (1-hour average)
- VOC: 2.0 ppmvd at 15 percent O_2, 1.20 lbs/hour (1-hour average)
- PM10/PM2.5: 3.0 lbs/hour
- SO_2: 1.02 lbs/hour for short term (at 0.75 grains sulfur/100 scf), 0.34 lbs/hour for long term (at 0.25 grains sulfur/100 scf)
- NH_3: 5.0 ppmvd at 15 percent O_2, 3.64 lbs/hour. (1-hour average)

Four Cell Cooling Tower

- Drift rate, percent of recirculation rate: 0.001 percent, using a mist eliminator
- PM10: 0.009 lbs/hour per cell, 0.04 lbs/hour (24-hour average)

[2] The applicant has proposed to meet a more stringent limit of 2.3 ppm, but the SCAQMD has established 2.5 ppm as the NOx BACT level for this project.

Emergency Engine

The proposed 1,141-BHP emergency black start engine would be Tier II engine.

- NOx: 6.4 grams/kW-hour, 12.06 lbs/hour
- CO: 3.5 grams/kW-hour, 5.79 lbs/hour
- VOC: 1.0 grams/kW-hour, 0.05 lbs/hour
- PM10: 0.2 grams/kW-hour, 0.05 lbs/hour (24-hour average)
- SO_2: Diesel fuel with sulfur content no greater than 0.0015 percent by weight, 0.006 lbs/hour

Emission Offsets

SCAQMD requires offsets for the project's annual emissions of NOx, VOC, PM10 and SO_2. Offsets are not required for CO, because of the recent redesignation of the SCAB to attainment for CO. **Air Quality Table 18**, shows the amount of RTC credits (lbs/year) and ERC credits (lbs/day) required by SCAQMD.

Air Quality Table 18
Canyon SCAQMD Offset Requirement Summary (lbs)

	NOx	VOC	SO_2	PM10
Reclaim Trading Credits (lbs/year)	29,956 [a]	--	--	--
Emission Reduction Credits (lbs/day) [b]	--	21	5	48

Source: SCAQMD 2009a
Note:
a – The first commissioning year RTC credit requirement of 41,120 lbs is higher than the normal year requirement shown above.
b – The emission reduction credit requirements include the SCAQMD offset ratio of 1.2:1.

Air Quality Tables 19 through **22** provide the applicant's proposed emission offset mitigation package. The applicant has not yet procured the first year NOx RTC credits and is not required to until before turbine first fires. SCAQMD requires a 1:1 RTC offset for all stationary source NOx emissions which meets CEC staff CEQA recommended minimum offset ratio of 1:1 for all nonattainment pollutants and their precursors. For all other pollutants requiring District offsets, SCPPA is proposing to surrender emission reduction credits in quantities to meet District offset requirements.

Air Quality Table 19 provides the applicant's currently proposed offset package for VOC.

Air Quality Table 19
VOC Offsets Proposed for Canyon

Offset Source Location	Method of Reduction	Date of Reduction	Credit Number	Amount
Ringier America, Inc. 1600 E Orangethorpe Ave, Fullerton, CA 92831	n/a	Jul. 2nd, 1991	AQ008840	10 lbs/day
Allied Signal, Inc. 850 S Sepulveda Blvd, El Segundo, CA 90245	Inactivation	Aug. 14th, 1991	AQ008842	10 lbs/day
Total Daily ERC Holdings				20 lbs/day
SCAQMD ERCs Required [a]				20 lbs/day

Source: GB 2009b, SCAQMD 2009a, SCAQMD 2009f
Notes: n/a – not available
a – The ERC requirement includes the SCAQMD offset ratio of 1.2:1.

Air Quality Table 19 shows that the total amount of proposed VOC ERCs (equivalent to 7,300 lbs/year), after District recalculation of offset requirements after publication of the PDOC, is now found to be one pound short of meeting District requirements (21 lbs/day). The District will require the applicant to obtain this additional pound of VOC ERCs before they issue the Permit to Construct for the project. The 21 lbs/day (7,665 lbs/year) of ERCs required for the project meets staff's recommended minimum offset ratio of 1:1 for all nonattainment pollutant and their precursors. The actual offset ratio, for comparison with the CEC staff recommended minimum offset ratio of 1:1, is 1.24:1 based on maximum annual emissions of 6,192 lbs/year.

Air Quality Table 20 provides the applicant's proposed offset package for PM10. The certificate numbers for the short-term and permanent credits from the same certificate source are combined in the table.

Air Quality Table 20
PM10 Offsets Proposed for Canyon

Offset Source Location	Method of Reduction	Date of Reduction	Credit Number	Amount
Pechiney Cast Plate Inc. 3200 Fruitland Ave, Vernon, CA 90058	Shutdown	Jan. 31st, 2006	AQ008907, AQ008909, AQ008911, AQ008913, AQ008915, AQ008917, AQ008919, AQ008921	1 lbs/day
Pechiney Cast Plate Inc. 3200 Fruitland Ave, Vernon, CA 90058	Shutdown	Jan. 31st, 2006	AQ008864, AQ008866, AQ008868, AQ008870, AQ008872, AQ008874, AQ008876, AQ008878	2 lbs/day
Intl. Light Metals Corp. 19200 S Western Ave, Torrance, CA 90509	Shutdown	Mar. 13th, 1992	AQ008844	4 lbs/day
Commercial Enameling Co. 6200-04 S Alameda St, Huntington Park, CA 90255	n/a	Sep. 15th, 1995	AQ008846	4 lbs/day
Los Angeles Export Terminal 750 Eldridge St, Terminal Island, CA 90731	Shutdown	May 19th, 2006	AQ009059, AQ009061, AQ009063, AQ009065, AQ009067, AQ009069, AQ009071, AQ009073	6 lbs/day
Pechiney Cast Plate Inc. 3200 Fruitland Ave, Vernon, CA 90058	Shutdown	Jan. 31st, 2006	AQ008891, AQ008893, AQ008895, AQ008897, AQ008899, AQ008901, AQ008903, AQ008905	7 lbs/day
Commonwealth Aluminum Concast 2211E Carson St. Long Beach, CA 90810	Shutdown	Feb. 25th, 2006	AQ009027, AQ009029, AQ009031, AQ009033, AQ009035, AQ009037, AQ009039, AQ009041	2 lbs/day
Commonwealth Aluminum Concast 2211E Carson St. Long Beach, CA 90810	Shutdown	Feb. 25th, 2006	AQ009043, AQ009045, AQ009047, AQ009049, AQ009051, AQ009053, AQ009055, AQ009057	19 lbs/day
Commonwealth Aluminum Concast 2211E Carson St. Long Beach, CA 90810	Shutdown	Feb. 25th, 2006	AQ009325, AQ009327, AQ009329, AQ009331, AQ009333, AQ009335, AQ009337, AQ009339	2 lbs/day
Deluxe Laboratories 1377 N Serrano Ave, Hollywood, CA 90027	n/a	Aug. 1st, 1991	AQ008838	1 lbs/day
Total Daily ERC Holdings				48 lbs/day
SCAQMD ERCs Required [a]				48 lbs/day

Source: GB 2009b, SCAQMD 2009a, SCAQMD 2009f
Note: n/a – not available
a – The ERC requirement includes the SCAQMD offset ratio of 1.2:1.

Air Quality Table 20 shows that the total amount of proposed PM10 ERCs (equivalent to 17,520 lbs/year) meets the District requirements and also meets staff's recommended minimum offset ratio of 1:1 for all nonattainment pollutants and their precursors. The actual offset ratio, for comparison with the CEC staff recommended minimum offset ratio of 1:1, is 1.21:1 based on maximum total project annual PM10 emissions of 14,536 lbs/year for all proposed stationary emissions sources (turbines, cooling tower, and emergency black start engine).

Air Quality Table 21 provides the applicant's proposed offset package for SO_2.

Air Quality Table 21
SO_2 Offsets Proposed for Canyon

Offset Source Location	Method of Reduction	Date of Reduction	Credit Number	Amount
CBS Corp. 7800 Beverly Blvd, Los Angeles, CA 90036	n/a	Dec. 17th, 1990	AQ008862	4 lbs/day
SCAQMD ERCs Required [a]				4 lbs/day

Source: GB 2009b, SCAQMD 2009a, SCAQMD 2009f
Note: n/a – not available
a – The ERC requirement includes the SCAQMD offset ratio of 1.2:1.

Air Quality Table 21 shows that the total amount of proposed SO_2 ERCs (equivalent to 1,460 lbs/year), after District recalculation of offset requirements after publication of the PDOC, is now found to be one pound short of meeting District requirements (5 lbs/day). The District will require the applicant to obtain this additional pound of SO_2 ERCs before they issue the Permit to Construct for the project. The 5 lbs/day (1,825 lbs/year) of ERCs required for the project meets staff's recommended minimum offset ratio of 1:1 for all nonattainment pollutant and their precursors. The actual offset ratio, for comparison with the CEC staff recommended minimum offset ratio of 1:1, is 1.12:1 based on maximum annual emissions of 1,634 lbs/year.

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, including ammonia slip, 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, with additional staff recommended compliance demonstration and monitoring would mitigate all project air quality impacts to less than significant.

Staff has made a determination that the applicant's offset proposal, after obtaining another pound of VOC and SO_2 ERCs, meets both District requirements and CEQA mitigation requirements. Staff acknowledges that the requirement of this minor additional amount of VOC and SO_2 ERCs was unknown by the applicant and the applicant will be required to obtain these additional ERCs prior to the District issuing the Permit to Construct for the project. 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 the 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.

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 has added condition **AQ-SC7**, which requires confirmation of the ERCs surrender prior to first fire, and confirmation that the applicant has provided the additional one pound of VOC and SO_2 ERCs prior to initiating construction. Additionally, staff has added **AQ-SC8** and **AQ-SC9** to ensure that the chiller cooling tower, which does not require a permit from SCAQMD, is mitigated and has emission limits as described by the applicant.

CUMULATIVE IMPACTS AND MITIGATION

"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 South Coast 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. This 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"; combining the project's direct emissions with other local major emission sources;
- a discussion of chemically reactive pollution impacts; ozone and PM2.5; and
- an analysis of the project's greenhouse gas emissions, which is provided in Appendix AIR-1.

Summary of Projections

The SCAQMD is the agency with principal responsibility for analyzing and addressing cumulative air quality impacts, including the impacts of ambient ozone and particulate matter. The SCAQMD has summarized the cumulative impact of ozone and particulate matter on the air basin from the broad variety of its sources. Analyses of these cumulative impacts, as well as the measures the SCAQMD proposes to reduce impacts to air quality and public health, are summarized in two publicly available documents that the SCAQMD has adopted or will soon adopt. These adopted air quality plans are summarized below.

- **2007 Air Quality Management Plan** (adopted 6/1/2007)
  Link: www.aqmd.gov/aqmp/07AQMP/07AQMP.html
- **Final 2003 Air Quality Management Plan** (adopted 12/10/1999)
  Link: www.aqmd.gov/aqmp/AQMD03AQMP.htm

2007 Air Quality Management Plan

(*The following paragraphs are excerpts from the Executive Summary of the 2007 Air Quality Management Plan adopted by the SCAQMD June 1, 2007*)

The SCAQMD adopted (June 1, 2007) the 2007 Air Quality Management Plan (AQMP) primarily in response to changes in the federal Clean Air Act (CAA). The CAA requires an 8-hour ozone non-attainment area to prepare a State Implementation Plan (SIP) revision by June of 2007 (which has been completed) and a PM2.5 non-attainment area to submit a SIP revision by late 2007 (which has been completed). The SCAQMD has decided that it is most prudent to prepare a single comprehensive and integrated SIP revision that satisfies both the ozone and PM2.5 requirements. Additionally, the U.S.EPA requires that transportation conformity budgets be established based on the most recent planning assumptions and approved motor vehicle emission model. The AQMP is based on assumptions provided by both the California Air Resources Board (ARB) and the Southern California Association of Governments (SCAG) reflecting their upcoming model (EMFAC) for motor vehicle emissions and demographic updates.

The AQMP relies on a comprehensive and integrated control approach to achieve the PM2.5 standard by 2015 through implementation of short-term and midterm control measures and achieve the 8-hour ozone standard by 2021/2024 based on implementation of additional long-term measures. In order to demonstrate attainment by the prescribed deadlines, emission reductions needed for attainment must be in place by 2014 and 2020/2023 timeframe.

Since PM2.5 in the Basin is overwhelmingly formed secondarily, the overall draft control strategy focuses on reducing precursor emission of SOx, directly-emitted PM2.5, NOx, and VOC instead of fugitive dust. Based on the District’s modeling sensitivity analysis, SOx reductions, followed by directly-emitted PM2.5 and NOx reductions, provide the greatest benefits in terms of reducing the ambient PM2.5 concentrations. While VOC reductions are less critical to overall reductions in PM2.5 air quality, they are heavily relied upon for meeting the 8-hour ozone standard. SOx is also the only pollutant that is projected to grow in the future, due to ship emissions at the ports, requiring significant controls.

Directly-emitted PM2.5 emission reductions from ongoing diesel toxic reduction programs and from the short-term and mid-term control measures are also incorporated into the AQMP. NOx reductions primarily based on mobile source control strategies (e.g., add-on control devices, alternative fuels, fleet modernization, repowers, and retrofits) are also relied upon for attainment. Adequate VOC controls need to be in place in time for achieving significant VOC reductions needed for the 8-hour ozone standard by 2021/2024. Reducing VOC emissions in early years would also ensure continued progress in reducing the ambient ozone concentrations. The 8-hour ozone control strategy relies on the implementation of the PM2.5 control strategy augmented with additional long-term VOC and NOx reductions for meeting the standard by 2020/2023 timeframe. With respect to PM10, since the Basin did not attain the annual standard by 2006, additional local programs are proposed to address the attainment issue in an expeditious manner.

The AQMP control measures consist of three components: 1) the District's Stationary and Mobile Source Control Measures; 2) State and Federal Control Measures recommended by ARB and/or SCAQMD staff; and 3) Regional Transportation Strategy and Control Measures provided by SCAG.

The SCAQMD control strategy for stationary and mobile sources is based on the following approaches: 1) facility modernization; 2) energy efficiency and conservation; 3) good management practices; 4) market incentives/compliance flexibility; 5) area source programs; 6) emission growth management; and 7) mobile source programs. The AQMP also includes SCAQMD staff's recommended State and federal stationary and mobile source control measures since ARB has only developed an overview of a possible control strategy for PM2.5.

The measures, prepared by SCAQMD staff and recommended for ARB's consideration for inclusion into the final AQMP, include strategies such as Smog Check Program enhancements, extensive fleet modernization of on-road heavy-duty diesel vehicles and off-road diesel equipment, accelerated penetration of advanced technology vehicles, low sulfur fuel for marine engines, accelerated turn-over of high-emitting off-road engines, and gasoline and diesel fuel reformulations.

Finally, the emission benefits associated with the 2004 Regional Transportation Plan and the 2006 Regional Transportation Improvement Program are also reflected in the AQMP.

In order to achieve necessary reductions for meeting air quality standards, all four agencies (i.e., SCAQMD, ARB, U.S.EPA, and SCAG) would have to aggressively develop and implement control strategies through their respective plans, regulations, and alternative approaches for pollution sources within their primary jurisdiction. Even though SCAG does not have direct authority over mobile source emissions, it will commit to the emission reductions associated with implementation of the 2004 Regional Transportation Plan and 2006 Regional Transportation Improvement Program which are imbedded in the emission projections. Similarly, the Ports of Los Angeles and Long Beach have authority they must utilize to assist in the implementation of various strategies if the region is to attain clean air by federal deadlines. The **Air Quality Table 22** below shows the areas of jurisdiction for each agency.

Air Quality Table 22
Area of Jurisdiction for Agency

Agency	Jurisdiction
U.S.EPA	Forty-nine state mobile vehicle emission standards. Airplanes, trains, and ships. New off-road construction & farm equipment below 175 hp.
ARB	On-road/Off-road vehicles. Motor vehicle fuels. Consumer products.
SCAQMD	Stationary (e.g., industrial/commercial) and area sources. Indirect sources. Some mobile sources (e.g., visible emissions and use regulations from trains and ships).
SCAG	AQMP conformity assessment. Regional Transportation Improvement Program. Transportation Control Measures.
Local Government/CTCs	Transportation and local government actions (i.e., land use approvals & ports). Transportation facilities.

Although the SCAQMD has completely met its obligations under the 2003 AQMP and stationary sources subject to the District's jurisdiction account for only 11 percent of NOx and 24 percent of SOx emissions in the Basin in 2014, the AQMP contains several short-term and mid-term control measures aimed at achieving further NOx and SOx reductions (as well as VOC and PM2.5 reductions) from these already regulated sources.

These strategies are based on facility modernization, energy conservation measures and more stringent requirements for existing equipment (e.g., space heaters, ovens, dryers, furnaces). In addition to short-term and mid-term control measures, the SCAQMD is also committing to long-term VOC reductions of 32 tons per day by 2020 for the 8-hour ozone attainment.

Clean air for this region requires ARB to aggressively pursue reductions and strategies for on-road and off-road mobile sources and consumer products. In addition, considering the significant contribution of federal sources such as marine vessels, locomotives, and aircraft in the Basin (i.e., 72 percent of SOx and 34 percent of NOx), it is imperative that the U.S.EPA pursue and develop regulations for new and existing federal sources to ensure that these sources contribute their fair share of reductions toward attainment of the federal standards. Unfortunately, regulation of these emission sources has not kept pace with other source categories and as a result, these sources are projected to represent a significant and growing portion of emissions in the Basin. Without a collaborative and serious effort among all agencies, attainment of the federal standards would be seriously jeopardized.

Final 2003 Air Quality Management Plan

(*The following are edited/updated excerpts from the 2003 Air Quality Management Plan adopted by the SCAQMD December 10, 1999*)

The SCAQMD amended the 1997 Air Quality Management Plan (AQMP) in 1999 to address the U.S.EPA's proposed disapproval of the 1997 Ozone SIP revision to ensure that the 1997 AQMP complied with or exceeded federal requirements. The 1999 AQMP amendments to the 1997 AQMP were subsequently approved by the U.S.EPA into the SIP in April 2000. The SCAQMD updated the PM10 portion of the 1997 AQMP for the South Coast Air Basin in 2002 as part of the District's request to extend the PM10 attainment date from 2001 to 2006 as allowed under the federal Clean Air Act (CAA). The U.S.EPA approved the 2002 update on April 18, 2003.

The purpose of the 2003 Revisions to the Air Quality Management Plan are to set forth a comprehensive program that will lead the area within SCAQMD jurisdiction into compliance with all federal and state air quality planning requirements. Specifically, the 2003 AQMP Revision is designed to satisfy the California Clean Air Act (CCAA) tri-annual update requirements and fulfill the District's commitment to update transportation emission budgets based on the latest approved motor vehicle emissions model and planning assumptions. The Plan will be submitted to U.S.EPA as a SIP revision once it is approved by the SCAQMD Governing Board and the California Air Resources Board (ARB).

The 2003 AQMP sets forth programs which require the cooperation of all levels of government: local, regional, state, and federal. Each level is represented in the Plan by the appropriate agency or jurisdiction that has the authority over specific emissions sources. Accordingly, each agency or jurisdiction is associated with specific planning and implementation responsibilities.

At the federal level, the U.S.EPA is charged with regulation of 49-state on-road motor vehicle standards; trains, airplanes, and ships; and non-road engines less than 175 horsepower. The ARB, representing the state level, also oversees on-road vehicle emission standards, fuel specifications, some off-road sources and consumer product standards. At the regional level, the SCAQMD is responsible for stationary sources and some mobile sources. In addition, the SCAQMD has lead responsibility for the development and adoption of the Plan. Lastly, at the local level, Associations of Governments have a dual role of leader and coordinator. In their leadership role, they, in cooperation with local jurisdictions and sub-regional associations, develop strategies for these jurisdictions to implement; as a coordinator, they facilitate the implementation of these strategies. For the South Coast Air Basin, the Southern California Association of Governments is the District's major partner in the preparation of the AQMP. Interagency commitment and cooperation are the keys to success of the AQMP.

Since air pollution physically transcends city and county boundaries, it is a regional problem. No one agency can design or implement the Plan alone and the strategies in the Plan reflect this fact.

Past air quality programs have been effective in improving the Basin's air quality.

Ozone levels have been reduced by half over the past 30 years, nitrogen dioxide, carbon monoxide, sulfur dioxide, and lead standards have been met, and other criteria pollutant concentrations have significantly declined. However, the Basin still experiences exceedances of health-based standards for ozone and particulate matter under ten microns in size (PM10).

Progress in implementing the 1997/1999 SIPs can be measured by the number of control measures that have been adopted as rules and the resulting tons of pollutants targeted for reduction. Emission reduction commitments and reductions achieved in 2010 are based on the emissions inventory from the 1997 SIP. Since October 1999, sixteen control measures or rules have been adopted or amended by the SCAQMD through October 2002. The primary focus of the District's efforts had been the adoption and implementation of VOC control measures. The SCAQMD has achieved 158 tons per day VOC reductions, exceeding its 1997/1999 SIP commitment by approximately 44.5 tons per day.

To date, ARB has committed to VOC and NOx emission reductions of approximately 90 and 106 tons per day, respectively, and has achieved 67 and 140 tons per day, respectively. While exceeding its NOx target by 34 tons per day, ARB fell short of the VOC target by 21 tons per day using the 1997 SIP currency. U.S.EPA was obligated to VOC and NOx emission reductions of approximately 35 and 75 tons per day, respectively, and has achieved 38 and 63 tons per day, respectively.

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. Beyond six miles there is little or no measurable cumulative overlap between stationary emission sources. The non-photochemical-reactant pollutant emission impacts of the criteria pollutant emissions (i.e., NOx, SOx, CO, PM10 and PM2.5) have, from staff's experience with air dispersion modeling, had a finite time and distance to remain airborne. In staff's experience of using the U.S.EPA air dispersion models (SCREEN, ISCST3 and AERMOD), staff has never seen any proposed power plant having non-photochemical-reactant pollutant emission impacts which approach or go beyond 10 kilometers (or six miles). This effectively identifies all new emissions that emanate from a single point (e.g., a smoke stack), referred to as "point sources." The submittal of an air district application is a reasonable demarcation of what is "reasonably foreseeable". So, as an example, if the last year of ambient air quality monitoring data from area monitoring stations was 2003, then Commission staff (or the applicant) would ask the air district for all new applications that are not included in the ambient data.

- 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 are rare but include existing sources that are co-located with 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.
- When there are a large number of sources (in some cases 15 to 20 sources) and they are primarily of small emission quantities with higher impacts, the modeling results must be carefully interpreted so that they are not skewed towards the smaller, high-impacting sources. The reason being that while small sources can cause higher impacts, they are typically limited to within a hundred yards or similar close proximity of the source. Therefore, a cumulative interaction with the proposed project emission impacts is unlikely.

Once the modeling results are produced, 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 informational 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).

In January and February 2008, URS Corporation, the consultant of CPP project, has requested and received from SCAQMD a list of permits issued to facilities within all the zip code areas wholly or partially contained within the 6-mile radius from CPP site. During March and April 2008, URS eliminated facilities that have not been permitted within the last two years, facilities not located within six miles, and facilities belonging to categories that typically emit only VOC such as gasoline service stations. The elimination process resulted in fifteen facilities being considered as candidate emissions sources for the cumulative analysis. During May and June 2008, based on additional details on the fifteen permits received from SCAQMD, URS narrowed the number of facilities down to four facilities, including two projects with baghouse controlled emission sources and two internal combustion (IC) engines. In July 2008, CEC and URS agreed that two IC engines should not be considered as cumulative emission source since both engines are at least five miles away from the CPP, operate only for testing and in emergencies and are expected to emit less than 5 tons per year for each criteria pollutant. URS was not able to obtain stack parameters and emission information for the two projects with particulate emissions controlled by a baghouse, however, it was generally agreed that these are most likely very minor emission sources (easily less than 5 tons per year). These projects are located more than 3 miles from the CPP site and required particulate collection efficiency for new baghouses in SCAQMD is greater than 99 percent. Therefore, two baghouse projects are not considered as emissions sources for the cumulative analysis, resulting in no significant stationary cumulative emissions sources within the vicinity of the CPP site (URS 2009a). Therefore, the modeling results shown in **Air Quality Tables 15, 16** and **17** represent the project cumulative analysis as well as the project direct impacts analysis results.

COMPLIANCE WITH LORS

FEDERAL

The District is responsible for issuing the federal New Source Review (NSR) permit and has been delegated enforcement of the applicable New Source Performance Standards (Subpart IIII and KKKK) and other Federal Clean Air Act requirements applicable to this project.

STATE

The applicant would demonstrate that the project would 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 (FDOC) and the Energy Commission's affirmative finding for the project.

The fire pump engine is also subject to the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines. This measure limits the types of fuels allowed, established maximum emission rates, establishes recordkeeping requirements.

The proposed Tier 2 engine meets the emission limit requirements of this rule. This measure would also limit the engine's testing and maintenance operation to 50 hours per year as is required by District condition (**AQ-20**).

LOCAL

The District rules and regulations specify the emissions control and offset requirements for new sources such as the CPP. Best Available Control Technology would be implemented, emission reduction credits (ERCs) are required for all PM10, VOC, and SO_2 emissions based on an average daily emission rate for each emission source, and RECLAIM Trading Credits (RTCs) are required for all permitted NOx emissions. Compliance with the District's new source requirements would ensure that the project would be consistent with the strategies and future emissions anticipated under the District's air quality attainment and maintenance plans.

The applicant provided an air quality permit application to the SCAQMD in 2007 when the siting case was first initiated. Due to major issues with the District's offset program, including the federal courts invalidating both Rule 1309.1 priority reserve credits and later Rule 1304 offset exemptions, the project was first on hold for over a year and has undergone at least two major changes in the proposed operating profiles. The applicant provided additional information to the District when they re-filed a revised application in September 2008, which relied on the Rule 1304 exemptions, and later provided additional information in December 2008 after they obtained enough traditional ERCs to offset the project to the current stipulated maximum monthly operating levels. The District has issued a PDOC (SCAQMD 2009a) on February 25th and an FDOC (SCAQMD 2009f) on June 26th, which states that the proposed project is expected to comply with all applicable District rules and regulations. The DOC evaluates whether and under what conditions the proposed project would comply with the District's applicable rules and regulations, as described below.

SCAQMD Regulation II-Permits

Rule 212-Standards for Approving Permits

Rule 212 requires that a person shall not build, erect, install, alter, or replace any equipment, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce, or control the issuance of air contaminants without first obtaining written authorization for such construction from the Executive Officer. A public notice will be issued followed by a 30-day public comment period prior to issuance of a permit. Compliance is expected.

SCAQMD Regulation IV-Prohibitions

Rule 218-Continuous Emission Monitoring

This rule requires the applicant to submit an "Application for CEMS" for a CO CEMS for each CTG and adhere to retention of records and reporting requirements once approval to operate the CO CEMS is granted. Compliance is expected.

Rule 401-Visible Emissions

This rule limits visible emissions to an opacity of less than 20 percent (Ringlemann No.1), as published by the United States Bureau of Mines. It is unlikely, with the use of the SCR/CO catalyst configuration that there would be visible emissions. Compliance is expected.

Rule 402-Nuisance

This rule requires that a person not 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 cause, or have a natural tendency to cause injury or damage to business or property. Compliance is expected.

Rule 403-Fugitive Dust

The purpose of this rule is to reduce the amount of particulate matter entrained in the ambient air as a result of man-made fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. The provisions of this rule apply to any activity or man-made condition capable of generating fugitive dust such as construction activities. This rule prohibits emissions of fugitive dust beyond the property line of the emission source. The applicant would take steps to prevent and/or reduce or mitigate fugitive dust emissions from the project site. Such measures include covering loose material on haul vehicles, watering, and using chemical stabilizers when necessary. The installation and operation of the CTGs is expected to comply with this rule.

Rule 407-Liquid and Gaseous Air Contaminants

This rule limits CO emissions to 2,000 ppmvd and SO_2 emissions to 500 ppmvd, averaged over 15 minutes. For CO, the CTGs would meet the BACT limit of 4.0 ppmvd @ 15 percent O_2, 1-hr average, and the turbines would be conditioned as such. For SO_2, equipment which complies with Rule 431.1 is exempt from the SO_2 limit in Rule 407. The applicant would be required to comply with Rule 431.1 and thus the SO_2 limit in Rule 407 would not apply.

Rule 409-Combustion Contaminants

This rule restricts the discharge of contaminants from the combustion of fuel to 0.1 grain per cubic foot of gas, calculated to 12 percent CO_2, averaged over 15 minutes. The equipment is expected to meet this limit.

Rule 431.1-Sulfur Content of Gaseous Fuels

CPP would use pipeline quality natural gas which would comply with the 16 ppmv sulfur limit, calculated as H_2S, specified in this rule.

Rule 431.2-Sulfur Content of Liquid Fuels

CPP would use California low sulfur diesel fuel for the black start engine which would comply with the 15 ppmv sulfur limit specified in this rule.

Rule 475-Electric Power Generating Equipment

Requirements of the rule specify that the equipment must comply with a PM10 mass emission limit of 11 lbs/hr or a PM10 concentration limit of 0.01 grains/dscf. The PM10 mass emissions from the CPP project turbines are estimated to be 3 lbs/hr. Therefore, compliance is expected.

Regulation IX – Standards For Performance For New Stationary Sources

Regulates emissions and provides other operating and recordkeeping requirements for emergency black start engine and gas turbines.

Regulation XIII – New Source Review & Regulation XX RECALIM New Source Review

Rule 1303(a) and Rule 2005(b)(1)(A)-BACT – LM 6000PM CTGs

These rules state that the Executive Officer shall deny the Permit to Construct for any new source which results in an emission increase of any non-attainment air contaminant, any ozone depleting compound, or ammonia unless the applicant can demonstrate that BACT is employed for the new source. The applicant has provided a performance warranty which accompanied the initial application package which indicates that each LM 6000PM can comply with, and for NOx, even exceed the BACT requirements (2.3 ppm vs. the 2.5 ppm BACT requirement). SCAQMD now considers the more restrictive 1-hour averaging times to be achieved in practice and CPP would therefore be required to comply with the 1-hour averages for NOx, CO, and VOC as opposed to the three hour as was proposed. The proposed project emission characteristics are lower than that required by BACT for the combustion turbines, therefore compliance is expected.

Rule 1303(a) and Rule 2005(b)(1)(A-)-BACT – Black Start Engine

The black start engine is required to employ BACT because the maximum daily emissions from this source are expected to exceed 1 lbs/day. The Tier II BACT levels would apply to the emergency black start engine along with a diesel particulate filter to further control PM10/PM2.5 emissions. BACT for SOx emissions for black start engine is diesel fuel with a sulfur content no greater than 0.0015 percent by weight. The manufacturer has indicated that this engine would comply with the Tier II emission levels and the applicant would be allowed to use diesel fuel with a sulfur content of no greater than 0.0015 percent by weight. The emergency black start engine is expected to comply with BACT.

Rule 1303(a)-BACT – Cooling Tower

Rule 219(e)(3) provides an exemption for water cooling towers and water cooling ponds not used for evaporative cooling of process water or not used for evaporative cooling of water from barometric jets or from barometric condensers and in which no chromium compounds are contained. The four cell cooling towers being proposed at CPP would meet the requirements of Rule 219(e)(3) and is therefore exempt from NSR. BACT therefore does not apply; however, the applicant has proposed the use of a mist eliminator that reduces drift to no more than 0.001 percent of the recirculating water flow meter.

Rule 1303(a)-BACT – Ammonia Storage Tank

A pressure relief valve that would be set at no less than 25 psig would control ammonia emissions from the storage tank. In addition, a vapor return line would be used to control ammonia emissions during storage tank filling operations. Based on the above, compliance with BACT requirements is expected.

Rule 1303(b)(1) and Rule 2005(b)(1)(B) - Modeling

The applicant has conducted air dispersion modeling using the U.S.EPA AERMOD air dispersion model. The applicant modeled both the cumulative and individual permit unit impacts for the project. No significant deficiencies in methodology were noted and it was concluded that the project would not create new violations or make significantly worse an existing violation of ambient air quality standards. Compliance with these rules is expected.

Rule 1303(b)(2) and Rule 2005(b)(2)-Offsets – LM 6000PM CTGs

Since CPP is a new facility with an emissions increase, offsets would be required for all criteria pollutants. CPP would be included in NOx RECLAIM and as such, NOx increases would be offset with RTCs at a 1.0 to 1 ratio. Non-RECLAIM criteria pollutants (VOC, SOx, and PM10) would be offset by either the purchase of Emission Reduction Credits (ERCs) at a 1.2 to 1 ratio. CO emissions are not required to be offset since CO is an attainment pollutant. CPP has identified the VOC, PM10 and SO_x ERCs that would be used for the project. NOx RECALIM trading credits much be obtained by the applicant prior to the first fire of the turbines. Compliance with the offset requirements of Rules 1303(b)(2) and 2005(b)(2) is expected.

Rules 1303(b)(3)-Sensitive Zone Requirements and 2005(e)-Trading Zone Restrictions

Both rules state that ERCs must be obtained from the appropriate trading zone. In the case of Rule 1303(b)(3), unless credits are obtained from the Priority Reserve, facilities located in the South Coast Air Basin are subject to the Sensitive Zone requirements specified in Health & Safety Code Section 40410.5. CPP is located in Zone 1 and is therefore eligible to obtain its ERCs only from within Zone 1. Similarly in the case of Rule 2005(e), CPP, because of its location may only obtain RECLAIM Trading Credits (RTCs) from Zone 1. All ERCs identified by the applicant are within Zone 1. Compliance is expected with both rules.

Rule 1303(b)(5)(A) and Rule 2005(g)(2) – Alternative Analysis

The applicant is required to conduct an analysis of alternative sites, sizes, production processes, and environmental control techniques for the CPP project and to demonstrate that the benefits of the proposed project outweigh the environmental and social costs associated with this project. The applicant has performed a comparative evaluation of alternative sites as part of the AFC process and has concluded that the benefits of providing additional electricity and increased employment in the surrounding area would outweigh the environmental and social costs incurred in the construction and operation of the proposed facility. Compliance is expected.

Rule 1303(b)(5)(B) and Rule 2005(g)(1) – Statewide Compliance

The applicant has certified in the District's 400-A form that all major sources under its ownership or control in the State of California are in compliance with all federal, state, and local air quality rules and regulations. In addition, a letter from Steve Sciortino of the City of Anaheim, dated July 3, 2008, certified that all sources under common ownership within the District are in compliance with all the applicable District rules, variances, orders and settlement agreements. Therefore, compliance is expected.

Rule 1303(b)(5)(C) and Rule 2005(g)(4) – Protection of Visibility

Modeling is required if the source is within a Class I area and the NOx and PM10 emissions exceed 40 ton per year and 15 ton per year respectively. The project permitted emissions are below these levels so the provisions of this requirement are not applicable.

Rule 1303(b)(5)(D) – Compliance through CEQA

The Energy Commission is the Lead Agency under CEQA. Since the applicant is required to receive a certification from the Energy Commission, the applicable CEQA requirements and deficiencies will be addressed. Compliance is expected.

Regulation XIV – Toxics and Other Non-Criteria Pollutants

Rule 1401 – New Source Review of Toxic Air Contaminants

Rule 2005(c) – RECLAIM Rule 1401 Compliance

Rule 1401 specifies limits for maximum individual cancer risk (MICR), cancer burden, and noncancer acute and chronic hazard index (HI) from new permit units, relocations, or modifications to existing permits that emit toxic air contaminants. The District's Health Risk Assessment (HRA) of the CPP found that it would comply with the requirements of these risks. Please see the Public Health Section for additional discussion of the HRA.

Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines

This rule applies to new and in-use prime and emergency stationary compression ignition (CI) engines rated at greater than 50 bhp. Rule 1470(c)(1)(A)(i) requires the use of ARB diesel fuel. Rule 1470(c)(1)(A)(i) limits the diesel PM to 1.5 g/bhp-hr and the PM emissions are expected to be 0.009 g/bhp-hr. Therefore compliance is expected. 1470(c)(2)(C)(i)(III) limits engine operation to no more than 50 hours for maintenance and testing.

Regulation XVII-Prevention of Significant Deterioration (PSD)

The District's PSD delegation was rescinded on 3/3/03 by USEPA, and on 7/25/07 USEPA and the District signed a new "Partial PSD Delegation Agreement", which for this project would delegate authority for PSD permitting to the District. However, the emissions from this project are well below PSD permit trigger levels so PSD permitting would not be required and this rule is not applicable CPP.

Regulation XX-RECLAIM (other Requirements)

Rule 2001 – Applicability

NOx emissions are anticipated to exceed 4 tons per year, and the applicant has opted into RECALIM program via an opt-in letter, dated March 26, 2008, from Steve Sciortino.

Rule 2005(h) – Public Notice

CPP would comply with the requirements for Public Notice found in Rule 212. Therefore compliance with Rule 2005(h) is demonstrated.

Rule 2005(j) – Compliance with State and Federal NSR.

CPP would comply with the provisions of this rule by having demonstrated compliance with SCAQMD NSR Regulations XIII and Rule 2005-NSR for RECLAIM.

Rule 2012 – RECLAIM Monitoring Recording and Recordkeeping Requirements

This rule requires any NOx sources or process unit required to be monitored and to report emissions with a CEMS. Each CTG is required to be equipped with a CEMS to verify compliance with the NOx BACT limit. The rule also required the Facility Permit holder of a new facility which elects to enter RECLAIM or a facility that is required to enter RECLAIM shall install all required or elected monitoring, reporting, and recording systems no later than 12 months after entry into RECLAIM. Compliance is expected.

Regulation XXX – Title V

CPP is a Title V facility because the cumulative emissions would exceed the Title V major source thresholds, would operate CTG rated over 25 MW and because it is also subject to the federal acid rain provisions. The applicant has provided the Title V permit applications and the initial Title V permit is being processed and the required public notice would be sent along with the Rule 212(g) Public Notice, which is also required for this project. The public and U.S.EPA are afforded the opportunity to review and comment on the project within a 30-day and 45-day review period, respectively. Compliance is expected.

Regulation XXXI – Acid Rain Permit Program

The acid rain regulations are designed to control SO_2 and NOx emissions that would form acid rain. Title IV of the federal Clean Air Act provides for the issuance of acid rain permits for qualifying facilities. Regulation XXXI requires a subject facility to obtain emission allowances for SOx emissions as well as monitoring SOx, NOx, and carbon dioxide (CO_2) emissions from the facility. Compliance is expected.

NOTEWORTHY PUBLIC BENEFITS

No air quality related noteworthy public benefits have been identified.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comments on the PSA Air Quality analysis were received from the City of Yorba Linda and the City of Placentia, respectively. Responses to those comments are being provided in the **ALTERNATIVES** section. Comments on the PSA Air Quality analysis were also received from SCQAMD. Responses to SCAQMD comments are provided below.

SCAQMD – Mohsen Nazemi, P.E. (SCAQMD 2009f)
The SCAQMD provided a list of editorial and document correction comments on the PSA in Attachment B to the FDOC.

Response: Staff agrees with all of the SCAQMD comments and has made all of the suggested revisions or necessary clarifications in this FSA, noting that the final FDOC values listed for VOC, PM10, and SO_2 30-day average emissions provided in **Air Quality Table 13** are different than provided in their comment letter (Comment 3).

The SCAQMD also provided separate responses to comment documents (SCAQMD 2009c, SCAQMD 2009d, SCAQMD 2009e) regarding PDOC comments received from the City of Placentia (CofP 2009a), the City of Yorba Linda (CofYL 2009b), and B&C Awnings (B&C 2009a, B&C 2009b). Staff has no issues with the responses provided by SCAQMD to those comments and is not repeating them in this document.

CONCLUSIONS

The CPP would likely comply with all laws, ordinances, regulations, and standards and would result in a less than significant impact under CEQA if CPP complies with all staff-recommended and District-required conditions of certification.

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.

Staff has proposed a number of permit conditions that are in addition to the permit conditions that the SCAQMD has proposed. In most cases the staff-proposed permit conditions deal with air quality issues that the SCAQMD is not required to address. The staff-proposed conditions of certification are summarized as follows. Conditions of Certification **AQ-SC1** through **AQ-SC5** are construction-related permit conditions. **AQ-SC6** provides the administrative procedure requirements for project modifications. **AQ-SC7** provides the compliance demonstration requirements for the project's ERC based emission offset mitigation. **AQ-SC8** and **AQ-SC9** provides the chiller cooling tower mist eliminator performance standard and requires the applicant to conduct cooling tower water testing, and requires emission reporting that is not required in the SCAQMD conditions, respectively. **AQ-SC10** is a quarterly compliance report requirement.

Conditions of Certification **AQ-1** through **AQ-32** are the SCAQMD permit conditions with staff proposed verification language.

Global climate change and greenhouse gas (GHG) emissions from the project are discussed and analyzed in Appendix AIR-1. The Canyon Power Plant project, as a peaking project with an enforceable operating limitation less than 60 percent of capacity, is not subject to the requirements of SB1368 and the Emission Performance Standard. Staff notes that mandatory reporting of GHG emissions per Air Resources Board greenhouse gas regulations would occur, and this would enable the ARB to gather the information needed to regulate CPP in trading markets if required by the regulations implementing the California Global Warming Solutions Act of 2006 (AB 32). The project may be subject to additional reporting requirements and GHG reduction or trading requirements as these regulations are more fully developed and implemented.

The SCAQMD has a unique system of structuring and numbering their permit conditions. In order for the reader to avoid confusion between how the SCAQMD numbers their permit conditions and how the Energy Commission staff normally numbers permit conditions, the staff prepared **Air Quality Table 23** that cross references the conditions in the FDOC with the conditions presented by staff in this analysis.

Air Quality Table 23
SCAQMD Permit Conditions with Corresponding Commission Conditions of Certification

SCAQMD Permit Conditions	CEC Condition of Certification	Condition Description
Gas Turbine Generators		
A63.1	AQ-1	Monthly contaminant emission limit (PM10, SOx & VOC) Units 1-4.
A99.1	AQ-2	Relief from 2.5 ppm NOx limit during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per year. Units 1-4.
A99.2	AQ-2	Relief from 4.0 ppm CO limit during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per year. Units 1-4.
A99.3	AQ-2	Relief from 2.0ppm ROG limits during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per year. Units 1-4.
A99.4	AQ-3	NOx limit during the turbine commissioning, not to exceed 12 months.
A99.5	AQ-3	NOx limit for interim time period of end of commissioning to continuous emission monitoring (CEMS) certification, not to exceed 12 months.
A195.1	AQ-4	NOx emission limit of 2.5 ppm @ 15% O_2 averaged over 1-hour.
A195.2	AQ-4	CO emission limit of 4.0 ppm @ 15% O_2 averaged over 1-hour.
A193.3	AQ-4	ROG emission limit of 2.0 ppm @ 15% O_2 averaged over 1-hour.
A327.1	AQ-5	Relief from emission limits, under Rule 475; project may violate either the mass emission limit or concentration emission limit, but not both at the same time.
B61.2	AQ-6	H_2S concentration limit for natural gas.
D12.1	AQ-7	Requires the installation of a fuel flow meter.
D29.1	AQ-8	Requires source tests for specific pollutants (NOx, CO, SOx, VOC, PM10, and NH_3) within 180 days of initial startup.

SCAQMD Permit Conditions	CEC Condition of Certification	Condition Description
D29.2	AQ-9	Requires source tests for ammonia (NH_3); quarterly for the first year and annually thereafter.
D29.3	AQ-10	Requires source tests for specific pollutants (SOx, VOC, and PM10) once every three years.
D82.1	AQ-12	Requires the installation of CEMS for CO emissions.
D82.2	AQ-12	Requires the installation of CEMS for NOx emissions.
E193.1	AQ-SC10	Requires that the turbines be operated according to the mitigation measures stipulated in the Commission Decision.
H23.1	AQ-13	Establishes the applicability of 40CFR60 Subpart KKKK for the project contaminant NOx and SOx.
I296.1	AQ-14	Prohibited from operation unless the operator hold sufficient RTCs for the CTGs. Units 1-4.
K40.1	AQ-11	Source test reporting requirements.
K67.1	AQ-15	Requires record keeping of fuel use during commissioning, prior to and after CEMs certification.
SCR/CO Catalyst		
A195.4	AQ-16	Establishes the 5 ppm ammonia slip limit.
D12.2	AQ-17	Requires a flow meter for the ammonia injection.
D12.3	AQ-18	Requires a temperature gauge at the SCR inlet.
D12.4	AQ-19	Requires a pressure gauge to measure the differential pressure across the SCR grid.
E179.1	AQ-17, -18	Defines “continuously record” for D12.2 and D12.3 as recording once an hour based on the average of continuous monitoring for that hour.
E179.2	AQ-19	Defines “continuously record” for D12.4 as recording once a month based on the average of continuous monitoring for that month.
E193.1	AQ-SC10	Requires that the SCR/CO catalyst be operated according to the mitigation measures stipulated in the Commission Decision.

SCAQMD Permit Conditions	CEC Condition of Certification	Condition Description
Black Start Engine		
C1.1	AQ-20	Limits the operating hours to no more than 200 hours per year.
D12.5	AQ-21	Requires the installation of a non-resettable time meter.
E193.1	AQ-SC10	Requires that the black start engine be operated according to the mitigation measures stipulated in the Commission Decision.
E193.2	AQ-22	Limits operating hours of black start engine.
E193.3	AQ-23	Requires control system of black start engine.
I296.2	AQ-24	Prohibited from operation unless the operator hold sufficient RTCs for the black start engine.
K67.2	AQ-25	Requires record keeping in the manner approved by the District Executive Officer.
K67.3	AQ-26	Requires record keeping for the diesel particulate filter.
Ammonia Storage Tank		
C157.1	AQ-27	Requires the installation of a pressure relief valve.
E144.1	AQ-28	Requires venting of the storage tank during filling only to the vessel from which it is being filled.
E193.1	See the Hazardous Materials Section	Requires that the Ammonia Storage Tank be operated according to the mitigation measures stipulated in the Commission Decision.
K67.4	AQ-29	Required record keeping for the black start engine.
Oil Water Separator		
E193.1	See the Soil and Water Section	Requires that the oil water separator be operated according to the mitigation measures stipulated in the Commission Decision.
Facility Conditions		
F9.1	AQ-30	Exhaust opacity limits.
F14.1	AQ-31	Limits the sulfur content in the diesel fuel no more than 15 ppm.
Rule 219 Exempt Equipment Conditions		
K67.5	NA	Required record keeping of thinners and no-thinners architectural applications (paint).

PROPOSED CONDITIONS OF CERTIFICATION

Staff recommends the following conditions of certification to address the impacts associated with the construction and operation of the CPP project. These conditions include the SCAQMD proposed Conditions from the FDOC, with appropriate staff proposed verification language for each condition, as well as Energy Commission staff proposed conditions. Revisions to the conditions provided in the District's FDOC, which should be published sometime during spring or summer of 2009, will be incorporated in the Final Staff Assessment.

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 from the material 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. SCAQMD Rule 403 required mitigation measures shall apply when they are more stringent than measures a) through m).

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 shut-down 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. A good faith effort shall be made to find and use off-road construction diesel equipment that has a rating of 100 hp to 750 hp and that meets the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines as specified in Title 13, California Code of Regulations section 2423(b)(1). This good faith effort shall be documented with signed written correspondence by the appropriate construction contractors along with documented correspondence with at least two construction equipment rental firms.

D. All construction diesel engines, which have a rating of 50 hp or more, shall meet, at a minimum, the Tier 2 California Emission Standards for Off-Road Compression-Ignition Engines as specified in Title 13, California

E. Code of Regulations section 2423(b)(1). The following exceptions for specific construction equipment items may be made on a case-by-case basis.

   1. Tier 1 equipment will be allowed on a case-by-case basis only when the project owner has documented that no Tier 2 equipment is available for a particular equipment type that must be used to complete the project's construction. This shall be documented with signed written correspondence by the appropriate construction contractors along with documented correspondence with at least two construction equipment rental firms.

   2. The construction equipment item is intended to be on site for five days or less.

   3. Equipment owned by specialty subcontractors may be granted an exemption, for single equipment items on a case-by-case basis, if it can be demonstrated that extreme financial hardship would occur if the specialty subcontractor had to rent replacement equipment, or if it can be demonstrated that a specialized equipment item is not available by rental.

F. 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.

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

H. Construction equipment will employ electric motors when feasible.

<u>Verification:</u> 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 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 SCAQMD or U.S.EPA, and any revised permit issued by the SCAQMD 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-SC7 The project owner shall surrender the ERCs for SOx, VOC and PM10 as listed in the table below or a modified list, as allowed by this condition. An additional pound per day of VOC and SO_2 ERCs shall be identified prior to initiation of construction. If additional or revised ERCs are submitted, the project owner shall submit an updated table including the additional or revised ERCs to the CPM. The project owner shall request CPM approval for any substitutions, modifications, or additions of credits listed.

Certificate Number(s)	Amount (lbs/day)	Pollutant
AQ008840	10	VOC
AQ008842	10	VOC
AQ008862	4	SO_2
AQ008907, -09, -11, -13,-15, -17, -19, -21	1	PM10
AQ008864, -66, -68, -70, -72, -74, -76, -78	2	PM10
AQ008844	4	PM10
AQ008846	4	PM10
AQ009059, -61, -63, -65, -67, -69, -71, -73	6	PM10
AQ008891, -93, -95, -97, -99, -01, -03, -05	7	PM10
AQ009027, -29, -31, -33, -35, -37, -39, -41	2	PM10
AQ009043, -45, -47, -49, -51, -53, -55, -57	19	PM10
AQ009325, -27, -29, -31, -33, -35, -37,-39	2	PM10
AQ008838	1	PM10

The CPM, in consultation with the District, may approve any such change to the ERC list provided that the project remains in compliance with all Conditions of Certification, and applicable laws, ordinances, regulations, and standards, the requested change(s) will not cause the project to result in a significant environmental impact, and the SCAQMD confirms that each requested change is consistent with applicable federal and state laws and regulations.

Verification: The project owner shall provide the ERC certificate information for the additional pound per day of VOC and SO_2 ERCs as required by the District and this condition at least 30 days prior to initiating construction. This information will provide the following information for each of the additional ERC certificates: 1) the location/address of the reduction; 2) the date of reduction; and 3) the method of reduction,

The project owner shall submit to the CPM the NSR Ledger Account from the District, showing that the project's offset requirements have been met, 30 days prior to turbine first fire for the traditional ERCs. If the CPM approves a substitution or modification to the list of ERCs, the CPM shall file a statement of the approval with the project owner and commission docket. The CPM shall maintain an updated list of approved ERCs for the project.

AQ-SC8 The project owner shall perform cooling tower recirculating water quality testing at least once during any quarter when the cooling tower has operated, or shall provide for continuous monitoring of conductivity as an indicator, for total dissolved solids content.

Verification: The project owner shall submit to the CPM cooling tower recirculating water quality tests or a summary of continuous monitoring results and daily recirculating water flow in the Quarterly Operation Report (**AQ-SC10**). If the project owner uses continuous monitoring of conductivity as an indicator for total dissolved solids content, the project owner shall submit data supporting the calibration of the conductivity meter and the correlation with total dissolved solids content at least once each year in a Quarterly Operation Report (**AQ-SC10**).

AQ-SC9 The cooling towers daily PM10 emissions shall be limited to 0.96 lbs/day in total for all four cooling tower cells. The cooling towers shall be equipped with a drift eliminator to control the drift fraction to no greater than 0.001 percent of the circulating water flow. The project owner shall estimate daily PM10 emissions from the cooling towers using the quarterly water quality testing data or continuous monitoring data and daily circulating water flow data. Compliance with the cooling tower PM10 emission limit shall be demonstrated as follows:

PM10 = cooling water recirculation rate (lbs/hr) * total dissolved solids concentration in the blowdown water (ppm/1,000,000) * design controlled drift rate (fraction).

Verification: The project owner shall submit the manufacturers guarantee for the drift eliminator demonstrating compliance with this condition at least 30 days before installation of the chiller cooling tower. The project owner shall submit cooling tower water quality sampling or continuous monitoring plan for approval by the CPM at least 30 days before first turbine fire. The project owner shall submit to the CPM daily cooling tower PM10 emission estimates in the Quarterly Operation Report (**AQ-SC10**) for all quarters during which the cooling tower was operated.

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 the District (if requested by the District) no later than 30 days following the end of each calendar quarter.

DISTRICT FINAL DETERMINATION OF COMPLIANCE CONDITIONS (SCAQMD 2009F)

Gas Turbines (D1, D7, D13 and D19)

(note: the following conditions are per turbine unless otherwise specified)

AQ-1 The project owner shall limit emission from this equipment as follows:

CONTAMINANT	EMISSION LIMIT
VOC	Less than or equal to 129 lbs IN ANY CALENDAR MONTH
PM10	Less than or equal to 299 lbs IN ANY CALENDAR MONTH
SOx	Less than or equal to 34 lbs IN ANY CALENDAR MONTH

For the purposes of this condition, the above emission limits shall be based on the emissions from a single turbine.

The turbine shall not commence with normal operation until the commissioning process has been completed. Normal operation commences when the turbine is able to supply electrical energy to the power grid as required under contract with the relevant entities. The District shall be notified in writing once the commissioning process for each turbine is completed.

Normal operation may commence in the same calendar month as the completion of the commissioning process provided the turbine is in compliance with the above emission limits.

The project owner shall calculate the monthly emissions for VOC, PM10, and SOx using the equation below.

Monthly Emissions, lbs/month = (Monthly fuel usage in mmscf/month) * (Emission factors indicated below)

For commissioning, the emission factors shall be as follows: VOC, 3.76 lbs/mmcf; PM10, 6.03 lbs/mmcf; and SOx, 0.68 lbs/mmcf.

For normal operation, the emission factors shall be as follows: VOC, 2.59 lbs/mmcf; PM10, 6.03 lbs/mmcf; and SOx, 0.68 lbs/mmcf.

For a month during which both commissioning and normal operation take place, the monthly emissions shall be the total of the commissioning emissions and the normal operation emissions.

The project owner shall maintain records in a manner approved by the District to demonstrate compliance with this condition and the records shall be made available to District personnel upon request.

[RULE 1303(b)(2)–Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: The project owner shall submit all emission calculations, fuel use, CEM records and a summary demonstrating compliance of all emission limits stated in this Condition to the CPM in the Quarterly Operation Report (**AQ-SC10**).

AQ-2 The 2.5 ppm NOx, 4.0 ppm CO, and 2.0 ppm ROG emission limits shall not apply during turbine commissioning, start-up, and shutdown periods. Commissioning shall not exceed 156 hours total. Each start-up shall not exceed 35 minutes. Each shutdown shall not exceed 10 minutes. Each turbine shall be limited to a maximum of 240 start-ups per year.

NOx, CO, and ROG emissions for an hour that includes a full start-up sequence of 35 minutes, followed immediately by a turbine trip, a five minute purge period during which no fuel is burned, and the first 20 minutes of a restart sequence shall not exceed 14.27 lbs for NOx, 6.3 lbs for CO, and 1.29 lbs for ROG and for the hour which includes a shutdown 4.07 lbs for NOx, 4.15 for CO, and 1.27 lbs for ROG.

The project owner shall maintain records in a manner approved by the District to demonstrate compliance with this condition and the records shall be made available to District personnel upon request.

For the purposes of this condition, start-up shall be defined as the start -up process to bring the turbine to full successful operation.

[RULE 1703(a)(2) – PSD-BACT, 10-7-1988; RULE 2005, 5-6-2005; RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: The project owner shall provide start-up and shutdown occurrence and duration data as part as part of the Quarterly Operation Report (**AQ-SC10**). The project owner shall make the site available for inspection of the commissioning and startup/shutdown records by representatives of the District, ARB and the Commission.

AQ-3 The 98.16 lbs/mmcf NOx emission limit(s) shall only apply during turbine commissioning and the 11.53 lbs/mmcf NOx emission limit(s) shall only apply after turbine commissioning during the interim reporting period to report RECLAIM emissions. The interim reporting period shall not exceed 12 months from entry into RECLAIM.

[RULE 2012, 5-6-2005]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: 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 this condition and the emission limits of Condition **AQ-1**, **AQ-2**, and **AQ-4** as appropriate. The monthly commissioning status report shall include criteria pollutant emission estimates for each commissioning activity and total commissioning emission estimates. The monthly commissioning status report shall be submitted to the CPM until the report includes the completion of the initial commissioning activities. The project owner shall make the site available for inspection of the commissioning and startup/shutdown records by representatives of the District, ARB and the Commission.

AQ-4 The 2.5 ppmv NOX emission limit(s) is averaged over 60 minutes at 15 percent O_2, dry.

The 4.0 ppmv CO emission limit(s) is averaged over 60 minutes at 15 percent O_2, dry.

The 2.0 ppmv ROG emission limit(s) is averaged over 60 minutes at 15 percent O_2, dry.

[RULE 1703(a)(2) – PSD-BACT, 10-7-1988; RULE 2005, 5-6-2005]

[RULE 1703(a)(2) – PSD-BACT, 10-7-1988]

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]

[Devices subject to this condition: D1, D7, D13, D19]

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

AQ-5 For the purpose of determining compliance with District Rule 475, combustion contaminant emissions may exceed the concentration limit or the mass emission limit listed, but not both limits at the same time.

[RULE 475, 10-8-1976; RULE 475, 8-7-1978]

[Devices subject to this condition: D1, D7, D13, D19]

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

AQ-6 The project owner shall not use natural gas containing the following specified compounds:

Compound	Range	Grain per 100 scf
H_2S	Greater than	0.25

This concentration limit is an annual average based on monthly samples of natural gas composition or gas supplier documentation. Gaseous fuel samples shall be tested using District Method 307-91 for total sulfur calculated as H_2S.

[RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: The project owner shall submit fuel gas sulfur content records as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-7 The project owner shall install and maintain a(n) flow meter to accurately indicate the fuel usage being supplied to the turbine.

The project owner shall also install and maintain a device to continuously record the parameter being measured.

[RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002; RULE 2012, 5-6-2005]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: The project owner shall submit fuel usage records on as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-8 The project owner shall conduct source test(s) for the pollutant(s) identified below.

Pollutant	Method	Averaging Time	Test Location
NOx	District Method 100.1	1 hour	Outlet of SCR
CO	District Method 100.1	1 hour	Outlet of SCR
SOx	AQMD Laboratory Method 307-91	N/A	Fuel Sample
VOC	District Method 25.3	1 hour	Outlet of SCR
PM10	District Method 5	4 hours	Outlet of SCR
Ammonia	District Method 207.1 and 5.3 or U.S.EPA Method 17	1 hour	Outlet of SCR

The test shall be conducted after AQMD approval of the source test protocol, but no later than 180 days after initial start-up. The AQMD shall be notified of the date and time of the test at least 10 days prior to the test.

The test shall be conducted in accordance with AQMD approved test protocol. The protocol shall be submitted to the AQMD engineer no later than 45 days before the proposed test date and shall be approved by the AQMD before the test commences. The test protocol shall include the proposed operating conditions of the turbine during the tests, the identity of the testing lab, a statement from the testing lab certifying that it meets the criteria of Rule 304, and a description of all sampling and analytical procedures.

The test shall be conducted to determine the oxygen levels in the exhaust. In addition, the tests shall measure the fuel flow rate (cfh), the flue gas flow rate, and the turbine generating output in MW.

The test shall be conducted when this equipment is operating at loads of 100, 75, and 50 percent, with the exception of PM10 testing. For PM10, the test shall be conducted when this equipment is operating at a load of 100 percent.

For natural gas fired turbines only, VOC compliance shall be demonstrated as follows: a) Stack gas samples are extracted into Summa canisters maintaining a final canister pressure between 400-500 mm Hg absolute, b) Pressurization of canisters are done with zero gas analyzed/certified to contain less than 0.05 ppmv total hydrocarbon as carbon, and c) Analysis of canisters are per U.S.EPA Method TO-12 (with preconcentration) and temperature of canisters when extracting samples for analysis is not below 70 degrees F.

The use of this alternative method for VOC compliance determination does not mean that it is more accurate than AQMD Method 25.3, nor does it mean that it may be used in lieu of AQMD Method 25.3 without prior approval except for the determination of compliance with the VOC BACT level of 2.0 ppmv calculated as carbon for natural gas fired turbines.

Because the VOC BACT level was set using data derived from various source test results, this alternate VOC compliance method provides a fair comparison and represents the best sampling and analysis technique for this purpose at this time. The test results shall be reported with two significant digits.

For the purpose of this condition, alternative test method may be allowed for each of the above pollutants upon concurrence of AQMD, U.S.EPA and ARB.

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002; RULE 1703(a)(2)-PSD-BACT, 10-7-1988; RULE 2005, 5-6-2005]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: The project owner shall submit the proposed protocol for the initial source tests 45 days prior to the proposed source test date to both the SCAQMD and CPM for approval. The project owner shall submit source test results no later than 60 days following the source test date to both the SCAQMD and CPM. The project owner shall notify the SCAQMD and CPM no later than 10 days prior to the proposed initial source test date and time.

AQ-9 The project owner shall conduct source test(s) for the pollutant(s) identified below.

Pollutant	Method	Averaging Time	Test Location
NH_3	District Method 207.1 and 5.3 or U.S.EPA Method 17	1 hour	Outlet of SCR

The test(s) shall be conducted at least quarterly during the first twelve months of operation and at least annually thereafter. The AQMD shall be notified of the date and time of the test at least 10 days prior to the test.

If the turbine is not in operation during one quarter, then no testing is required during that quarter.

The NOx concentration, as determined by the CEMS, shall be simultaneously recorded during the ammonia slip test. If the CEMS is inoperable, a test shall be conducted to determine the NOx emissions using District Method 100.1 measured over a 60 minute averaging time period.

The test shall be conducted and the results submitted to the District within 60 days after the test date.

The test shall be conducted to demonstrate compliance with the Rule 1303 concentration limit.

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: The project owner shall submit the proposed protocol for the initial source tests 45 days prior to the proposed source test date to both the SCAQMD and CPM for approval. The project owner shall notify the SCAQMD and CPM no later than 10 days prior to the proposed source test date and time. The project owner shall submit source test results no later than 60 days following the source test date to both the SCAQMD and CPM.

AQ-10 The project owner shall conduct source test(s) for the pollutant(s) identified below.

Pollutant	Method	Averaging Time	Test Location
SOx	AQMD Laboratory Method 307-91	N/A	Fuel Sample
VOC	District Method 25.3	1 hour	Outlet of SCR
PM10	District Method 5	4 hours	Outlet of SCR

The test shall be conducted at least once every three years. The AQMD shall be notified of the date and time of the test at least 10 days prior to the test.

The test shall be conducted to determine the oxygen levels in the exhaust. In addition, the tests shall measure the fuel flow rate (cfh), the flue gas flow rate, and the turbine generating output in MW.

The test shall be conducted in accordance with AQMD approved test protocol. The protocol shall be submitted to the AQMD engineer no later than 45 days before the proposed test date and shall be approved by the AQMD before the test commences. The test protocol shall include the proposed operating conditions of the turbine during the tests, the identity of the testing lab, a statement from the testing lab certifying that it meets the criteria of Rule 304, and a description of all sampling and analytical procedures.

The test shall be conducted when this equipment is operating at loads of 100, 75, and 50 percent, with the exception of PM10 testing. For PM10, the test shall be conducted when this equipment is operating at a load of 100 percent.

For natural gas fired turbines only, VOC compliance shall be demonstrated as follows: a) Stack gas samples are extracted into Summa canisters maintaining a final canister pressure between 400-500 mm Hg absolute, b) Pressurization of canisters are done with zero gas analyzed/certified to contain less than 0.05 ppmv total hydrocarbon as carbon, and c) Analysis of canisters are per U.S.EPA Method TO-12 (with preconcentration) and temperature of canisters when extracting samples for analysis is not below 70 degrees F.

The use of this alternative method for VOC compliance determination does not mean that it is more accurate than AQMD Method 25.3, nor does it mean that it may be used in lieu of AQMD Method 25.3 without prior approval except for the determination of compliance with the VOC BACT level of 2.0 ppmv calculated as carbon for natural gas fired turbines.

Because the VOC BACT level was set using data derived from various source test results, this alternate VOC compliance method provides a fair comparison and represents the best sampling and analysis technique for this purpose at this time. The test results shall be reported with two significant digits.

For the purposes of this condition, alternative test method may be allowed for each of the above pollutants upon concurrence of AQMD, U.S.EPA, and ARB.

The test shall be conducted for compliance verification of the BACT VOC 2.0 ppmv limit.

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002; RULE 1703(a)(2)-PSD-BACT, 10-7-1988]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: The project owner shall submit the proposed protocol for the source tests 45 days prior to the proposed source test date to both the SCAQMD and CPM for approval. The project owner shall notify the SCAQMD and CPM no later than 10 days prior to the proposed source test date and time. The project owner shall submit source test results no later than 60 days following the source test date to both the SCAQMD and CPM.

AQ-11 The project owner shall provide to the District a source test report in accordance with the following specifications:

Source test results shall be submitted to the District no later than 60 days after the source test was conducted.

Emission data shall be expressed in terms of concentration (ppmv) corrected to 15 percent oxygen (dry basis), mass rate (lbs/hr), and lbs/mmcf. In addition, solid PM emissions, if required to be tested, shall also be reported in terms of grains/dscf.

All exhaust flow rate shall be expressed in terms of dry standard cubic feet per minute (dscfm) and dry actual cubic feet per minute (dacfm).

All moisture concentration shall be expressed in terms of percent corrected to 15 percent oxygen.

Source test results shall also include the oxygen levels in the exhaust, fuel flow rate (CFH), the heating content of the fuel, the flue gas temperature, and the generator power output (MW) under which the test was conducted.

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002; RULE 1703(a)(2)-PSD-BACT, 10-7-1988; RULE 2005, 5-6-2005]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: The project owner shall submit source test results no later than 60 days following the source test date to both the SCAQMD and CPM. The project owner shall notify the SCAQMD and CPM no later than 10 days prior to the proposed source test date and time.

AQ-12 The project owner shall install and maintain a CEMS to measure the following parameters:

NOx concentration in ppmv and CO concentration in ppmv

Concentrations shall be corrected to 15 percent oxygen on a dry basis.

The CO CEMS shall be installed and operating no later than 90 days after initial startup of the turbine, in accordance with an approved AQMD Rule 218 CEMS plan application. The project owner shall not install the CEMS prior to receiving initial approval from AQMD. Within two weeks of the turbine start-up, the project owner shall provide written notification to the District of the exact date of start-up.

The NOx CEMS shall be installed and operating no later than 90 days after initial start-up of the turbine and shall comply with the requirements of Rule 2012. During the interim period between the initial start-up and the provisional certification date of the CEMS, the project owner shall comply with the monitoring requirements of Rule 2012(h)(2) and 2012(h)(3). Within two weeks of the turbine start-up date, the project owner shall provide written notification to the District of the exact date of start-up.

The CO CEMS shall be installed and operated to measure CO concentrations over a 15 minute averaging time period.

The NOx CEMS shall be installed and operating (for BACT purposes only) no later than 90 days after initial start-up of the turbine.

[RULE 1703(a)(2)-PSD-BACT, 10-7-1988; RULE 218, 8-7-1981; RULE 218, 5-14-1999]

[RULE 1703(a)(2)-PSD-BACT, 10-7-1988; RULE 2005, 5-6-2005; RULE 2012, 5-6-2005]

[Devices subject to this condition: D1, D7, D13, D19]

<u>Verification:</u> Within 30 days of certification, the project owner shall notify the CPM of the completion of the certification process for the CEMS.

AQ-13 This equipment is subject to the applicable requirements of the following Rules or Regulations.

Contaminant	**Rule**	**Rule/Subpart**
NOx	40CFR60, SUBPART	KKKK
SOx	40CFR60, SUBPART	KKKK

[40 CFR 60 Subpart KKKK, 7-6-2006]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: The project owner shall provide appropriate records to show compliance with 40 CFR 60 Subpart KKKK as part of the Quarterly Operation Report (**AQ-SC10**).

AQ-14 This equipment shall not be operated unless the project owner demonstrates to the Executive Officer that the facility holds sufficient RTCs to offset the prorated annual emissions increase for the first compliance year of operation. In addition, this equipment shall not be operated unless the project owner demonstrates to the Executive Officer that, at the commencement of each compliance year after the first compliance year of operation, the facility holds sufficient RTCs in an amount equal to the annual emissions increase.

To comply with this condition, the project owner shall prior to the 1st compliance year hold a minimum NOx RTCs of 9,677 lbs/yr. This condition shall apply during the 1st 12 months of operation, commencing with the initial operation of the gas turbine.

To comply with this condition, the project owner shall, prior to the beginning of all years subsequent to the 1st compliance year, hold a minimum of 6,886 lbs/yr of NOx RTCs for the operation of the gas turbine.

In accordance with Rule 2005(f), unused RTCs may be sold only during the reconciliation period for the fourth quarter of the applicable compliance year inclusive of the 1st compliance year.

The condition shall apply to each turbine individually.

[RULE 2005, 5-6-2007]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: The project owner shall provide confirmation from the District 30 days prior to first fire that sufficient RTCs to satisfy the District's requirements for the first year of operation as provided in this condition have been obtained. The project owner shall submit evidence of sufficient RTCs to the CPM demonstrating compliance with this condition for each compliance year after the 1st compliance year, at least 15 days prior to the commencement of that compliance year.

AQ-15 The project owner shall keep records in a manner approved by the District, for the following parameter(s) or item(s):

Natural gas fuel use during the commissioning period.

Natural gas fuel use after the commissioning period and prior to CEMS certification.

Natural gas fuel use after CEMS certification.

[RULE 2005, 5-6-2005]

[Devices subject to this condition: D1, D7, D13, D19]

Verification: The project owner shall submit all fuel usage records as part of the Quarterly Operation Report (**AQ-SC10**).

Selective Catalytic Reduction (SCR) Catalysts (C4, C10, C16, C22)

AQ-16 The 5 ppmv NH_3 emission limit(s) is averaged over 60 minutes at 15 percent O_2, dry basis. The project owner shall calculate and continuously record the NH_3 slip concentration using the following equation.

District Requirement

NH_3 (ppmv) = [a–b*c/1E6]*1E6/b; where

a = NH_3 injection rate (lbs/hr)/17(lbs/lbs-mol)

b = dry exhaust gas flow rate (scf/hr)/385.3 (scf/lbs-mol)

c = change in measured NOx across the SCR (ppmvd at 15 percent O_2)

The project owner shall install and maintain a NOx analyzer to measure the SCR inlet NOx ppmv accurate to plus or minus 5 percent calibrated at least once every twelve months.

The NOx analyzer shall be installed and operated within 90 days of initial start-up.

The project owner shall use the above described method or another alternative method approved by the District's Executive Officer.

The ammonia slip calculation procedures described above shall not be used for compliance determination or emission information without corroborative data using an approved reference method for the determination of ammonia.

[RULE 1303(a)(1) – BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]

[Devices subject to this condition: C4, C10, C16, C22]

Verification: The project owner shall include ammonia slip concentrations averaged on an hourly basis as part of the Quarterly Operation Report (**AQ-SC10**). The project owner shall submit all SCR inlet NOx analyzer calibration results to the CPM within 60 days of the calibration date. Exceedances of the ammonia limit shall be reported and chronic exceedances of the ammonia slip limit, defined as occurring more than 10 percent of the operation for any single HRSG exhaust stack, shall be identified by the project owner and confirmed by the CPM within 60 days of the submitted Quarterly Operation Report (**AQ-SC10**) that indicates chronic exceedances. If a chronic exceedance is identified and confirmed, the project owner shall work in conjunction with the CPM to develop a reasonable compliance plan to investigate and redress the chronic exceedance of the ammonia slip limit within 60 days of the above confirmation.

AQ-17 The project owner shall install and maintain a(n) flow meter to accurately indicate the flow rate of the total hourly throughput of injected ammonia.

The project owner shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every 12 months.

The calibration records shall be kept on site and made available to District personnel upon request.

The ammonia injection system shall be placed in full operation as soon as the minimum temperature at the outlet to the SCR reactor is reached. The minimum temperature is 540 degrees F.

The ammonia injection rate shall remain between 6.83 gal/hr and 16 gal/hr.

Continuously record shall be defined as recording at least once every hour and shall be calculated based upon the average of the continuous monitoring for that hour.

[RULE 1303(a)(1) – BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1703(a)(2)-PSD-BACT, 10-7-1988; RULE 2005, 5-6-2005]

[Devices subject to this condition: C4, C10, C16, C22]

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate device has been installed and is functioning properly. The project owner shall submit annual calibration results within 30 days of their successful completion and shall make the records required under the condition available for inspection by representatives of the District, ARB, and the Commission.

AQ-18 The project owner shall install and maintain a(n) temperature gauge to accurately indicate the temperature of the exhaust at the inlet to the SCR reactor.

The project owner shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every 12 months.

The catalyst temperature range shall remain between 665 degrees F and 870 degrees F.

The catalyst inlet temperature shall not exceed 870 degrees F.

The temperature range requirement of this condition shall not apply during start-up conditions of the turbine not to exceed 35 minutes per start-up. For this condition, start-up shall be defined as the start-up process to bring the turbine to full successful operation.

Continuously record shall be defined as recording at least once every hour and shall be calculated based upon the average of the continuous monitoring for that hour.

[RULE 1303(a)(1) – BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1703(a)(2)-PSD-BACT, 10-7-1988; RULE 2005, 5-6-2005]

[Devices subject to this condition: C4, C10, C16, C22]

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate device has been installed and is functioning properly. The project owner shall submit annual calibration results within 30 days of their successful completion.

AQ-19 The project owner shall install and maintain a(n) pressure gauge to accurately indicate the differential pressure across the SCR catalyst bed in inches of water column.

The project owner shall also install and maintain a device to continuously record the parameter being measured.

The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every 12 months.

The pressure drop across the catalyst shall not exceed 6 inches water column.

Continuous record shall be defined as measuring at least once every month and shall be calculated based upon the average of the continuous monitoring for that month.

[RULE 1303(a)(1) – BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1703(a)(2)-PSD-BACT, 10-7-1988; RULE 2005, 5-6-2005]

[Devices subject to this condition: C4, C10, C16, C22]

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate device has been installed and is functioning properly. The project owner shall submit annual calibration results within 30 days of their successful completion.

Black Start Diesel Engine (D25)

AQ-20 The project owner shall limit the operating time to no more than 200 hour(s) in any one year.

The 200 hours in any one year shall include no more than 50 hours for maintenance and performance testing.

The duration of each test shall not exceed 38 minutes in any one hour.

[RULE 1110.2, 2-1-2008; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002; RULE 1401, 3-7-2008; RULE 1470, 6-1-2007; RULE 2012, 5- 6-2005; CA PRC CEQA, 11-23-1970; CA PRC CEQA, 11-23-1970]

[Devices subject to this condition: D25]

Verification: The project owner shall submit all dates of operation, elapsed time in hours, and the reason for each operation in the Quarterly Operation Report (**AQ-SC10**).

AQ-21 The project owner shall install and maintain a(n) non-resettable elapsed time meter to accurately indicate the elapsed operating time of the engine.

[RULE 1110.2, 2-1-2008; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002; RULE 1401, 3-7-2008; RULE 1470, 6-1-2007; RULE 2012, 5- 6-2005]

[Devices subject to this condition: D25]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission. The project owner shall submit elapsed time in hours in the Quarterly Operation Report (**AQ-SC10**).

AQ-22 The project owner shall operate and maintain this equipment according to the following requirements:

The operation of this engine beyond the 50 hours per year allotted for maintenance and performance testing shall be allowed only in the event of a loss of grid power or up to 30 minutes prior to a rotating outage, provided that the utility distribution company has ordered rotating outages in the control area where the engine is located or has indicated that it expects to issue such an order at a certain time, and the engine is located in a utility service block that is subject to the rotating outage.

Engine operation shall be terminated immediately after the utility distribution company advises that a rotating outage is no longer imminent or in effect.

This engine shall be operated for the primary purpose of providing a back up source of power to start a turbine.

[RULE 1110.2, 2-1-2008; RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002; RULE 1401, 3-7-2008; RULE 1470, 6-1-2007; RULE 2012, 5- 6-2005]

[Devices subject to this condition: D25]

Verification: The project owner shall submit all dates of operation, elapsed time in hours, and the reason for each operation in the Quarterly Operation Report (**AQ-SC10**).

AQ-23 The project owner shall operate and maintain this equipment according to the following specifications:

The project owner shall operate the diesel particulate filter system only with an operational HiBACK data logging and alarm system with backpressure and temperature monitors.

The HiBACK data logging and alarm system shall be programmed to provide a red warning signal and an audible alarm, whenever the engine backpressure reaches the maximum allowable backpressure of 40 inches of water. The engine backpressure shall not exceed 40 inches of water in operation.

The engine shall be operated at the load level required to achieve an engine exhaust gas temperature of 572 degrees F (300 degrees C) for passive regeneration of the diesel particulate filter for at least 30 percent of the operating time.

The engine shall not be operated below the passive regeneration temperature of 572 degrees F for more than 240 consecutive minutes.

The project owner shall regenerate the diesel particulate filter after every 12 cold starts or whenever a yellow warning signal indicating the backpressure is 10 percent below the maximum allowable backpressure of 40 inches of water is received from the HiBACK alarm system, whichever occurs first. Filter regeneration is complete when the backpressure monitoring system indicates a normal backpressure reading.

The engine shall be shut down and the diesel particulate filter shall be cleaned whenever the backpressure reaches the maximum backpressure limit of 40 inches water. Cleaning shall be performed according to the manufacturer’s recommendations in the installation and maintenance manual.

After every 200 hours of normal engine operation, the project owner shall inspect the integrity of the diesel particulate filter and, if necessary, replace it.

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]

[Devices subject to this condition: D25]

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate devices have been installed and are functioning properly. The project owner shall maintain engine maintenance records tests how compliance with the maintenance requirements of this condition and shall make these records available for inspection by representatives of the District, ARB, and the Commission.

AQ-24 This equipment shall not be operated unless the project owner demonstrates to the Executive Officer that the facility holds sufficient RTCs to offset the prorated annual emissions increase for the first compliance year of operation. In addition, this equipment shall not be operated unless the project owner demonstrates to the Executive Officer that, at the commencement of each compliance year after the first compliance year of operation, the facility holds sufficient RTCs in an amount equal to the annual emissions increase.

To comply with this condition, the project owner shall prior to the 1st compliance year hold a minimum NOx RTCs of 2412 lbs/yr. This condition shall apply during the 1st 12 months of operation, commencing with the initial operation of the black start engine.

To comply with this condition, the project owner shall, prior to the beginning of all years subsequent to the 1st compliance year, hold a minimum of 2412 lbs/yr of NOx RTCs for operation of the black start engine.

In accordance with Rule 2005(f), unused RTC's may be sold only during the reconciliation period for the fourth quarter of the applicable compliance year inclusive of the 1st compliance year.

[RULE 2005, 5-6-2005]

[Devices subject to this condition: D25]

Verification: The project owner shall provide confirmation from the District 30 days prior to first fire that sufficient RTCs to satisfy the District's requirements for the first year of operation as provided in this condition have been obtained. The project owner shall submit evidence of sufficient RTCs to the CPM demonstrating compliance with this condition for each compliance year after the 1^{st} compliance year, at least 15 days prior to the commencement of that compliance year.

AQ-25 The project owner shall keep records, in a manner approved by the District, for the following parameter(s) or item(s):

An engine operating log shall be maintained which on a monthly basis shall list all engine operations in each of the following areas:

A. Emergency use hours of operation,

B. Maintenance and testing hours, and

C. Other operating hours, with a description of the reason for operation.

In addition, each time the engine is started manually, the log shall include the date of operation and the timer reading in hours at the beginning and end of operation. The log shall be kept for a minimum of five calendar years prior to the current year and made available to District personnel upon request. The total hours of operation for the previous calendar year shall be recorded some time during the first 15 days of January each year.

[RULE 1110.2, 2-1-2008]

[Devices subject to this condition: D25]

Verification: The project owner shall make records required by this condition available for inspection by representatives of the District, ARB, and the Commission.

AQ-26 The project owner shall keep records, in a manner approved by the District, for the following parameter(s) or item(s):

The project owner shall maintain records of diesel particulate filter inspections, replacements, and cleaning.

The project owner shall maintain monthly records of the exhaust temperature, engine backpressure, and date and time for the duty cycle of the engine as downloaded from the HiBACK data logging and alarm system.

All records shall be maintained on file for a minimum of five years and made available to District personnel upon request.

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]

[Devices subject to this condition: D25]

Verification: The project owner shall make records required by this condition available for inspection by representatives of the District, ARB, and the Commission.

Ammonia Tank (D28)

AQ-27 The project owner shall install and maintain a pressure relief valve set at 25 psig.

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]

[Devices subject to this condition: D28]

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

AQ-28 The project owner shall vent this equipment, during filling, only to the vessel from which it is being filled.

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]

[Devices subject to this condition: D28]

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

AQ-29 The project owner shall keep records in a manner approved by the Executive Officer, for the following parameter(s) or item(s):

The project owner shall document an inspection each time the tank is filled to ensure the vapor recovery equipment is consistently and properly used.

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]

[Devices subject to this condition: D28]

Verification: The project owner shall make the records required under this condition by representatives of the District, ARB and the Commission.

Facility Conditions

AQ-30 Except for open abrasive blasting operations, the project owner shall not discharge into the atmosphere from any single source of emissions whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is:

A. As dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines; or

B. Of such opacity as to obscure an observer' s view to a degree equal to or greater than does smoke described in subparagraph (a) of this condition.

[RULE 401, 3-2-1984; RULE 401, 11-9-2001]

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

AQ-31 The project owner shall not use diesel fuel containing sulfur compounds in excess of 15 ppm by weight as supplied by the supplier.

Material safety data sheets for the diesel fuel shall be kept current and made available to District personnel upon request.

[RULE 431.2, 5-4-1990; RULE 431.2, 9-15-2000]

Verification: The project owner shall make the diesel fuel material data sheets available for inspection by representatives of the District, ARB, and the Energy Commission.

ACRONYMS

AAQS	Ambient Air Quality Standard
AERMOD	ARMS/EPA Regulatory Model
AFC	Application for Certification
APCO	Air Pollution Control Officer
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
AQMP	Air Quality Mitigation Plan
ARB	Air Resources Board
ATA	American Trucking Association
ATC	Authority to Construct
ATCM	Air Toxic Control Measure
AVR	Automatic Voltage Regulator
BACT	Best Available Control Technology
bhp	brake horse power
Btu	British thermal unit
CAA	Clean Air Act
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEC	California Energy Commission (or Energy Commission)
CEMS	Continuous Emission Monitoring System
CEQA	California Environmental Quality Act
CFH	Cubic feet per hour
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CofA	City of Anaheim
CPM	(CEC) Compliance Project Manager
CPP	Canyon Power Plant Energy Project
CTG	Combustion Turbine Generator
dacfm	Dry Actual Cubic Feet per Minute
dscf	Dry Standard Cubic Feet
dscfm	Dry Standard Cubic Feet per Minute

EMFAC	Emission Factors
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
FSA	Final Staff Assessment
GE	General Electric
GHG	Green House Gas
gr	Grains (1 gr ≅ 0.0648 grams)
H_2S	Hydrogen Sulfide
HP	Horse Power
HRA	Health Risk Assessment
HSC	Health and Safety Code
IC	Internal Combustion
ISCST3	Industrial Source Complex Short Term, version 3
kW	Kilowatts (1,000 Watts)
lbs	Pound(s)
LORS	Law, Ordinance, Regulations and Standards
MCR	Monthly Compliance Report
µg	Microgram
$\mu g/m^3$	Microgram per cubic meter
MMBtu	Million British thermal units
mmcf	Million cubic feet
mmHg	Millimeters of mercury
MW	Megawatts (1,000,000 Watts)
NH_3	Ammonia
NO	Nitrogen Monoxide
NO_2	Nitrogen Dioxide
NO_3	Nitrates
NOx	Oxides of Nitrogen *or* Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
O_2	Oxygen
O_3	Ozone
OLM	Ozone Limiting Method
PDOC	Preliminary Determination Of Compliance

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
PTO	Permit to Operate
RECLAIM	Regional Clean Air Incentives Market
ROG	Reactive Organic Gas
RTC	RECLAIM Trading Credit
SCAB	South Coast Air Basin
SCAG	Southern California Association of Government
SCAQMD	South Coast Air Quality Management SCAQMD (also: District)
scf	Standard Cubic Feet
SCPPA	Southern California Public Power Authority
SCR	Selective Catalytic Reduction
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_3	Sulfate
SOx	Sulfur Oxides
SoCalGas	Southern California Gas Company
SOx	Oxides of Sulfur
TDS	Total Dissolved Solids
tpy	tons per year
U.S.EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

REFERENCES

ARB 2006 - California Air Resources Board. Almanac Emission Projection Data (published in 2006). http://www.arb.ca.gov/ei/emsmain/emsmain.htm

ARB 2008 - California Air Resources Board. California Ambient Air Quality Data 1980-2006 on CD ROM. February, 2008.

ARB 2009a - California Air Resources Board. California Ambient Air Quality Standards available on ARB Website. http://www.arb.ca.gov/aqs/aqs.htm. Accessed February 2009.

ARB 2009b - California Air Resources Board. Air Designation Maps available on ARB website. http://www.arb.ca.gov/desig/adm/adm.htm. Accessed February 2009.

ARB 2009c - California Air Resources Board. California Ambient Air Quality Data Statistics available on ARB website. http://www.arb.ca.gov/adam/ welcome.html. Accessed January 2009.

ASPEN 2009b – Aspen/W. Walters (tn 50457). URS Project Emission Information, dated 3/10/09. Submitted to CEC/Docket Unit on3/11/09.

B&C 2009a – B&C Awnings/C. Walker (tn 51115). B&C Awnings Comments on Canyon, dated 3/14/09. Submitted to CEC/Docket Unit on 4/16/09.

B&C 2009b – B&C Awnings (tn 51116). B&C Awnings Comments on Canyon, dated 2/24/09. Submitted to CEC/Docket Unit on 4/16/09.

CofA 2007a - City of Anaheim/S. Sciortino (tn 43903). Application for Certification Volume I & II, dated 12/27/07. Submitted to CEC/Docket Unit on 12/28/07.

CofA 2007b - City of Anaheim/S. Sciortino (tn 43905). Air Quality and Public Health Modeling Files, dated 12/27/07. Submitted to CEC/Docket Unit on 12/28/07.

CofA 2008b - City of Anaheim/S. Sciortino (tn 48477). Notification of Change in Scope, dated 9/18/08. Submitted to CEC/Docket Unit on 10/8/08.

CofA 2009b – City of Anaheim/S. Sciortino (tn 49917). Change in Fuel Use and SOx/PM Emission Factors Used During Commissioning, dated 1/28/09. Submitted to CEC/Docket Unit on 1/28/09.

CofP 2009b – City of Placentia/T. Butzlaff / G. Sowards (tn 51851). Comments from City of Placentia, dated 6/4/09. Submitted to CEC/Docket Unit on 6/5/09.

CofYL 2009a – City of Yorba Linda/S. Harris (tn 51650). Comment Letter from City of Yorba Linda, dated 5/11/09. Submitted to CEC/Docket Unit on 5/22/09.

CofYL 2009b – City of Yorba Linda/S. Harris (tn 51898). City of Yorba Linda Comment Letter, dated 3/11/09. Submitted to CEC/Docket Unit on 6/10/09.

GB 2009b – Galati & Blek/S. Galati (tn 50156). Documentation Regarding ERC Certificates, dated 2/17/09. Submitted to CEC/Docket Unit on 2/17/09.

GB 2009j - Galati & Blek/M. Mills (tn 52104). SCPPA's Canyon Power Project Operational Hours Spreadsheet, dated 06/22/09. Submitted to CEC/Docket Unit on 06/22/09.

GWF Energy 2008a. GWF Energy (GWF Energy LLC/CH2MHILL). Hanford Energy Park Peaker, Petition for License Amendment, Conversion to GWF Hanford Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 1, 2008.

IC 2009a – Independent Consultant/J. Cole (tn 51685). City of Yorba Linda Comparison of Combined-Cycle v.s. Simple Cycle. Submitted to CEC/Docket Unit on 5/26/09.

SCAQMD 2006 - South Coast Air Quality Management District. Air Quality Standards Compliance Report. September 2003.

SCAQMD 2009a – South Coast Air Quality Management District / M. Nazemi (tn: 50221). South Coast Preliminary Determination of Compliance, dated 2/18/09. Submitted to CEC/Docket Unit on 2/23/2009.

SCAQMD 2009c – South Coast Air Quality Management District / M. Nazemi (tn: 52031). Response to Public Comments from the City of Placentia, dated 6/11/09. Submitted to CEC/Docket Unit on 6/11/09.

SCAQMD 2009d – South Coast Air Quality Management District / M. Nazemi (tn: 52032). Response to Public Comments from the City of Yorba Linda, dated 6/11/09. Submitted to CEC/Docket Unit on 6/11/09.

SCAQMD 2009e – South Coast Air Quality Management District / M. Nazemi (tn: 52306). Response to Public Comments from B & C Awnings, dated 6/25/09. Submitted to CEC/Docket Unit on 7/6/09.

SCAQMD 2009f – South Coast Air Quality Management District / M. Nazemi (tn: 52179). South Coast Final Determination of Compliance, dated 6/24/09. Submitted to CEC/Docket Unit on 6/25/09.

URS 2009a – URS/J. Mitchell (tn 49919). Changes to Annual Emission and Dispersion Modeling, dated 1/28/09. Submitted to CEC/Docket Unit on 1/28/09.

U.S.EPA 2009 - United States Environmental Protection Agency. Air Quality Maps. http://www.epa.gov/region09/air/maps/maps_top.html. Accessed February 2009.

WC 2009 (Weather Channel). Monthly averages for Anaheim, California. Website: http://www.weather.com. Accessed February 2009.

THIS PAGE INTENTIONALLY LEFT BLANK

Air Quality Appendix AIR-1

Greenhouse Gas Emissions

Testimony of William Walters, P.E. and Matthew Layton, P.E.

SUMMARY OF CONCLUSIONS

The Canyon Power Plant Project (CPP) is a proposed addition to the state's electricity system that would produce greenhouse gas (GHG) emissions while generating electricity for California consumers. CPP is a peaking project designed to operate infrequently, during periods of high local electricity demand and the need for local grid reliability support. The project's emissions per megawatt-hour (MWh) would be lower than those of other power plants and peaking projects that the project would displace and, thus, would contribute to a reduction of the California and overall Western Electricity Coordinating Council system greenhouse gas (GHG)[3] emissions and GHG emission rate average.

Staff notes that mandatory reporting of the GHG emissions provides the necessary information for the California Air Resources Board to develop greenhouse gas regulations and/or trading markets required by the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.). The project may be subject to additional reporting requirements and GHG reductions or trading requirements as these regulations are more fully developed and implemented.

On October 8, 2008, the Energy Commission adopted an order initiating an informational (OII) proceeding (08-GHG OII-1) to solicit comments on how to assess the greenhouse gas impacts of proposed new power plants in accordance with the California Environmental Quality Act (CEQA). This analysis provides the staff's conclusions concerning greenhouse gas emissions for this siting case. Future power plant siting and amendment cases are likely to be reviewed with the benefit of new information and policy direction from the Energy Commission in response to the OII. This analysis recognizes that the "prudent use" of natural gas for electricity generation will serve to optimize the system (for integrating intermittent renewable generation and providing reliability), but, without further analysis and policy direction by the Commission to refine this general understanding, this analysis leaves the implications for optimizing the system to future cases (CEC 2009a).

While CPP would emit GHG emissions, the relative efficiency of CPP and the system build-out of renewable resources in California would result in a net cumulative reduction of energy and GHG emission from new and existing fossil resources. Electricity is produced by operation of inter-connected generation resources. Operation of one power

[3] Fuel-use closely correlates to the efficiency of and carbon dioxide (CO_2) emissions from natural gas-fired power plants. And since CO_2 emissions from the fuel combustion dominate greenhouse gas (GHG) emissions from power plants, CO_2 and GHG are used interchangeably in this section.

plant, like Canyon, affects all other power plants in the interconnected system. The operation of the Canyon facility would affect the overall electricity system operation and GHG emissions in several ways:

- CCP would displace some less efficient peaking capacity in the dispatch order of gas-fired facilities that are required to provide electricity reliability in the local region.
- CCP would provide flexible peaking power necessary to integrate the growing generation from intermittent renewable sources, such as wind and solar generation.
- CCP would facilitate to some degree the replacement out-of-state coal electricity generation that must be phased out in conformance with the State's new Emissions Performance Standard.
- CCP could facilitate to some extent the replacement of generation provided by aging power plants that use once-through cooling.

These system impacts would result in a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from power plants, does not worsen current conditions, and would not result in impacts that are cumulatively significant.

Staff concludes that the short-term minor emission of greenhouse gases during construction that are necessary to create this new low GHG-emitting peaking resource would be sufficiently reduced by "best practices" and would, therefore, not be significant.

The Canyon Power Plant Project, as a peaking project with an enforceable operating limitation less than 60 percent of capacity[4], is not subject to the requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2900 et. seq.).

INTRODUCTION

GHG emissions are not criteria pollutants, but are discussed in the context of cumulative impacts. The State has demonstrated a clear willingness to address global climate change though research, adaptation[5], and GHG inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity consumption, and describes the applicable GHG standards and requirements.

[4] CPP is limited, through air quality permit restrictions, to a maximum annual capacity factor of less than 15 percent.

[5] While working to understand and reverse global climate change, it is prudent to also adapt to potential changes in the state's climate (for example changing rainfall patterns).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies in **Greenhouse Gas Table 1** pertain to the control and mitigation of greenhouse gas emissions. Staff's analysis examines the project's compliance with these requirements.

Greenhouse Gas Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
State	
California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)	This act requires the California Air Resource Board (ARB) to enact standards that will reduce GHG emission to 1990 levels. Electricity production facilities will be regulated by the ARB.
California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq.	These ARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)
Title 20, California Code of Regulations, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	The regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 $MTCO_2$/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO_2/MWh).

GLOBAL CLIMATE CHANGE AND ELECTRICITY PRODUCTION

There is general scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps significantly) to that change. Man-made emissions of greenhouse gases, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Indeed, the California Legislature finds that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California" (Cal. Health & Safety Code, sec. 38500, division 25.5, part 1).

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 require reporting of greenhouse gases (GHG) or global climate change[6] emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It

[6] Global climate change is the result of greenhouse gases, or air emissions with global warming potentials, affecting the global energy balance, and thereby, climate of the planet. The term greenhouse gases (GHG) and global climate change (GCC) gases are used interchangeably.

requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be achieved by 2020.[7] To achieve this, ARB has a mandate to define the 1990 emissions level and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB adopted early action GHG reduction measures in October 2007, adopted mandatory reporting requirements and the 2020 statewide target in December 2007, and adopted a statewide scoping plan in December 2008 to identify how emission reductions will be achieved from significant sources of GHG via regulations, market mechanisms, and other actions. ARB staff is developing regulatory language to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures, including market mechanisms (ARB 2006). The regulations must be effective by January 1, 2011 and mandatory compliance commences on January 1, 2012. The mandatory reporting requirements are effective for electric generating facilities over 0 megawatt (MW) capacity, and the due date for initial reports by existing facilities this first year was June 1, 2009.

Examples of strategies that the state might pursue for managing GHG emissions in California, in addition to those recommended by the Energy Commission and the Public Utilities Commission, were identified in the California Climate Action Team's Report to the Governor (CalEPA 2006). The scoping plan approved by ARB in December 2008 builds upon the overall climate policies of the Climate Action Team report and show the recommended strategies to achieve the goals for 2020 and beyond. Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy), land use planning, and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). The scoping plan includes a 33 percent Renewables Portfolio Standard (RPS), aggressive energy efficiency targets, and a cap-and-trade system that includes the electricity sector (ARB 2008b).

It is possible that GHG reductions mandated by ARB will be non-uniform or disproportional across emitting sectors, in that most reductions will be based on cost-effectiveness (i.e., the greatest effect for the least cost). For example, the ARB proposes a 40 percent reduction in GHG from the electricity sector, even though that sector currently only produces about 25 percent of the state GHG emissions. In response, in September 2008 the Energy Commission and the Public Utilities Commission provided recommendations (CPUC 2008) to ARB on how to achieve such reductions through both programmatic and regulatory approaches, and identified regulation points should ARB decide that a multi-sector cap and trade system is warranted.

The Energy Commission's *2007 Integrated Energy Policy Report* (IEPR) also addresses climate change within the electricity, natural gas, and transportation sectors (CEC

[7] Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80% below 1990 levels by 2050.

2007). For the electricity sector, it recommends such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33 percent renewable portfolio standard.

SB 1368[8], enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibits California utilities from entering into long-term commitments with any base load facilities that exceed the Emission Performance Standard of 0.500 metric tonnes CO_2 per megawatt-hour[9] (1,100 pounds CO_2/MWh). Specifically, the SB 1368 Emission Performance Standard applies (EPS) 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.[10] If a project, instate or out of state, plans to sell base load electricity to California utilities, the utilities will have to demonstrate that the project meets the EPS. *Base load* units are defined as units that operate at a capacity factor higher than 60 percent. As a project with a permit operating restriction of less than 60 percent of the year, electricity from CPP would not have to meet the SB 1368 EPS.

In addition to these programs, California is involved in the Western Climate Initiative, a multi-state and international effort to establish a cap and trade market to reduce greenhouse gas emissions in the Western United States and the Western Electricity Coordinating Council (WECC). The timelines for the implementation of this program are similar to those of AB 32, with full roll-out beginning in 2012. And as with AB 32, the electricity sector has been a major focus of attention.

ELECTRICITY PROJECT GREENHOUSE GAS EMISSIONS

Electricity use can be as simple as turning on a switch to operate a light or fan. The system to deliver the adequate and reliable electricity supply is complex and variable. But it operates as an integrated whole to meet demand, such that the dispatch of a new source of generation generally curtails or displaces one or more less efficient or less competitive existing sources. Within the system, generation resources provide electricity, or energy, generating capacity, and ancillary services to stabilize the system and facilitate electricity delivery, or movement, over the grid. *Capacity* is the instantaneous output of a resource, in megawatts. *Energy* is the capacity output over a unit of time, for example an hour or year, generally reported as megawatt-hours or gigawatt-hours (GWh). Ancillary services[11] include regulation, spinning reserve, non-spinning reserve, voltage support, and black start capability. Individual generation resources can be built and operated to provide only one specific service. Alternatively, a resource may be able to provide one or all of these services, depending on its design and constantly changing system needs and operations.

8 Public Utilities Code § 8340 et seq.

9 The Emission Performance Standard only applies to carbon dioxide, and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.

10 See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

11 See page CEC 2009b, page 95.

California is actively pursuing policies to reduce GHG emissions that include adding non-GHG emitting renewable generation resources to the system mix. In this context, and because fossil-fueled resources produce GHG emissions, it is important to consider the role and necessity of also adding fossil-fuel resources. A report prepared as a response to the GHG OII (CEC 2009a) defines five roles that gas-fired power plants are likely to fulfill in a high-renewables, low-GHG system (CEC 2009b, pp 93 and 94):

1. Intermittent generation support
2. Local capacity requirements
3. Grid operations support
4. Extreme load and system emergency
5. General energy support.

The Energy Commission staff-sponsored report reasonably assumes that non-renewable power plants added to the system would almost exclusively be natural gas-fueled. Nuclear, geothermal, and biomass plants are generally base load and not dispatchable. Solid fueled projects are also generally base load, not dispatchable, and carbon sequestration technologies needed to reduce the GHG emission rates to meet the EPS are not yet developed (CEC 2009b, p. 92). Further, California has almost no sites available to add highly dispatchable hydroelectric generation.

Generation of electricity using any fossil fuel, including natural gas, can produce greenhouse gases with the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. For fossil fuel-fired power plants, the GHG emissions include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N_2O, not NO or NO_2, which are commonly known as NOx or oxides of nitrogen), and methane (CH_4 – often from unburned natural gas). Also included are sulfur hexafluoride (SF_6) from high voltage equipment and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds have very high relative global warming potentials. Global warming potential is a relative measure, compared to carbon dioxide, of a compound's residence time in the atmosphere and ability to warm the planet. Mass emissions of GHGs are converted into carbon dioxide equivalent (CO_2E) metric tonnes (MT) for ease of comparison.

PROJECT CONSTRUCTION

Construction of industrial facilities such as power plants requires coordination of numerous equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. Construction of CPP would involve 12 months of activity. **Greenhouse Gas Table 2** shows what the proposed project, as permitted, could potentially emit in greenhouse gases during construction. All emissions are converted to CO_2-equivalent and totaled.

Greenhouse Gas Table 2
CPP, Estimated Potential Construction Greenhouse Gas Emissions

Construction Element	CO_2-equivalent ($MTCO_2E$) [a]
Onsite construction including linear construction	777
Offsite vehicle travel	458
Construction Total	1,235

Source: Applicant (ASPEN 2009a) and a corrected as necessary by staff
Note:
a. One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms

PROJECT OPERATIONS

Greenhouse Gas Table 3 shows the estimated greenhouse gas emissions expected from the CPP project as currently proposed. The primary sources of GHG would be the natural gas fired combustion turbines. There will also be a small amount of GHG emissions from the diesel fuel consumed in the new emergency black start engine, and sulfur hexafluoride emissions from electrical component equipment. This emission estimate includes all stationary source emissions including leaks of SF_6 and HFCs, and does not include the minor GHG emissions from employees and material delivery traffic trips or maintenance emission sources. All emissions are converted to CO_2-equivalent and totaled. Based on the estimated total greenhouse gas emissions from CPP and the rated output, staff estimates that the Greenhouse Gas Emission Performance Factor to be approximately 0.537 $MTCO_2E$/MWh.

The expected maximum annual GHG emissions are somewhat below the permitted maximum value shown in **Greenhouse Gas Table 3**, which would occur if the project were to operate at maximum permitted levels. As the capacity factor decreases so does the project's overall efficiency which will cause the actual project GHG emissions to increase slightly per MWh. For comparison the similarly designed Riverside Energy Resource Center had actual GHG emissions of 0.542 $MTCO_2E$/MWh from their LM6000 gas turbines for a two year period that operated with an overall capacity factor of just less than five percent. Since the project's permit limits operation to considerably less than a 60 percent annual capacity factor (less than 15 percent), it is not required to meet the EPS of 0.500 $MTCO_2$/MWh.

Greenhouse Gas Table 3
CPP, Estimated Potential Operating Annual Greenhouse Gas Emissions

	Project Emissions (metric tonnes [a] per year)	Global Warming Potential [b]	CO_2 Equivalent ($MTCO_2E$)
Carbon Dioxide (CO_2)	120,949	1	120,949
Methane (CH_4)	6.8	21	144
Nitrous Oxide (N_2O)	1.4	310	424
Hexafluoride (SF_6)	0.0059	23,900	311
Hydrofluorocarbons (HFCs)	0.0163	1,300 [c]	47
Perfluorocarbons (PFCs)	0	7,850 [d]	0
Total Project GHG emissions – $MTCO_2E$ per year			121,874
Total Project MWh per year (net) [e]			226,980
Project CO_2 Emissions Performance - $MTCO_2$/MWh			0.533
Project GHG Emissions Performance - $MTCO_2E$/MWh			0.537

Source: Staff estimate based on applicant revised operation profile and AFC heat rates (CofA 2007a, ASPEN 2009a)
Notes:
a. One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
b. The global warming potential is a measure of the chemicals' warming properties and lifetime in the atmosphere relative to CO_2. The values shown are based on the emission factors from the ARB. (ARB 2008a)
c. The proposed chiller cooling fluid HFC-134a has a global warming potential of 1,300.
d. This figure is an average GWP for the two PFCs, CF_4 and C_2F_6.
e. This reflects staff's assumption of net base load power (194 MW) for 1,080 hours and one-half base load power (97 MW) for 180 hours (startup/shutdown hours).

The proposed project would be permitted, on an annual basis, to emit over 120,000 metric tonnes of CO_2-equivalent per year if operated at its maximum permitted level. The CPP would be used sparingly but its energy would be more efficient than many of the existing peaking plant that it would displace. The annual CO_2 performance of the CPP would be dependent on the number of startup and number of hours operating at high load.

The proposed project would increase the available energy and capacity to the electricity system of the Greater LA Area. The CPP would be likely to provide local reliability support, and could facilitate the retirement of other less-efficient power plants.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses the cumulative effects of GHG emissions caused by both construction and operation. 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. Staff is continuing to monitor development of AB 32 Scoping Plan implementation efforts and general trends and developments affecting GHG regulation in the construction and electricity sectors.

The impact of GHG emissions caused by this natural gas-fired facility is characterized by considering how the power plant would affect the overall electricity system. The integrated electricity system depends on fossil-fueled generation resources to provide energy and satisfy local capacity needs. As directed by the OII (CEC 2009a), staff is refining and implementing the concept of a "blueprint" that describes the long-term role of fossil-fueled power plants in California's electricity system. The five separate roles that gas-fired power plants are most likely to fulfill in the future of a high-renewables, low-GHG system include: 1) Intermittent generation support; 2) Local capacity requirements; 3) Grid operations support; 4) Extreme load and system emergencies support; and 5) General energy support (CEC 2009b, p. 93). CPP is analyzed here for its role in providing local capacity and generation and general energy support for expected generation retirements or replacements.

CONSTRUCTION IMPACTS

Staff does not believe that the small GHG emission increases from construction activities would be significant for several reasons. First, the period of construction will be short-term and the emissions intermittent during that period, not ongoing during the life of the project. Additionally, control measures that staff recommends to address criteria pollutant emission, such as limiting idling times and requiring, as appropriate, equipment that meets the latest criteria pollutant emissions standards would further minimize greenhouse gas emissions to the extent feasible. The use of newer equipment will increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment.

DIRECT/INDIRECT OPERATION IMPACTS AND MITIGATION

New, efficient, natural gas-fired generation promotes the state's efforts to improve GHG electrical generation efficiencies, therefore, reduce greenhouse gas emissions and the amount of natural gas used by electricity generation. As the *2007 Integrated Energy Policy Report* (CEC 2007, p. 184) noted:

> New natural gas-fueled electricity generation technologies offer efficiency, environmental, and other benefits to California, specifically by reducing the amount of natural gas used—and with less natural gas burned, fewer greenhouse gas emissions. Older combustion and steam turbines use outdated technology that makes them less fuel- and cost-efficient than newer, cleaner plants.… The 2003 and 2005 IEPRs noted that the state could help reduce natural gas consumption for electric generation by taking steps to retire older, less efficient natural gas power plants and replace or repower them with new, more efficient power plants.

Thus, in the context of the Energy Commission's *Integrated Energy Policy Report*, the CPP's likely replacement of older existing plant capacity and higher GHG-emitting energy furthers the state's strategy to promote efficiency and reduce fuel use and GHG emissions. As stated in the 2009 *Framework for Evaluating Greenhouse Gas Implications of Natural Gas-Fired Power Plants in California* (CEC 2009b, p.20):

> When one resource is added to the system, all else being held equal, another resource will generate less power. If the new resource has a lower cost or fewer

emissions than the existing resource mix, the aggregate system characteristics will change to reflect the cheaper power and lower GHG emissions rate.

Net GHG emissions for the integrated electric system will decline when new gas-fired power plants are added to: 1) permit the penetration of renewable generation to the 33 percent target; 2) improve the overall efficiency of the electric system; or 3) serve load growth or capacity needs more efficiently than the existing fleet (CEC 2009b, p. 98).

The Role of CPP in Local Generation Displacement

The proposed CPP would have a net heat rate of 9,907 Btu/kWhr[12] or 0.533 $MTCO_2$/MWh. Compared to other peaking and boiler units in the Los Angeles control area (shown in **Greenhouse Gas Table 4**), CPP would be more efficient, and emit fewer GHG emissions during any hour of operation than almost every other peaking unit save two facilities, the Anaheim CT1 facility and the Riverside Energy Resource Center facility. It is expected that CPP would dispatch after Anaheim CT1 and the Riverside Energy Resource Center and likely before the other peakers in most situations. The dispatch, or loading order of generation resources is clearly shown in **Greenhouse Gas Table 4**. Those units with the best, or lowest heat rate or lowest $MTCO_2$/MWh rate, generally operate more, have a higher capacity factor, than other units with higher heat rates. However, dispatch order can change, or deviate from economic or efficiency dispatch, in any one year or due to other concerns such as permit limits, contractual obligations, local reliability needs, or emergencies.

[12] Based on the High Heating Value (HHV) of the fuel(s) used. HHV is used for all heat rate and fuel conversions to GHG mass emissions that are discussed in this document.

Greenhouse Gas Table 4
Greater Los Angeles Area, SCE Interconnected, Local Generation Heat Rates and 2008 Energy Outputs

Plant Name	Capacity (MW)	Capacity Factor	Heat Rate (Btu/kWh)[a]	2008 Energy Output (GWh)	GHG Performance ($MTCO_2$ /MWh)
Mountainview	1,054	72.3%	7,141	6,691.3	0.378
Alamitos 1-6 [b]	1,970	14.6%	10,782	2,532.7	0.571
Magnolia	310	57.7%	7,233	1,570.6	0.383
Huntington Beach (AES) 1-4 [b]	880	19.9%	10,927	1,535.8	0.578
City of Vernon Malburg Power Plant	159	64.8%	7,711	903.9	0.408
Etiwanda Generating Station 3-4 [b]	1,049	9.2%	11,795	848.4	0.624
El Segundo Power 3-4 [b]	670	8.6%	11,045	507.8	0.584
Redondo Beach LLC (AES) 5-8 [b]	1,343	2.7%	11,726	316.7	0.621
Glendale Grayson 1-9 [b,c]	287	8.1%	13,068	203.3	0.378
Indigo Generation LLC [c]	135	9.9%	10,000	117.0	0.529
Pasadena Broadway [b]	75	13.6%	12,220	89.9	0.647
Riverside Energy Resource Center [c]	96	9.4%	9,527	79.3	0.477
Anaheim CT [c]	49	12.0%	9,424	52.1	0.499
Pasadena Glenarm [c]	156	2.6%	10,679	36.0	0.565
Long Beach Generation LLC [c]	260	1.2%	15,323	27.2	0.811
Burbank Lake 1 [c]	61	3.3%	10,789	17.8	0.571
Burbank Olive [b]	110	1.2%	17,347	11.4	0.918
Barre Peaker [c]	49	1.1%	12,059	4.7	0.638
Center Peaker [c]	49	1.1%	10,587	4.7	0.560
Mira Loma Peaker [c]	49	1.0%	11,992	4.5	0.849
Springs Generation Project 1-4 [c]	40	1.1%	12,483	3.9	0.661
Etiwanda Peaker [c]	49	0.9%	12,105	3.7	0.641
Alliance Century 1-4 [c]	46	0.4%	12,952	1.6	0.685
Alliance Drews 1-4 [c]	46	0.4%	13,764	1.5	0.728
City of Vernon 6-7 [c]	42	0.1%	11,946	0.3	0.632

Source: Energy Commission Staff
Note:
a. Based on the Higher Heating Value or HHV of the fuel.
b. Boiler facilities.
c. Peaker facilities.

The Role of CPP in Renewables Goals/Load Growth

As California moves towards an increased reliance on renewable energy, the bulk of renewable generation available to and used in California in the near to intermediate future will be intermittent wind generation with some intermittent solar (CEC 2009b, p.3). To accommodate the increased variability in generation due to increasing renewable penetration, compounded by increasing load variability, control authorities such as the California Independent System Operator (CAISO) need increased flexibility from other generation resources such as hydro generation, dispatchable pump loads, energy storage systems, and fast ramping and fast starting fossil fuel generation resources (CAISO 2007, p. 14).

CPP would provide flexible, dispatchable and fast ramping[13] power that would not obstruct penetration of renewable energy. In general, combustion turbines can ramp up quickly, but output of a large-scale combined cycle facility can be limited by the steam turbine to about 15 MW per minute.[14]

CPP would also provide fast starting[15] capabilities. The new CTGs would have the ability of achieving a worst-case 35-minute startup cycle, and generally much faster than 35 minute startup. Intermittent renewable sources of energy would be accommodated by CPP varying its energy output as needed to integrate the renewable sources, which enables CPP to play a role in most system operating scenarios.[16]

The amount of dispatchable fossil fuel generation used as regulation resources, fast ramping resources, or load following or supplemental energy dispatches will have to be significantly increased due to the planned intermittent resources needed to meet the 20 percent RPS (CAISO 2007, p.113); the 33 percent RPS will require even more dispatchable generation to integrate the renewables. However, this does not suggest the existing and new fossil fuel capacity will operate more in terms of total generation, but will need to operate more in a supplementary rather than base load role. **Greenhouse Gas Table 5** shows how the build-out of either the 20 percent or the 33 percent Renewable Portfolio Standards will affect generation from new and existing non-renewable resources. Should California reach its goal of meeting 33 percent of its retail demand in 2020 with renewable energy, non-renewable, most likely fossil-fueled, energy needs will fall by more than 36,000 GWh/year. In other words, all growth will need to come from renewable resources to achieve the 33 percent RPS, and some existing and new fossil units will generate less energy than the currently do, given the expected growth rate in retail sales.

---

[13] The CAISO categorizes *fast-ramping* as a generator capable of going from lowest power to highest in under 20 minutes, or greater than 10 MW per minute.

[14] Of the 2,821 MW of thermal resources providing Ancillary Services to the CAISO, most (2,441 MW) have ramp rates between 10 and 31 MW/min. The bulk of the resources providing Ancillary Services with ramp rates greater than 10 MW/min (7,141 MW) are hydroelectric facilities (ISO 2007).

[15] In general, fast starts are defined as being less than two hours.

[16] It is important to note that renewable generation is just one source of intermittency, or variability, that fast ramping plants can and do accommodate for in the California electric system, such as inaccurate load and weather forecasts, and unscheduled generation outages.

These assumptions are conservative in that the forecasted growth in retail sales assumes that the impacts of planned increases in expenditures on (uncommitted) energy efficiency are already embodied in the current retail sales forecast[17]. If, for example, forecasted retail sales in 2020 were lowered by 10,000 GWh due to the success of increased energy efficiency expenditures, non-renewable energy needs fall by an additional 8,000 to 6,700 GWh/year, totaling as much as 45,000 GWh per year of reduced non-renewable energy, depending on the RPS assumed.

Greenhouse Gas Table 5
Estimated Changes in Non-Renewable Energy
Potentially Needed to Meet California Loads, 2008-2020

California Electricity Supply	**Annual GWh**	
Statewide Retail Sales, 2008, estimated [a]	265,185	
Statewide Retail Sales, 2020, forecast [a]	308,070	
Growth in Retail Sales, 2008-20	42,885	
Growth in Net Energy for Load [b]	46,316	
California Renewable Electricity	**GWh @ 20% RPS**	**GWh @ 33% RPS**
Renewable Energy Requirements, 2020 [c]	61,614	101,663
Current Renewable Energy, 2008	29,174	
Change in Renewable Energy-2008 to 2020 [c]	32,440	72,489
Resulting Change in Non-Renewable Energy [d]	13,876	(-36,173)

Source: Energy Commission staff 2009.
Notes:
a. Not including 8 percent transmission and distribution losses.
b. Based on 8 percent transmission and distribution losses, or 42,885 GWh x 0.08 = 46,316 GWh.
c. Renewable standards are calculated on retail sales and not on total generation, which accounts for 8 percent transmission and distribution losses.
d. Based on net energy (including 8 percent transmission and distribution losses), not based on retail sales.

The Role of CPP in Retirements/Replacements

CPP would be capable of annually providing 227 GWh of natural gas-fired generation energy to replace resources that are or will likely be precluded from serving California loads. State policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in high GHG-emitting, such as coal-fired, generation, generation that relies on water for once-through cooling, and aging power plants (CEC 2007). Some of the existing plants that are likely to require significant capital investments to continue operation in light of these policies may be unlikely to undertake the investments and will retire or be replaced.

[17] The extent to which uncommitted energy efficiency savings are already represented in the current Energy Commission demand forecast is a subject of study for the 2009 IEPR.

Replacement of High GHG-Emitting Generation

High GHG-Emitting resources, such as coal, are effectively prohibited from entering into new contracts for California electricity deliveries as a result of the Emissions Performance Standard adopted in 2007 pursuant to SB 1368. Between now and 2020, more than 18,000 GWh of energy procured by California utilities under these contracts will have to reduce GHG emissions or be replaced; these contracts are presented in **Greenhouse Gas Table 6**.

This represents almost half of the energy associated with California utility contracts with coal-fired resources that will expire by 2030. If the State enacts a carbon adder[18], all the coal contracts (including those in **Greenhouse Gas Table 6**, which expire by 2020 and, other contracts that expire beyond 2020 and are not shown in the table) may be retired at an accelerated rate as coal-fired energy becomes uncompetitive due to the carbon adder or the capital needed to capture and sequester the carbon emissions. Also shown are the approximate 500 MW of in-state coal and petroleum coke-fired capacity that may be unlikely to contract with California utilities for baseload energy due to SB1368 Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from renewable generation; some will come from new and existing natural gas fired generation. All will emit significantly less GHG than the coal and petroleum coke-fired generation, which average about 1.0 $MTCO_2$/MWh without carbon capture and sequestration, or about two times the as much as a the CPP or other new peaker projects and two and a half times more than new gas-fired combined-cycle projects, resulting in a significant net reduction in GHG emissions from the California electricity sector.

[18] A carbon adder or carbon tax is a specific value added to the cost of a project for per ton of associated carbon or carbon dioxide emissions. Because it is based on, but not limited to, actual operations and emission and can be trued up at year end, it is considered a simple mechanism to assign environmental costs to a project.

Greenhouse Gas Table 6
Expiring Long-term Contracts with Coal-fired Generation 2009 – 2020

Utility	Facility [a]	Contract Expiration	Annual GWh Delivered to CA
PG&E, SCE	Misc In-state Qual. Facilities [a]	2009-2019	4,086
LADWP	Intermountain	2009-2013	3,163 [b]
City of Riverside	Bonanza, Hunter	2010	385
Department of Water Resources	Reid Gardner	2013 [c]	1,211
SDG&E	Boardman	2013	555
SCE	Four Corners	2016	4,920
Turlock Irrigation District	Boardman	2018	370
LADWP	Navajo	2019	3,832
		TOTAL	**18,522**

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.

Notes:

a. All facilities are located out-of-state except for the Miscellaneous In-state Qualifying Facilities.
b. Estimated annual reduction in energy provided to LADWP by Utah utilities from their entitlement by 2013.
c. Contract not subject to Emission Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.

Retirement of Generation Using Once-Through Cooling

New, dispatchable resources like the CPP would also be required to provide generation capacity (that is, the ability to meet fluctuating, intermittent electricity loads) in the likely event that facilities utilizing once-through cooling (OTC) are retired. The State Water Resource Control Board (SWRCB) has proposed significant changes to OTC units, which would likely require retrofit, retirement, or significant curtailment of dozens of generating units. In 2008, these units collectively produced about 58,000 GWh. While those OTC facilities owned and operated by utilities and recently-built combined cycles may well install dry or wet cooling towers, it is unlikely that the aging, merchant plants will do so. Most of these units operate at low capacity factors, suggesting a limited ability to compete in the current electricity market. Although the timing would be uncertain, new resources would out-compete aging plants and would displace the energy provided by OTC facilities and likely accelerate the retirements.

Any additional costs associated with complying with the SWRCB regulation would be amortized over a limited revenue stream today and into the foreseeable future. Their energy and much of their dispatchable, load-following capability will have to be replaced. These units constitute over 15,000 MW of merchant capacity and 17,800 GWh of merchant energy. Of this, much but not all of the capacity and energy are in local reliability areas, requiring a large share of replacement capacity – absent transmission upgrades – to locations in the same local reliability area. **Greenhouse Gas Table 7** provides a summary of the statewide utility and merchant energy supplies affected by the OTC regulations.

Greenhouse Gas Table 7
Units Utilizing Once-Through Cooling: Capacity and 2008 Energy Output [a]

Plant, Unit Name	Owner	Local Reliability Area	Aging Plant?	Capacity (MW)	2008 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Diablo Canyon 1, 2	Utility	None	No	2,232	17,091	Nuclear
San Onofre 2, 3	Utility	L.A. Basin	No	2,246	15,392	Nuclear
Broadway 3 [b]	Utility	L.A. Basin	Yes	75	90	0.648
El Centro 3, 4 [b]	Utility	None	Yes	132	238	0.814
Grayson 3-5 [b]	Utility	LADWP	Yes	108	150	0.799
Grayson CC [b]	Utility	LADWP	Yes	130	27	0.896
Harbor CC	Utility	LADWP	No	227	203	0.509
Haynes 1, 2, 5, 6	Utility	LADWP	Yes	1,046	1,529	0.578
Haynes CC	Utility	LADWP	No	560	3,423	0.376
Humboldt Bay 1, 2 [a]	Utility	Humboldt	Yes	107	507	0.683
Olive 1, 2 [b]	Utility	LADWP	Yes	110	11	1.008
Scattergood 1-3	Utility	LADWP	Yes	803	1,327	0.618
Utility-Owned				**7,776**	**39,988**	**0.693**
Alamitos 1-6	Merchant	L.A. Basin	Yes	1,970	2,533	0.661
Contra Costa 6, 7	Merchant	S.F. Bay	Yes	680	160	0.615
Coolwater 1-4 [b]	Merchant	None	Yes	727	576	0.633
El Segundo 3, 4	Merchant	L.A. Basin	Yes	670	508	0.576
Encina 1-5	Merchant	San Diego	Yes	951	997	0.674
Etiwanda 3, 4 [b]	Merchant	L.A. Basin	Yes	666	848	0.631
Huntington Beach 1, 2	Merchant	L.A. Basin	Yes	430	916	0.591
Huntington Beach 3, 4	Merchant	L.A. Basin	No	450	620	0.563
Mandalay 1, 2	Merchant	Ventura	Yes	436	597	0.528
Morro Bay 3, 4	Merchant	None	Yes	600	83	0.524
Moss Landing 6, 7	Merchant	None	Yes	1,404	1,375	0.661
Moss Landing 1, 2	Merchant	None	No	1,080	5,791	0.378
Ormond Beach 1, 2	Merchant	Ventura	Yes	1,612	783	0.573
Pittsburg 5-7	Merchant	S.F. Bay	Yes	1,332	180	0.673
Potrero 3	Merchant	S.F. Bay	Yes	207	530	0.587
Redondo Beach 5-8	Merchant	L.A. Basin	Yes	1,343	317	0.810
South Bay 1-4	Merchant	San Diego	Yes	696	1,015	0.611
Merchant-Owned				**15,254**	**17,828**	**0.605**
Total In-State OTC				**23,030**	**57,817**	

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.
Notes:
a. OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating Station (not ocean-cooled), currently under construction, enters commercial operation.
b. Units are aging, but are not OTC.

New generation resources that can either provide local support or energy will emit significantly less GHGs. Existing aging and OTC natural gas generation average 0.6 to 0.7 MTCO2/MWh, which is less efficient, higher GHG emitting, than a new natural gas-fired simple-cycle project like CPP. When a project can provide energy and capacity, given its location, it can provide a significant net reduction in GHG emissions from the California electricity sector. A project like CPP that is located in a coastal load pocket, like the Greater Los Angeles Local Capacity Area, would more likely provide local reliability support as well as facilitate the retirement of aging and/or OTC power plants.

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 entire assessment is a cumulative impact assessment. The project alone would not be sufficient to change global climate, but would emit greenhouse gases and therefore has been analyzed as a potential cumulative impact in the context of existing GHG regulatory requirements and GHG energy policies.

COMPLIANCE WITH LORS

Ultimately, ARB's AB 32 regulations may address both the degree of electricity generation sector emissions reductions (through cap-and-trade), and the method by which those reductions will be achieved (e.g., through command-and-control). However, the programmatic approach is currently under development. That regulatory approach may address emissions not only from the newer, more efficient, and lower emitting facilities licensed by the Commission, but also the older, higher-emitting facilities not subject to any GHG reduction standard that this agency could impose. This programmatic approach is likely to be more effective in reducing GHG emissions overall from the entire electricity sector than one that merely relies on displacing out-of-state coal plants ("leakage") or older "dirtier" facilities.

The Energy Commission and the Public Utilities Commission provided recommendations (CPUC 2008) to ARB on how to achieve such reductions through both programmatic and regulatory approaches and identified the regulation points should ARB decide that a multi-sector cap-and-trade system is warranted. As ARB codifies accurate GHG inventories and methods, it may become apparent that emission reductions from the generation sector are less cost-effective than other sectors, and that other sectors of sources can achieve reductions with relative ease and cost-effectiveness.

The project would be subject to ARB's mandatory reporting requirements and potentially other future requirements mandating compliance with AB 32 that are being developed by ARB. How the project would comply with these ARB requirements is speculative at this time, but compliance would be mandatory. The ARB's mandatory GHG emissions reporting requirements do not indicate whether the project, as defined, would comply with the potential GHG emissions reduction regulations being formulated under AB 32. The project may have to provide additional reports and GHG reductions, depending on the future regulations expected from ARB.

Reporting of GHG emissions would enable the project to demonstrate consistency with the policies described above and the regulations that ARB adopts and to provide the information to demonstrate compliance with any applicable EPS that could be enacted in the next few years. The CPP project would not be subject to the SB 1368 Emission Performance Standard if it continues operate less than a 60 percent annual capacity factor.

NOTEWORTHY PUBLIC BENEFITS

Electricity is produced by operation of inter-connected generation resources, and by knowing the fuel used by the generation sector, the resulting GHG emissions can be known. Operation of one power plant, like Canyon, affects all other power plants in the interconnected system. The operation of the Canyon facility will have an impact upon system operation and GHG emissions in several ways:

- CCP would displace less efficient peaking capacity in the dispatch order of gas-fired facilities that are required to provide electricity reliability in the local region.
- CCP would provide flexible peaking power necessary to integrate the growing generation from intermittent renewable sources, such as wind and solar generation.
- CCP would facilitate to some degree the replacement out of state coal electricity generation that must be phased out to conform to the State's new Emissions Performance Standard.
- CCP would replace peaking generation provided by aging power plants that use once-through cooling, that are currently being used as peakers to provide necessary local reliability.

The project would likely lead to a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state's power plants, would not worsen current conditions, and would thus not result in impacts that are cumulatively significant. Moreover, it would be consistent with AB 32 goals.

The energy displaced by the CPP project would result in a reduction in GHG emissions from the electricity system. In other system roles, as described in **Greenhouse Gas Table 8**, CPP would minimize its GHG impacts by filling nearly all of the expected future roles for gas-fired generation, in a high-renewables, low-GHG system.

Greenhouse Gas Table 8
CPP, Summary of Role in Providing Energy and Capacity Resources

Services Provided by Generating Resources	Discussion, Canyon Power Project
Integration of Renewable Energy	• Would provide fast startup capability. • Would provide rapid ramping capability. • Would have ability to provide regulation and reserves, and energy when renewable resources are unavailable.
Local Generation Displacement	• Would be able to satisfy/partially satisfy local capacity area (LCA) resource requirements. • Would provide voltage support.
Ancillary Services, Grid System, and Emergency Support	• Would provide fast startup capability. • Would have low minimum load levels. • Would provide rapid ramping capability. • Would have ability to provide regulation and reserves. • Would provide black start capability.
General Energy Support	• Would provide general energy support. • Could facilitate some retirements and replacements • Would provide cost-competitive energy. • Would be able to help a load-serving entity (LSE) meet resource adequacy (RA) requirements.

Source: Energy Commission staff; based on: Expected Roles for Gas-Fired Generation (CEC2009b, p. 7).

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The City of Yorba Linda's PSA comments (CofYL 2009a, IC 2009a) note that the GHG emissions from the project, in terms of fuel efficiency or CO2E per MWh, could be reduced by 20 to 25 percent if a conventional combined-cycle or Benson combined-cycle/OTSG design were used instead of the proposed simple-cycle peaker design. Staff acknowledges that combined-cycle projects are more efficient than simple cycle projects and would have lower GHG emissions per MWh. However, very low capacity factor fast-start peaker projects are a necessary part of the overall system mix and the project as designed is well suited for that proposed role with GHG emissions that are as low or lower than most of the existing plants that fit this particular system role (see **Greenhouse Gas Table 4**). Therefore, staff believes that the proposed project design is more than adequate to provide for system wide reductions in GHG emissions given the applicant's proposed purpose, expected use, and system reliability role for this project (GB 2009e, GB 2009j).

CONCLUSIONS

The Canyon Power Plant Project (CPP), as an addition to the California electricity system, is a peaking project that would operate infrequently, during periods of high local electricity demand and the need for local grid reliability support. The project's GHG emissions per MWh are expected to be lower than those of other power plants and peaking projects that the project would replace and, thus, would contribute to continued improvement of the California and overall Western Electricity Coordinating Council system greenhouse gas (GHG) emissions and GHG emission rate average.

The project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state's power plants, would not worsen current conditions, and would thus not result in impacts that are cumulatively significant. The CPP would also provide other potential GHG benefits by filling nearly all of the expected future roles for gas-fired generation, in a high-renewables, low-GHG system.

Staff notes that mandatory reporting of GHG emissions per Air Resources Board greenhouse gas regulations would occur, and this would enable the ARB to gather the information needed to regulate CPP in trading markets if required by the regulations implementing the California Global Warming Solutions Act of 2006 (AB 32). The project may be subject to additional reporting requirements and GHG reduction or trading requirements as these regulations are more fully developed and implemented

Staff does not believe that the minor GHG emission increases from construction activities would be significant for several reasons. First, the period of construction would be short-term and the emissions intermittent during that period, not ongoing during the life of the project. Additionally, control measures or best practices, that staff recommends, such as limiting idling times and requiring, as appropriate, equipment that meet the latest emissions standards would further minimize greenhouse gas emissions since staff believes that the use of newer equipment will increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. For all these reasons, staff concludes that the minor short-term emission of greenhouse gases during construction would be sufficiently reduced and would, therefore, not be significant.

Since this power project is a peaking facility that would be permitted for less than a 60 percent annual capacity factor, it would not be subject to the requirements of SB 1368 and the Emission Performance Standard if it enters into long- term energy or capacity contracts with one of California's regulated utilities.

PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification related to Greenhouse Gas emissions are proposed. The project owner would comply with mandatory ARB GHG emissions reporting regulations

(California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq.) and/or future GHG regulations formulated by the ARB, such as GHG emissions cap and trade markets.

REFERENCES

ARB 2006. AB 32 Fact Sheets, California Global Warming Solutions Act of 2006 and Timeline. www.arb.ca.gov/cc/cc.htm. September 2006.

ARB 2008a. Regulation for the Mandatory Reporting of Greenhouse Gas Emissions. Final Review Draft. http://arb.ca.gov/cc/reporting/ghg-rep/arbreg.pdf. Attachment A. September 18, 2008.

ARB 2008b. California Air Resource Board. Climate Change, Proposed Scoping Plan a Framework for Change, Pursuant to AB 32. Released October 2008, approved December 2008. <http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm>.

ASPEN 2009a – Aspen/W. Walters (tn 50456). City of Anaheim Greenhouse Gas Data Response, dated 3/10/09. Submitted to CEC/Docket Unit on 3/11/09.

CalEPA 2006 (California Environmental Protection Agency). Climate Action Team Report to Governor Schwarzenegger and the Legislature. March, 2006.

CEC 1998 (California Energy Commission). 1997 Global Climate Change, Greenhouse Gas Emissions Reduction Strategies for California, Volume 2, Staff Report. 1998.

CEC 2003. 2003 Integrated Energy Policy Report. December 2003.

CEC 2007. 2007 Integrated Energy Policy Report. <http://www.energy.ca.gov/2007_energypolicy/documents/index.html. 2007>.

CEC 2009a. California Energy Commission. Committee Report (08-GHG OII-01). Committee Guidance On Fulfilling California Environmental Quality Act Responsibilities For Greenhouse Gas Impacts In Power Plant Siting Applications. March 2009. http://www.energy.ca.gov/ghg_powerplants/documents/index.html.

CEC 2009b. California Energy Commission. Framework for Evaluating Greenhouse Gas Implications of Natural Gas-Fired Power Plants in California, CEC-700-2009-009, MRW and Associates. May 27, 2009.

CAISO 2007. California Independent System Operator. Integration of Renewable Resources, November 2007.

CofA 2007a. City of Anaheim/S. Sciortino (tn 43903). Application for Certification Volume I & II, dated 12/27/07. Submitted to CEC/Docket Unit on 12/28/07.

CofYL 2009a – City of Yorba Linda/S. Harris (tn 51650). Comment Letter from City of Yorba Linda, dated 5/11/09. Submitted to CEC/Docket Unit on 5/22/09.

CPUC 2008 Final Opinion on Greenhouse Gas Regulatory Strategies, Joint Agency proposed final opinion, publication # CEC-100-2008-007-D. Posted: September 12, 2008.

GB 2009e – Galati & Blek/S. Galati (tn 51426). Critical Issues Assessment Anaheim Peaking Power Siting Study (October 2006), dated 5/4/09. Submitted to CEC/Docket Unit on 5/4/09.

GB 2009j - Galati & Blek/M. Mills (tn 52104). SCPPA's Canyon Power Project Operational Hours Spreadsheet, dated 06/22/09. Submitted to CEC/Docket Unit on 06/22/09.

IC 2009a – Independent Consultant/J. Cole (tn 51685). City of Yorba Linda Comparison of Combined-Cycle v.s. Simple Cycle. Submitted to CEC/Docket Unit on 5/26/09.

BIOLOGICAL RESOURCES

Testimony of Rick York

SUMMARY OF CONCLUSIONS

The City of Anaheim (City or applicant) proposes to construct and operate a 200 MW gas-fired power plant (Canyon Power Plant or CPP) at 3071 East Miraloma Avenue in Anaheim, California. Due to the project site's location in a highly developed, industrial area, there are no remaining natural features that provide suitable habitat for protected plant or wildlife species. Energy Commission staff (staff) analyzed the potential impacts to biological resources that are expected to occur during construction and operation of the proposed project and concluded that there would be none with the adoption and implementation of staff's proposed Biological Resources Condition of Certification **BIO-1** and **BIO-2**. Condition of Certification **BIO-1** requires the presence of a Biological Monitor during jack and bore drilling under Carbon Creek Channel to monitor operations in the event of frac-out (accidental release) of drilling fluid into the channel. Staff believes, due to the lack of biological resources on the site or nearby, the project would not have any significant direct, indirect, or cumulative impacts to biological resources.

INTRODUCTION

This section provides staff analysis of potential biological resource impacts from the CPP's proposal to construct and operate a new 200 MW natural gas-fired power plant in the City of Anaheim. This analysis would determine if there would be any impacts to state and federally listed species, species of special concern, wetlands, surface waters, and other areas of critical biological concern. This analysis presents information regarding the affected biotic community, the potential environmental impacts associated with the construction and operation of the proposed project, and where necessary specifies mitigation planning and compensation measures to reduce potential impacts to non-significant levels. This analysis is based, in part, on information provided in the City's Application for Certification (AFC) for the CPP (CofA 2007a); consultation with California Department of Fish and Game (CDFG) and United States Fish and Wildlife Service (USFWS), staff's observations at an informal site visit on April 24, 2008, data responses from the City on June 6, 2008, and the applicant's responses during the Data Response and Issues Resolution Workshop on June 13, 2008.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The CPP owner would need to abide by the following laws, ordinances, regulations, and standards (LORS) during project construction and operation.

FEDERAL

Federal Endangered Species Act

Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq., designates and provides for protection of threatened and endangered plant and animal species, and their critical habitat.

Migratory Bird Treaty

Title 16, United States Code, sections 703 through 711, makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act.

Clean Water Act

Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26), requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity which may result in a discharge into a California water body, including wetlands, must request state certification that the proposed activity will not violate state and federal water quality standards.

Fish and Wildlife Coordination Act

Title 16, United States Code, section 661, requires all federal agencies to coordinate with the USFWS in the preservation of fish and wildlife implementing federal actions.

STATE

California Endangered Species Act of 1984

Fish and Game Code, sections 2050 through 2098, protects California's rare, threatened, and endangered species.

California Code of Regulations (CCR)

Title 14, sections 670.2 and 670.5, lists the plants and animals of California that are declared rare, threatened, or endangered.

Fully Protected Species

Fish and Game Code, sections 3511, 4700, 5050, and 5515, designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations Title 14, section 670.7).

Nest or Eggs

Fish and Game Code section 3503 and 3503.3, protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.

Migratory Birds

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

California Environmental Quality Act (CEQA)

California Public Resources Code section 15380, CEQA, defines rare species more broadly than the definitions for species listed under the state and federal Endangered Species Acts. Under section 15830, rare species that meet the criteria for listing but are not otherwise protected (e.g., through state and federal listing) receive additional consideration. Included in this category are many plants considered rare by the California Native Plant Society and some animals on CDFG's Special Animals list.

California Public Resource Code 21000 et seq., regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by the CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.

Streambed Alteration Agreement

Fish and Game Code sections 1600 et seq., regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by the CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.

Native Plant Protection Act of 1977

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

California Species Preservation Act of 1970

California Fish and Game Code 900-903, requires the protection and enhancement of birds, mammals, fish, amphibians, and reptiles of California.

California Public Resources Code

Section 25523(a); 20 CCR Sections 1752, 1752.2, 2300-2309, and Chapter 2, Subchapter 5 Article I Appendix B Part (i), require the California Energy Commission to protect environmental quality with comment from the CDFG on rare or endangered species.

LOCAL

Green Element of the City of Anaheim General Plan

City of Anaheim Planning Department is to ensure that proposed development projects demonstrate a high degree of compatibility with any listed species and sensitive biological resources, creation of open spaces to beautify city, and reduce locally generated emissions by improving construction management practices (CoA 2007a).

SETTING

REGIONAL SETTING

The City of Anaheim is located on the coastal plain of the Los Angeles Basin, a broad alluvial plain situated between the Transverse and Peninsular Ranges. The Los Angeles Basin is surrounded by the Santa Monica Mountains on the north, the Puente Hills and Whittier Fault on the east, the Santa Ana Mountains and San Joaquin Hills to the south, and Palos Verde Peninsula and Pacific Ocean on the west. The project region is traversed by Carbon Creek Channel approximately 1,500 feet to the north, Anaheim Lake approximately 1,375 feet to the north-east, the Orange County Water District Kraemer Basin Groundwater Recharge Facility approximately 600 feet to the north-east, and the Santa Ana River approximately one mile to the south. The Santa Ana River is concrete lined in the area of the project region. Historically, the Los Angeles Basin native habitat included native woodlands, coastal scrubs, chaparrals, and grasslands that have since been replaced by non-native vegetation or urban development.

LOCAL

The City of Anaheim contains a mixture of industrial, commercial, light agriculture, residential districts, and entertainment parks. The City of Anaheim is bordered on the north by the City of Placentia, and on the south by the Santa Ana River Corridor, the City of Orange and an unincorporated area of Orange County. The CPP project area has two major freeways nearby. Highway 57 runs north-south approximately one mile to the west, and Highway 91 runs east-west approximately one mile to the south. The proposed power plant site is located at 3071 East Miraloma Avenue, with the closest intersection at East Miraloma and North Kraemer Boulevard to the east of the project site, in Anaheim, California. The CPP site is surrounded by industrial and commercial development with two residences, a school, and recreational area within a half mile. The CPP project site is located within a City of Anaheim designated industrial zone.

Any special status plant or animal species once associated with the natural habitats historically available in the CPP project area have been eliminated by extensive urbanization.

PROJECT SITE AND VICINITY DESCRIPTION

The proposed CPP site would be located on approximately 10 acres of industrial land that is currently paved in concrete and asphalt, with a small area unpaved where houses were removed. The site is bordered by East Miraloma Avenue to the south, and industrial areas to the north, west, and east. The principal use for the site previously was for a food catering business with a fleet of approximately 75-100 trucks. All onsite structures previously used for the food catering fleet would be demolished prior to construction of the CPP project.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff reviews the best scientific and factual data available for a project to make a determination of whether a project would have a significant effect on biological resources. The biological significance is based primarily on the habitat characteristics of the particular project site. Disturbance on a “brownfield” or developed site may not be significant due to lack of biological resources, but construction on a “greenfield” or undeveloped site may result in significant impacts due to the higher likelihood of biological resources within the area.

Significant impacts to biological resources would occur if special status species are likely to be impacted by construction or operation of the proposed project. Special status species include:

- state- or federally-listed species,
- state Fully Protected species,
- candidates for state or federal listing, and/or
- Species of Special Concern.

Other potential impacts staff considers to be significant include:

- interruption of species migration;
- reduction of native fish, wildlife and plant habitat;
- causing a fish or wildlife population to drop below self-sustaining levels; and
- disturbance of wetlands, marshes, riparian areas, or other wildlife habitat.

Harassment of a protected species regardless of whether or not loss of habitat or reduction in population occurs, and substantial degradation of the quality of the environment or environmental effects that are individually limited, but cumulatively considerable, would also be considered significant. Table 1 lists the special status biological resources known to occur in the general area of the project.

DIRECT AND INDIRECT IMPACTS AND MITIGATION

Direct impacts result at the same time and place as the project. Indirect impacts are caused by the project, but can occur later in time or farther removed in distance and are still reasonably foreseeable and related to the project.

Projects in developed sites typically have less of an impact on sensitive biological resources because they lack suitable habitat on site. However, such projects are evaluated for the impacts they could have on surrounding areas that remain in natural conditions and support sensitive biological resources.

BIOLOGICAL RESOURCES Table 1
Special Status Species Potentially Occurring in CPP Project Area

Plants	**Scientific Name**	**Status***
Chaparral sand-verbena	*Abronia villosa* var. *aurita*	__/__/1.B1
Braunton's milk-vetch	*Astragalus brauntonii*	FE/__/1B.1
Thread-leaved brodiaea	*Brodiaea filifolia*	FT/SE/1B.1
San Fernando Valley spineflower	*Chorizanthe parryi* var. *fernandina*	FC/SE/1B.1
Southern tarplant	*Centromadia parryi* ssp. *australis*	__/__/1B.1
Santa Ana River wollystar	*Eriastrum densifolium* ssp. *sanctorum*	FE/SE/1B.1
Fish		
Santa Ana sucker	*Catostomus santaanae*	FT/CSC
Santa Ana speckled dace	*Rhinichythys osculus* ssp. 3	__/CSC
Crustaceans		
San Diego fairy shrimp	*Branchinecta sandiegoensis*	FE/__
Riverside fairy shrimp	*Streotocephalus woottoni*	FE/__
Amphibians		
Arroyo toad	*Bufo californicus*	FE/CSC
Reptiles		
Southwestern pond turtle	*Actinemys marmorata pallida*	__/CSC
Orange-throated whiptail	*Aspidoscelis hyperythra*	__/CSC
Coast (San Diego) horned lizard	*Phrynosoma coronatum*	__/CSC
Coast patch-nosed snake	*Salvadora hexalepis virgultea*	__/CSC
Birds		
Cooper's hawk	*Accipiter cooperi*	__/CSC
Southern California rufous-crowned sparrow	*Aimophila ruficeps canescens*	__/CSC
Bell's sage sparrow	*Amphispiza belli belli*	__/CSC
Golden eagle	*Aquila chrysaetos*	__/CSC
Long-eared owl	*Asio otus*	__CSC
Burrowing owl	*Athene cunicularia*	__/CSC
Coastal cactus wren	*Campylorhynchus brunneicapillus sandigensis*	__/CSC
Western snowy plover	*Charadrius alexandrinus nivosus*	FT/CSC
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FC/SE
Southwestern willow flycatcher	*Empidonax traillii extimus*	FE/SE
Yellow-breasted chat	*Icteria virens*	__/CSC
Belding's savannah sparrow	*Passerculus sandwichensis beldingi*	_/SE
Coastal California gnatcatcher	*Polioptila californica californica*	FT/CSC
Light-footed clapper rail	*Rallus longirostris levipes*	FE/SE
Least Bell's vireo	*Vireo bellii pusillus*	FE/SE
Mammals		
Western mastiff bat	*Eumopos perotis californicus*	__/CSC
Pacific pocket mouse	*Perognathus longimembris pacificus*	FE/CSC
American badger	*Taxidea taxus*	__/CSC

***-Status Legend** (Federal/State/California Native Plant Society (CNPS) lists, CNPS list is for plants only):
FE = Federally listed Endangered; **FT** = Federally listed Threatened; **FC** = Candidate Species for Listing; **SE** = State-listed Endangered; **ST** = State-listed Threatened; **CSC =** California Species of Concern; **List 1B** = Rare or Endangered in California and elsewhere; **.1 =** Very endangered in California; __ = not listed in that category. (Sources: VPP 2006a; CDFG 2007a, 2007b; CNPS 2007).

Construction Impacts and Mitigation

Construction Laydown, Parking Area, and Power Plant Site

The construction laydown, parking area and power plant site would occupy the fenced 10-acre site of the proposed power plant. During staff's site visit on April 24, 2008, the area contained mostly paved areas with buildings and light poles with the exception of part of the laydown area. Previously the site had two houses on the southwest portion of the property which have since been removed, leaving an area with exposed soil and weeds. Only ruderal and weedy plants occurred within fence line in both the soil exposed and paved areas. Historically, sensitive plant species like chapparal sand-verbena (*Abronia villosa* var. *aurita*), Braunton's milk-vetch (*Astragalus brauntonii*), San Fernando Valley spinflower (*Chorizanthe parryi* var. *fernandina*), and Santa Ana River wollystar (*Eriastrum densifolium* ssp. *sanctorum*) were found in the region.

Sensitive wildlife species, like the burrowing owl (*Athene cunicularia*), have been known to occupy urban areas. However, it is highly unlikely that burrowing owls would be found on the CPP site because there is no suitable habitat on the construction laydown and parking areas or the power plant site, and no burrowing owls were found during surveys of the plant site. The area in which the project would be located historically contained several sensitive wildlife species including the Santa Ana sucker (*Catostomus santaanae*), Riverside fairy shrimp (*Streotocephalus woottoni*), coast (San Diego) horned lizard (*Phrynosoma coronatum*), western snowy plover (*Charadrius alexandrines nivosus*), southwestern willow flycatcher (*Empidonax traillii extimus*), coastal California gnatcatcher (*Polioptila californica californica*), and the Pacific pocket mouse (*Perognathus longimembris pacificus*). No habitat for these wildlife species currently exists on site. Informal consultation with USFWS and CDFG concluded that the CPP would not impact federally or state listed species or their designated critical habitat if the project remains as described in the AFC. Therefore, staff concludes that there would not be a significant impact to any sensitive biological resources on site.

Transmission Line

The project proposes to build an onsite 69 kilovolt (kV) switchyard to connect with existing offsite transmission lines. The project would install two offsite 100-foot lines underground to the south side of East Miraloma Avenue to connect with the overhead 69-kV Vermont-Yorba lines using two new transition structures. The project would install two more underground lines to the east. These lines would run east 4,000 feet on East Miraloma Avenue, turn south on North Miller Street and run for 3,000 feet and connect to the Dowling-Yorba 69-kV line at East La Palma Avenue. The applicant has stated that the land disturbance for these transmission line connections would be only 0.489 acres (CofA 2007a).

The transmission lines running to the east would be installed using a jack and bore drilling technique under the Carbon Creek Channel on East Miraloma Avenue for approximately 100-feet (G&B 2008d). The drilling under Carbon Creek Channel would be necessary to install the transmission lines underground for the entire route because buried transmission lines are less susceptible to loss of energy over the transmission. The CPP stated in Data Responses 8-BIO, 9-BIO, and 10-BIO that the jack and bore drilling would commence in the East Miraloma Avenue median strip between the opposite lanes of traffic (G&B 2008d). The applicant proposes a biological monitor be onsite during the drilling of the two sending pits and two receiving pits (G&B 2008d). The biological monitor would visually inspect the drill path, monitor the water body for evidence of release, examine the drilling fluids pressures and return flows, approve drilling/boring setup locations, and verify the perimeter of the work site is adequately flagged prior to equipment setup to prevent impacts to Carbon Creek Channel (G&B 2008d). If any of the boring operations lead to frac-out or the fluid pressures and return flows drop, the biological monitor would order all equipment shut down (G&B 2008d). Frac-out occurs when the drilling fluid inadvertently escapes and moves up through the soil into the creek. Avoidance of a frac-out is important to avoid impacts to the creek channel. During the Data Response workshop on June 13, 2008, the drilling fluid was described as a bentonite slurry with low silica content and non-toxic (DRIRW 2008a). All excess drilling fluids, slurry, and soil cuttings at the sending and receiving pits would be recycled or removed from site. Any boring fluids, contaminated soils, and excess material would be removed offsite and appropriately disposed of according to local, state, and federal regulatory agencies (G&B 2008d). Please see the ***Soil and Water Resources*** section for staff's proposed Condition of Certification **SOIL&WATER-2** which recommends the development and implementation of a frac-out plan.

Due to the proposed jack and bore drilling operations under Carbon Creek Channel at the East Miraloma Ave crossing, both the USACE and the CDFG were consulted because both agencies review and issue permits dealing with impacts to waterways and wetlands. USACE issues permits in association with the Clean Water Act (Sections 401 and 404) and CDFG issues permits for streambed and bank alterations (Sections 1600-1616, referred to as Streambed Alteration Agreements). The applicant provided documentation from the USACE demonstrating that the USACE would not need to issue any permits for the jack and bore drilling operation (G&B 2008d).

Staff also discussed the project with CDFG on July 2, 2008, after CDFG staff visited the site on June 30, 2008. CDFG has determined and informed the applicant that they would not need to file a Section 1600 Streambed Alteration Agreement application for streambed alterations.

Above-ground transmission lines are known to be a collision and/or electrocution threat to birds. The threat of collision and/or electrocution is greater when the transmission line is on a migratory pathway or adjacent to a water body in which there might be large flocks of birds. Due to the project using underground transmission lines, staff has concluded that the transmission lines would not cause a significant impact to biological resources with implementation of staff's proposed Conditions of Certification **BIO-1** and **BIO-2** to address potential concerns related to a frac-out during transmission line construction.

Pipelines

The natural gas supply pipeline would be constructed in paved roadways for 580 feet east on East Miraloma Avenue to North Kraemer Boulevard where it would travel north 2,600 feet to East Orangethorpe Avenue where there is a Southern California Gas Company line. The total land disturbance according to the applicant would be only 0.219 acres. North Kraemer Boulevard crosses Carbon Creek Channel and the applicant proposes to embed the gas pipeline into the roadway to avoid impacts to the creek according to a conversation with Larry Davis and Suzanne Wilson, City of Anaheim staff, at the site visit on April 24, 2008 (CofA Staff 2008a). This change in the project from the proposal in the AFC would not require a Streambed Alteration Agreement with CDFG because the pipeline will be in the roadbed rather than under the creek.

The new sewer pipeline installed onsite would be combined with process water discharge into the Orange County Sanitation District through a sewer connection located on East Miraloma Avenue. The domestic waste water would flow into the main wastewater lift station for eventual transfer to the sanitary sewer system. The pipeline would be approximately 75 feet long.

The water supply pipeline would convey recycled water from Orange County Groundwater Replenishment System (OCGWRS). The 14-inch pipeline would be constructed in paved roadways for 1,850 feet east on East Miraloma Avenue to the new offsite booster pump station located north of the curb in the City owned easement of East Miraloma Avenue. From the pumping station the line would travel north 210 feet in a new easement from the Orange County Water District and then 125 feet east in the new easement to the OCGWRS line of the western side of the Carbon Creek Channel where it would connect to the 60-inch diameter OCGWRS recycled water line. The CPP has stated that the entire land disturbance for the water supply pipeline would be only 0.246 acres (CofA 2007a).

Since all pipelines would be constructed in currently disturbed areas without biological resources, staff concludes impacts would be less than significant.

Light

The project site and adjacent areas were not found to have any sensitive species that could be impacted by additional lighting from the CPP. A slight increase in light and glare is expected to occur during construction of the power plant. Lights can disorient migratory birds flying at night or attract wildlife such as insects and insect-eaters in some cases. The CPP plans to use maximum illumination of work areas onsite with minimum effects to offsite areas by shielding lighting onsite (CofA 2007a). This project is located within an industrial area in which there is already night lighting that biological resources are acclimated to within the area, so staff expects the additional light from CPP would not affect any local wildlife.

Noise

During the field surveys and site visits, no sensitive species were found on the project site that would be impacted by additional noise during construction of the CPP. The applicant states that there would be an additional increase in the noise level in the area, but it would not exceed 65 dBA (CofA 2007a). The proposed CPP project is located within a highly developed area and there are no sensitive wildlife receptors present in the project area or nearby. Staff therefore concludes that there would not be significant impacts to biological resources due to the increase in noise during construction.

Habitat Compensation

Projects constructed on “greenfield” sites, or undeveloped sites, typically result in significant impacts to biological resources that are mitigated through habitat compensation. Due to the CPP site being a “brownfield” site, or developed site, no habitat compensation would be required of the CPP since the onsite and offsite construction activities would take place in industrial areas. The 0.489 acres for the transmission line, the 0.219 for the natural gas pipeline, and the 0.246 acres for the water supply pipeline would all occur in the industrial area surrounding the project site. There are no sensitive habitats or species within the project site or linear facilities and therefore no habitat compensation would be required.

Operation Impacts and Mitigation

Potential operation impacts include those to birds due to collision with and/or electrocution by the transmission lines and disturbance to wildlife due to increased operation noise and lighting.

Transmission lines, exhaust stacks, and other structures are known to be bird collision hazards which could lead to bird mortality. Birds could collide with the transmission lines or power plant structures, and transmission lines could electrocute birds with large wingspans. With the proposed project, staff does not believe there would be significant impacts to birds from collision or electrocution due to the lack of large concentrations of birds in the immediate area and because the new transmission lines would be buried.

Noise and lighting impacts due to operation of the CPP are not expected to be significant because there are no sensitive species known on the project site or nearby. The plant operations would create additional noise, but the CPP site is located in an industrial area and therefore already has a steady level of noise. Due to the lack of natural habitats, it is likely that any resident animals in the area have previously habituated to the continual, routine noise and lighting conditions of the area. Therefore, staff concludes the impacts to biological resources would not be significant.

Stormwater and Wastewater Impacts

Stormwater drainage from the proposed project could contain pollutants that would affect the water quality in the area. This project proposes to convey stormwater overland by sheet flow and collect in a network of catch basins (CofA 2007a). The stormwater that comes into contact with plant equipment would be sent through an underground piping system and treatment device to remove the sedimentation, coarse materials, and oil from the water before entering an underground percolation vault (CofA 2007a). Other stormwater would not require treatment and therefore would flow directly into the underground vault for percolation back into the soil (CofA 2007a). Staff concludes that there would be no significant impacts to biological resources associated with the discharge of the stormwater during operation. Please see the ***Soil and Water Resources*** section of this staff analysis for more detailed information on stormwater discharge and associated permitting requirements.

CUMULATIVE IMPACTS

A project could result in a significant 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, other current projects, and probable future projects (Cal. Code Regs., Title 14, Section 15130).

The proposed CPP site would not significantly affect biological resources and therefore would not contribute to any cumulative impact concerns. The CPP would only affect previously developed land in an industrial area without significant biological resources nearby; therefore staff concludes that the CPP would not cause significant cumulative impacts to biological resources.

COMPLIANCE WITH LORS

Due to the long term industrial use of the site and lack of biological resources, the need for further consultation with resource agencies is not necessary (CofA 2007a). The proposed CPP project would not be located adjacent to any riparian habitat or sensitive natural communities that exist in the region. Within or immediately adjacent to the proposed CPP area, there are no federally protected wetlands, including vernal pools or marsh habitats. Due to the highly developed industrial area the CPP project site and adjacent areas are located in, they do not act as significant wildlife corridors or conflict with any local policies or ordinances for protection of biological resources. The proposed CPP project does not conflict with provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or state habitat conservation plan because there are no applicable HCP’s or NCCP’s for this area (USFWS 2008a). On the CPP site, there are no biological resources of commercial or recreational value. Since staff does not anticipate any impacts to biological resources, the project would be in compliance with all federal, state, and local LORS during construction and operation.

NOTEWORTHY PUBLIC BENEFITS

Biological resources staff concludes the public benefit of the CPP project is that only existing industrial land will be developed and there would not be any significant impacts to sensitive habitats or species if the project is constructed with the proposed condition of certification.

CONCLUSIONS

The applicant has stated that the proposed project would avoid all construction and operation impacts to biological resources by choosing a location that currently contains no biological resources and is not located near any natural habitat areas. Staff concludes that impacts to biological resources during construction and operation would not occur provided that the conditions of certification are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

Staff proposes the following Biological Resources Condition of Certification:

JACK AND BORE DRILLING BEST MANAGEMENT PRACTICES

BIO-1 During construction using jack and bore drilling techniques a Biological Monitor must be present at all times. The Biological Monitor must be allowed to monitor all activities pertaining to drilling under Carbon Creek Channel, including but not limited to:

A. visually inspect the drill path,

B. monitor the creek for evidence of frac-out or drilling fluid release,

C. examining the drilling fluid pressures and return flows,

D. approval of the drilling setup locations,

E. verifying the perimeter of the work site is adequately flagged proper to equipment setup, and

F. having the authority to halt any drilling if the operations lead to frac-out or the drilling fluid pressures and return flows drop.

Verification: The Biological Monitor must notify the Compliance Project Manager (CPM) and California Department of Fish and Game (CDFG) (no later than the following morning of the incident, or Monday morning in the case of a weekend) in the event of frac-out. The CPM and CDFG must also be notified of any non-compliance or a halt of any jack and bore drilling operations. The project owner shall notify the CPM and CDFG 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.

REFERENCES

CDFG (California Department of Fish and Game). Personal communication between Naeem Siddiqui and Laurel Cordonnier on July 2, 2008 regarding the proposed transmission line jack and bore drilling.

CofA2007a – City of Anaheim/S. Sciortino (tn: 43903). City of Anaheim's Canyon Power Plant Application for Certification Volume I & II. Submitted to CEC/Docket Unit on December 27, 2007.

CofA Staff 2008a – City of Anaheim Staff Lawrence Davis and Suzanne Wilson. Personal communication between Lawrence Davis, Suzanne Wilson, and Laurel Cordonnier during site visit on April 24, 2008.

DRIRW (Data Response and Issues Resolution Workshop) 2008a. Communication with City of Anaheim regarding further questions about the Data Responses on June 13, 2008.

G&B 2008d – GB/M. Cosens (tn: 46614). Data Responses to Data Requests 1-55. Submitted to CEC/Docket Unit on June 6, 2008.

USFWS (United States Fish and Wildlife Service) 2008a. Personal communication by electronic mail between Laurel Cordonnier and Jonathan Snyder on March 17, 2008.

ACRONYMS LIST

AFC	Application for Certification
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CPM	Compliance Project Manager
CPP	Canyon Power Plant
HCP	Habitat Conservation Plan
LORS	Laws Ordinances Regulations and Standards
NCCP	Natural Community Conservation Plan
OCGWRS	Orange County Ground Water Replenishment System
RWQCB	Regional Water Quality Control Board
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

CULTURAL RESOURCES

Testimony of Beverly E. Bastian and Michael D. McGuirt

SUMMARY OF CONCLUSIONS

California Energy Commission staff's cultural resources analysis has determined that the proposed Canyon Power Plant (CPP) project would have no impact on known California Register of Historical Resources-eligible archaeological resources, ethnographic resources, built-environment resources, historic districts, or cultural landscapes in the project's construction areas. With the adoption of cultural resources Conditions of Certification **CUL-1** through **CUL-7**, the CPP project would have no significant impact on as-yet-unidentified buried archaeological deposits. Additionally, with the adoption and implementation of these conditions, the project would be in conformity with all applicable laws, ordinances, regulations, and standards (LORS). Staff therefore recommends that the Commission adopt **CUL-1** through **CUL-7**.

INTRODUCTION

This cultural resources assessment identifies the potential impacts of the CPP project on cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, and historic districts. Three kinds of cultural resources, classified by their origins, are considered in this assessment: prehistoric, ethnographic, and historic.

Prehistoric archaeological resources are associated with the human occupation and use of California prior to prolonged European contact. 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 12,000 years ago and extended through the eighteenth century until 1769, when the first Europeans settled in California.

Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. They may include traditional resource collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and structures.

Historic-period resources, both archaeological and architectural, are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Groupings of historic-period resources are also recognized as historic districts and as historic vernacular landscapes. Under federal and state historic preservation law, cultural resources must be at least 50 years old to have the potential to be of sufficient historical importance to merit consideration of eligibility for listing in the California Register of Historical Resources (CRHR). A resource less than 50 years of age must be of exceptional historical importance to be considered for listing.

For the CPP project, staff provides an overview of the environmental setting and history of the project's vicinity, an inventory of the cultural resources identified in the project vicinity, and an analysis of the potential impacts to cultural resources from the proposed project using criteria from the California Environmental Quality Act (CEQA).

If cultural resources are identified, staff determines which are historically significant (defined as eligible for the CRHR) and whether the CPP would have a significant impact on those that are CRHR eligible. Staff's primary concern is to ensure that all potentially CRHR-eligible cultural resources are identified, that all potential CPP impacts to those resources are identified and assessed, and that conditions are proposed that ensure that all significant impacts that cannot be avoided are mitigated to a less-than-significant level.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the Energy Commission are reviewed to ensure compliance with all applicable laws. For this project, which has no federal involvement,[1] the applicable laws are primarily state laws. 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 in California are also 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 5097.98 (b) and (e)	Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the NAHC-identified Most Likely Descendents (MLDs) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location not subject to further disturbance.
Health and Safety Code, section 7050.5	Makes it a misdemeanor to disturb or remove human remains found outside a cemetery; also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
County of Orange General Plan, 2005	County areas sensitive for historical, archaeological, and paleontological resources are identified; CEQA evaluation of cultural resources is required.
County of Orange Codified Ordinances	Protection policies for historical, archaeological, and paleontological resources in the county.
City of Anaheim Municipal Code	Prescribes the treatment of cultural resources in the City of Anaheim; defines the boundaries of the Anaheim Colony Historic District; requires specific plans to consider properties of historical value.

SETTING

Information provided regarding the setting of the proposed project places it in its geographical and geological context and specifies the technical description of the project. Additionally, the prehistoric, ethnographic, and historical background provides the context for the evaluation of the CRHR eligibility of any identified cultural resources within staff's area of analysis for this project.

REGIONAL SETTING

The proposed project is in the lower Santa Ana River watershed, located in the Los Angeles Basin, at the northern end of the Peninsular Ranges Geomorphic Province. The basin's boundaries are the Santa Monica Mountains on the north, the Puente Hills and the Whittier Fault on the east, the Santa Ana Mountains and the San Juan Hills on the south, and the Palos Verde Peninsula and Pacific coastline on the west (CofA2007a, pp. 6.3-3–6.3-4). The site is on an alluvial plain, associated with either (or both) young alluvial fan deposits from the nearby uplands or alluvial terrace deposits of the Santa Ana River (CofA2007a, pp. 6.3-11–6.3-12). The site (and the entire area) is underlain by 1.0–2.5 feet of fill and 2,000 feet of native, unconsolidated sand, silt, and gravel deposits (CofA2007a, p. 6.3-4). Along the Santa Ana River, these deposits historically were mined for construction materials, leaving three abandoned pits near the proposed project site that now serve as groundwater recharge basins (CofA2007a, p. 6.3-12). The proposed project site is at an elevation of 218 feet above mean sea level, sloping gradually to the southwest (CofA2007a, p. 3-3–4).

SITE, VICINITY, AND PROJECT DESCRIPTION

The proposed CPP project site is located at 3071 Miraloma Avenue, in the City of Anaheim, Orange County. The site consists of 10 acres of previously developed land, mostly paved with asphalt and concrete. From the 1930s to the 1960s, the site was part of an orange grove (AMEC 2007, p. 2). At the time of the submission of the AFC, buildings were present on the site that formerly housed a mobile food catering service and maintenance facilities for the associated vehicles. The large food service building is of tilt-up concrete construction and dates to 1967 (JRP 2007, p. 15). Three residential structures formerly occupied the southwest corner of the site, but these were demolished prior to submission of the AFC.

The vicinity of the proposed project is an industrial park, occupied by warehouses and light industry. Most of the buildings are tilt-up concrete construction, dating to the 1960s and 1970s (JRP 2007, p. 15).

The proposed project is a nominal 200-MW, simple-cycle, peaker power plant, which would take up the eastern half of the proposed project site, and which would consist of four natural gas-fired GE LM 6000PC Sprint gas turbines and their auxiliary equipment. A laydown area would occupy approximately the western half of the proposed project site (CofA2007a, pp. 3-1–3-2; p. 3-47).

Additionally the project includes off-site linear facilities consisting of (CofA2007a, pp. 3-2; 3-22; 3-50; Brock 2008):

- a new, 3,240-foot-long, 12-inch, natural gas underground pipeline running east on East Miraloma Avenue to Kraemer Boulevard, then north on Kraemer Boulevard to East Orangethorpe Avenue to connect into SoCal Gas Company's (SCGC) natural gas transmission pipeline L-1218;
- a new, 2,185-foot-long, 14-inch, recycled water pipeline, running from the proposed project site to the Orange County groundwater replenishment system (GWRS) on the southeastern side of Kraemer Basin, near the Carbon Canyon Diversion Channel, where a new off-site recycled water booster pump station would also be installed;
- four new underground 69-kV transmission lines running from the on-site switchyard under nearby streets to connect with two existing 69-kV overhead transmission lines, with two new lines running 100 feet to connect to the Vermont-Yorba line and the other two new lines running a total of 7,000 feet to connect to the Dowling-Yorba line;
- fiber optic cable for the supervisory control and data acquisition (SCADA) system running in a common trench with the two 7,000-foot, 69-kV underground transmission lines, to tie into existing underground fiber optic cable; and

- two 10-inch pipelines, each 75 feet long, running from the proposed project site to a COA-owned 14-inch pipeline running along East Miraloma Avenue, to provide potable water, fire water, and a back-up process water supply; and
- a 6-in sewer pipeline, 40 feet long, running from the proposed project site to the Orange County Sanitation District wastewater pipeline running along East Miraloma Avenue, to dispose of both sanitary and process wastewater.

Prehistoric Setting

Human Occupation in Southern California

The earliest generally accepted evidence for the human occupation of the North American continent dates to the geological epoch known as the Late Pleistocene, about 10,000 years BC. The evidence occurs primarily in the form of large, very skillfully made stone spear points, sometimes in association with the bones 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 (megafauna), such as mammoths and giant bison. Archaeologists believe that California did not have the Big Game Hunting Tradition, although its characteristic fluted projectile points have been found all over the state (scantily in Southern California). Rather, 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 when the glaciers of the Pleistocene era retreated and the warmer and drier climate of the succeeding geological era, the Holocene, caused major environmental changes, including a rise in sea level along the coast, desiccation of the formerly plentiful inland lakes, and extinction of megafauna (Moratto 1984, pp. 78–81; Byrd and Raab 2007, p. 215).

Early Holocene Cultures (9600 to 5600 BC)

For the Early Holocene epoch, previous archaeological interpretations had characterized a prevailing, region-wide hunting tradition in Southern California, known as the Western Pluvial Lakes Tradition, as follows: site locations on or near shorelines of bodies of fresh water; economy based on hunting a variety of animals and birds and on gathering shellfish and vegetal products; the absence of ground-stone artifacts (indicating no use of hard seeds as food); distinctive percussion-flaked stone artifacts; and a diverse stone toolkit. Gradually, archaeologists thought, people carrying this tradition spread to the coast where they increasingly exploited marine foods in the later part of this period (Moratto 1984, pp. 90–103; Byrd and Raab 2007, p. 218).

Moratto sums up the primary cultural-historical developments of the Early Holocene era in Southern California, listing several trends: increasing regional specialization, increasing technological diversification, increasing population, increasing sedentism, and intensification of use of plant resources (Moratto 1984, p. 113, Table 3.10).

In the Los Angeles area, human skeletal remains and faunal remains evidencing butchering have produced radiocarbon (C^{14}) dates corresponding to this early period. A partial skeleton of a young woman was recovered from one of the La Brea tar pits, located about 35 miles northwest of the proposed CPP project site. Bones impregnated with tar do not produce reliable C^{14} dates, but the “Brea Maid’s” bones were decontaminated and dated, resulting in a date of 7,000 ± 80 years BC (Moratto 1984, pp. 53–54). The tar pits have also yielded six long bones from extinct megafauna (lion, sabertooth cat, and bison) that have what appear to be butchering cut marks, and three of the bones also have what may be drilled holes. One of the bones was radiocarbon-dated to 13,200 ± 800 years BC. Moratto concludes that this is plausible evidence for the presence of humans at Rancho La Brea some 15,000 years ago, if the C^{14} date can be accepted (1984, p. 54). This evidence for the presence of humans in the Los Angeles area in the Early Holocene period suggests the possibility of additional important buried archaeological remains being encountered anywhere in the region, including the proposed CPP project site.

A more recent archaeological interpretation of this period, based on several subsequent decades of field work, identifies the earliest occupation sites in Southern California as located on the coast and on the Southern Channel Islands, where evidence of some of the earliest sea-faring (in wooden seagoing canoes) in North America has been found. Rather than being a later development, this very early adaptation to the exclusive use of maritime food resources, such as seals, sea lions, dolphins, and shellfish, has caused archaeologists to re-think their concept of technological developments in California prehistory (Byrd and Raab 2007, pp. 219, 226).

Middle Holocene Cultures (5600 to 1650 BC)

After 5000 BC, the present climate and environment were established in California. Previous archaeological interpretations saw Native Americans in Middle Holocene Southern California refining their exploitative abilities by developing their technology and adapting to the seasonal availability of a wide variety of local food sources through a mobile lifestyle that required no substantial houses or permanent villages. One of the key technological developments of this era was the millingstone, which was a rock slab or shallow basin shaped by painstaking grinding with a smaller rock and used to process hard seeds into meal. Along with millingstones, important developments in this era in Southern California were: the appearance of many large shell midden sites on the bays and estuaries of what are now San Diego and Orange Counties; the wide regional distribution of shell beads; and the introduction of pottery and clay figurines. These developments were thought to signal the greater exploitation of marine resources on the coast, the greater exploitation of vegetal food sources throughout the region, and the development of a regional trading network (Moratto 1984, pp. 147–153).

While the coastal shell middens, known as the La Jolla Culture, were the archaeological type site for the Middle Holocene period, archaeologists also identified two variants which co-existed with the shell midden sites during this time period: the Pauma Culture and the Sayles Culture, known from inland sites. Archaeologists characterize the three collectively as “Millingstone” cultures because sites of all three evidence extensive use of millingstones, an indication of dependence on vegetal food sources. Comparisons of sites of the three cultures suggest a basic similarity in subsistence among them, with variations reflecting adaptation to particular local resources, with shellfish remains being absent at Pauma and Sayles sites.

After several thousand years of unchanging coastal subsistence based on shellfish, nuts, and grasses, the end of the Middle Holocene period, as recognized previously by archaeologists, came as a result of estuarine silting, which reduced the availability of the essential shellfish. As the use of littoral resources decreased, archaeologists believed the use of inland resources, particularly acorns, increased, resulting in a shift in site locations from the coast to interior uplands in the Late Holocene period (Byrd and Raab 2007, pp. 219–220).

A more recent archaeological interpretation of the Middle Holocene, based on several subsequent decades of field work, in part contradicts and in part refines key aspects of the earlier interpretation. Paleoenvironmental studies have shown that estuarine silting was not uniform along the entire Southern California coast, and archaeologists have excavated at coastal sites evidencing continuous occupation well up into the Late Holocene (Byrd and Raab 2007, p. 220). Shell bead studies have shown the Middle Holocene trade network was considerably more extensive than previously suspected, across the entire Southern California region, and north through the Great Basin as far as what is now southeastern Oregon (Byrd and Raab 2007, pp. 220–221). Finally, excavations at Middle Holocene sites in the Southern Channel Islands have revealed substantial houses framed with whale ribs, situated in what appears to be a permanent village, possibly occupied year-round. These structures may be the earliest known residential structures in the state (Byrd and Raab 2007, pp. 221–222).

Late Holocene Cultures (1650 BC to AD 1769)

Previous archaeological interpretations of this period in Southern California identify it as the developmental time for the Native American groups and lifeways that Euro-Americans encountered and described. These interpretations recognized three gradual changes: increasing social complexity in adaptation to a stable, resource-rich environment; assimilation of the technology and practices of Northern and Central California Native American groups; and immigration to the coastal area by Native American groups from the eastern interior (Moratto 1984, p. 153; Byrd and Raab 2007, p. 222). The most important new practice introduced from Northern and Central California into Southern California was the technology of processing acorns for food, in particular ground-stone mortars and pestles. Another new practice introduced in this period was cremation of the dead, probably adopted from Native American groups to the east. The use of the bow and arrow and of pottery emerged during this period, as well.

To explain these changes, archaeologists pointed to linguistic evidence, which suggested that, beginning around 500 BC at the latest, newcomers emigrated from the Great Basin area to the coast between northern San Diego County and southern Los Angeles County. The migrants displaced the resident groups but rapidly adopted the local technology and economic practices. The descendants of the migrants include the Luiseños, Gabrielinos, and Nicoleños. The migrants' displaced neighbors to the north were probably the ancestors of the Chumash, and to the south, the ancestors of the Diegueños (Moratto 1984, pp. 156, 164–165).

A more recent archaeological interpretation of the Late Holocene, based on several subsequent decades of field work, again, in part contradicts and in part refines key aspects of the earlier interpretation. Instead of environmental stability and an adaptive balance between the population and the food resources, the new interpretation sees a trend toward overexploitation of high-value food species resulting in intensified use of less-productive food species and less foraging efficiency over time. A related change in settlement pattern occurred in the Late Holocene, in which three linked kinds of sites were arrayed over a group's territory: large, permanent residential bases, short-term, satellite, residential camps, and specialized-activity sites, facilitating the necessary intensified use of lesser-value foods. A related change in social complexity is posited, brought about by the need for structured decision-making and labor assignment, resulting in the emergence of differing social statuses within a group. A possibly causal factor is implied by paleoenvironmental data, which indicate that periods of drought and other environmental stresses may have required rapid adaptation and could have played a role in all of these changes (Byrd and Raab 2007, pp. 224–225). The newer interpretation additionally explains the Late Holocene immigration of Great Basin newcomers into Southern California as the continuation and expansion of the linkages between the two areas forged in the Middle Holocene via the shell bead trade network (Byrd and Raab 2007, p. 221).

Ethnographic Setting

The proposed project's construction areas are in territory formerly occupied by the Native American group known to the Spanish as the Gabrielino (from their previous association with the Mission San Gabriel Arcángel), but their present-day descendants prefer to be called Tongva. Gabrielino[2] territory included the watersheds of the Los Angeles, San Gabriel, and Santa Ana Rivers, the four southern Channel Islands, the Los Angeles Basin, and the coast from Topanga Creek to Aliso Creek. A Gabrielino population figure has been suggested by an estimate of some 50-100 mainland villages inhabited simultaneously by an average of 50-100 persons at the time of European contact (Bean and Smith 1978, pp. 538–540).

Because few Gabrielino culture-bearers survived into the twentieth century to leave a record of their society, only a sketchy outline can be suggested. They were patrilineal, with each lineage having a chief who inherited the office but had to have the approval and cooperation of his (chiefs were usually male) followers. Status in the society depended on both wealth and birth. Intergroup relations included diplomacy, trade, and war, all directed by the chief. Their material culture can be more fully described. The Gabrielino utilized a wide variety of both marine and terrestrial sources of food and materials. Their technology included the bow and arrow, spears, clubs, fish hooks and line, fish nets, basketry fish traps for use in rivers, harpoons, and ocean-going boats constructed of lashed planks and made waterproof with the asphaltum from natural seeps in the area (for example, the La Brea tar pits). The Gabrielino used these boats to take pelagic fish, to hunt sea mammals, and to settle the southernmost Channel Islands. They also gathered shellfish in the littoral zone and a wide range of plants from their inland territory for food and raw materials. The best-known Gabrielino material culture items were utilitarian or ornamental objects made from steatite. Santa Catalina Island was the source for this material, and both the finished objects and the raw

[2] "Gabrielino" is used here because the sources consulted and cited are twentieth-century ethnographers, and that is the term they use.

material were widely traded by the Gabrielino to other Native American groups in the southern California region (Bean and Smith 1978, pp. 542–543).

The project's construction areas are also located near the traditional territory of the Juaneño, or the Acjachemen, as some descendents prefer to be known. The name "Juaneño" was given by the Spanish to those Native Americans who were brought into the Mission San Juan Capistrano from the surrounding area. Similarly, "Luiseño" was the Spanish name for the Native Americans who came to be associated with the Mission San Luis Rey. Anthropologists and linguistics specialists consider the Juaneño and the Luiseño to be one ethnic nationality, which they call Luiseño (Bean and Shipek 1978, p. 550). Population estimates for the Luiseño vary from 5,000 to 10,000 persons at the time of first European contact in 1769 (Bean and Shipek 1978, p. 557).

The traditional territory of the Luiseño was located to the south of that of the Gabrielino and included coastal, inland, and mountain areas. Villages owned specific territories whose boundaries were marked and which residents used communally at the discretion of the hereditary chief. Within the village territory, some resource areas were privately owned and used exclusively by household groups. Material goods, including houses, were privately owned. Property ownership was an important concept to the Juaneño, and trespass could be a cause for war or severe punishment (Bean and Shipek 1978, p. 551).

Men were the primary hunters, going out as individuals and in groups. Meat sources included deer, antelope, a variety of small land mammals, game birds, sea mammals, shellfish, and mountain trout. Women were the primary gatherers of plant foods, including many kinds of grass seeds, prickly pear, pine nuts, yucca buds and pods, and the seeds of the chia, sunflower, and manzanita, but the principal plant food source was the acorn, six species of which were used (Bean and Shipek 1978, pp. 552, 555).

Conical houses were constructed in shallow excavated basins and thatched with reeds, brush, or bark. Villages were permanent and consisted of a clan tribelet, a group of related people who owned an area communally and were politically and economically autonomous. In addition to houses, a village usually had a sweathouse and a ceremonial structure enclosed by circular fencing. Villages were usually located in sheltered coves or canyons, near a water supply, and with defensibility considered. Their neighbors were wary of the Luiseño because of their propensity to expand their territory through warfare. Their political organization reflected this in putting war leadership duties in the hands of the chief and in institutionalizing an initiated warrior class. The chief also had economic and religious powers, which he wielded with the assistance of a council of hereditary shamans and ritual specialists, each of whom had special knowledge about the environment or ritual magic (Bean and Shipek 1978, pp. 550, 551, 553, 555).

Historic Setting

Spanish explorers and priests reached the area that would become Los Angeles in 1769. Priests established Mission San Gabriel Arcángel, southeast of what is now Pasadena, in 1771, and the Mission San Juan Capistrano in 1775. Three other missions and a mission station were also established within the territories of the Gabrielino and

Luiseño: Mission San Fernando Rey de España (founded 1797), Mission San Luís Rey de Francia (founded 1798), and the Asistencia de San Bernardino (founded 1830, near the current town of Pala) (Smith 1995). The missions introduced and converted the Gabrielino and Luiseño to Catholicism and to European lifeways and settled the Christianized Indians (called neophytes) on lands near the missions. The missions also introduced the Gabrielino and Luiseño to European diseases, to which they had no natural immunities, with the result that their numbers were greatly reduced.

Unlike the policy of the priests at Mission San Gabriel, where the Gabrielino neophytes were forced to live in mission housing and to depend entirely on the mission for their subsistence, the priests at Mission San Juan Capistrano allowed the Luiseño neophytes to continue their pre-contact settlement pattern in villages and their pre-contact subsistence modes, to which were added agriculture (wheat, corn, orchards), irrigation, and animal husbandry (Bean and Shipek 1978, p. 558).

The mission system started to decline in 1833, when the Mexican government decreed that the Indians were emancipated. In 1835 the missions were confiscated by the Mexican government, and mission lands, which were vast and encompassed the traditional territories of many California tribes, were then broken up and granted to private Mexican citizens for use as cattle ranches. The secularization of Mission San Gabriel and the disposition of its lands forced the remaining Gabrielino from the life they had led as neophytes at the mission and deprived them of the territory which they needed to return to their ancestral way of life. They scattered and joined other groups up and down the coast and in the interior, resulting in the loss of much of the traditional Gabrielino culture (Bean and Smith 1978, p. 541). The disposition of Mission San Juan Capistrano lands also displaced many Luiseño, but some of their villages became Mexican pueblos, and a few Luiseño individuals obtained land grants from the Mexican government. Traditional Luiseño culture was sustained in these enclaves (Bean and Shipek 1978, pp. 551, 561).

Later forces—including the discovery of gold, California statehood, and the influx of the great numbers of Americans, Europeans, Asians, and others who came to the new state as a result of these developments—accelerated the decline in Native American population and the loss of traditional lifeways for all Native Americans in California.

The Mexican land grant in which the proposed CPP project site is located was the 35,790-acre grant made to Juan Pacifico Ontiveros in 1837, called Rancho San Juan Cajon de Santa Ana. In September, 1857, Ontiveros sold a 1,165-acre parcel of this rancho to the Los Angeles Vineyard Society (City of Anaheim, 2007). This parcel included a 32-foot-wide strip of land running from Rancho San Juan Cajon de Santa Ana across Bernardo Yorba's Rancho San Antonio to the Santa Ana River, purchased by Ontiveros from Yorba for an irrigation ditch (AHS 2005). Another 3,900 acres of the rancho, which Ontiveros had deeded to his son and daughter-in-law, was purchased by Ontiveros' son-in-law, Augustus Langenberger, an Anaheim merchant, in 1864. By 1873, the rest of the Rancho San Juan Cajon de Santa Ana was added to the vast land holdings of the estate of the eminent Los Angeles merchant and rancher, Abel Stearns (CofA2007a, pp. 6.7-12–6.7-13). No evidence has been found of use of the proposed CPP project site for anything but cattle grazing during the rancho period.

The Los Angeles Vineyard Society (LAVS) was organized in San Francisco by a group of German immigrants in February, 1857. It had two purposes—founding a cooperative vineyard in Los Angeles and founding a German colony. The four founders had all come to the United States in the aftermath of the German Revolution of 1848, and all shared the revolution's political philosophy of utopian and humanitarian socialism. The business prospects of viticulture in the burgeoning but under-supplied California wine market of the 1850s, however, dominated the men's political idealism when they met to plan the venture in 1855. Two of the founders, John Frohling and Charles Kohler, were already making wine in Los Angeles to supply their wineshop in San Francisco. The third, Otto Weyse, was the editor of a newspaper, *The San Francisco Democrat*, and the fourth, George Hansen, was a lawyer, civil engineer, and land surveyor who had served as a Los Angeles County Deputy Supervisor for six years and knew Southern California well. To Hansen the LAVS entrusted the task of choosing and purchasing land for the colony (Carosso 1949, pp. 80–82; AHS 2005).

Forty-six Germans, most of them residents of San Francisco, purchased the fifty initial shares of the LAVS in the summer of 1857, with each share entitled to a 20-acre agricultural plot and a town-site for a home. Hansen laid out the central 40 acres of the colony lands as town lots, with some lots set aside for schools, churches, and other public uses, and with a European-style central plaza. Hansen aligned the colony's grid system to maximize water flow through the irrigation system he designed, which depended on a six-mile-long channel excavated from the colony to the Santa Ana River along the route originally planned by Juan Pacifico Ontiveros. The channel, eight feet wide and 2–3 feet deep, was a large investment in labor—it took six months in 1857-58 for Hansen's Indian, Mexican, and Chilean laborers to excavate it—but it was crucial to the colony's future success (Carosso 1949, pp. 82–83; CofA2007a, p. 6.7-14).

In January, 1858, the LAVS shareholders chose the name, "Annaheim" (later shortened to Anaheim), for their colony, combining "Anna," for the Santa Ana River, and "heim," German for "home." In 1858, Hansen turned his laborers to planting vines. Within a year, each of the 50 agricultural plots had eight acres of Mission grapes growing on it. The first colonists arrived in September, 1859 (Carosso 1949, pp. 81–82; CofA2007a, p. 6.7-14; AHS 2005).

The continuing high labor costs of the venture and its failure to pay any dividends caused the cooperative to disband, but the settlement continued. The agricultural plots and town lots were distributed by a random drawing held in San Francisco in September, 1859. The common property of the LAVS was sold to the Anaheim Water Company, which was incorporated on November 10, 1859. George Hansen was its first president, and each holder of 50 shares of the LAVS held 50 shares in the water company, although the water shares could not be transferred separately from the land. Soon more land was acquired by the community, bringing the total to 3,200 acres in 1868. The population of Anaheim at about that time was 1,200 (Carosso 1949, pp. 84–85; City of Anaheim, 2007; CofA2007a, p. 6.7-15).

Anaheim's first vintage was in 1861 and totaled 70,000 gallons (Carosso 1949, p. 85). By 1884, annual production of Anaheim's 50 wineries totaled more than one million gallons. Between 1884 and 1889, Anaheim's grape industry was destroyed by Pierce's Disease, a bacterium spread by leafhopper insects, that blighted and killed the vines.

Anaheim farmers experimented over the next several years with various crops before fixing on Valencia oranges and other citrus as a replacement for grapes, sparking the next era in Anaheim's agricultural boom (City of Anaheim, 2007).

Anaheim's infrastructure also developed as its agricultural economy grew. The Southern Pacific railroad reached Anaheim in 1875. Anaheim's thrifty civic leaders began a municipally-owned water department in 1879, consisting of a shallow well, a steam-driven pump, and a 20,000-gallon redwood tank. Orange County separated from Los Angeles County in 1889, and although Anaheim lobbied to be the new county seat, that honor went instead to the town of Santa Ana (CofA2007a, p. 6.7-16). In 1895, Anaheim opened the first municipally-owned electric utility in Southern California, which was powered by steam until 1916. The City of Anaheim continues today to provide highly economical water and electrical service to the city's residents and businesses (City of Anaheim, 2007; AHS 2005).

Between 1908 and 1911, canning, soda, and sugar factories were opened in Anaheim. In the 1920s, Anaheim sought to attract additional industry to the town through the outreach of the Anaheim Industrial Land Development Company. A group of Anaheim's business leaders privately purchased 40 acres of vacant land northeast of La Palma Avenue and Los Angeles Street (now Anaheim Boulevard) and sold the property at reduced prices to industries willing to relocate. Later increased to 416 acres, this area became the core of the Anaheim North Central Heavy Industrial District (City of Anaheim, 2007).

As developers began buying up farmland in the 1920s, Anaheim established the first City Planning Commission in Orange County in 1927. In 1928, Anaheim joined 12 other regional cities to create the Metropolitan Water District of Southern California, to assure Anaheim's water supply for the remainder of the century by participating in the plan to bring Colorado River water to Southern California (City of Anaheim, 2007).

The production of oranges grew steadily, even during the Great Depression, reaching a peak in 1938. In that year, heavy rains following a drought caused the Santa Ana River to flood, covering downtown Anaheim and depositing sand on valuable farm land. As a result, the Army Corps of Engineers planned the Prado Dam to control the Santa Ana River and its tributaries, but World War II delayed the funding and construction of the control system. It was 1961 before the Carbon Canyon Creek Diversion Channel, the part of the Santa Ana River control system located in the vicinity of the proposed project, was put in place (JRP 2007, p. 12).

Anaheim's agricultural production was its most important contribution to World War II, but after the war, aware of what wartime industrial development had done for other Southern California communities, Anaheim consciously sought to attract industry. Tactics such as advertisements in *The Wall Street Journal*, a streamlined permitting process, and the arrangement of tours for visiting businessmen worked well for Anaheim, attracting companies like Kwikset and several defense companies, such as Northrop Nortronics, Boeing, and Rockwell International's Autonetics. Autonetics became a major occupant of Northeast Annexation No. 2-A, the area where the proposed CPP project would be located. This area was added to Anaheim in 1956 as part of the city's new annexation policy that enlarged its area from 4.3 square miles in

1954 to 42 square miles by 1980, largely taking in the hill and canyon areas to the east. The Northeast Annexation separated the residential and industrial parts of the city and gave Anaheim more land to offer to industrial developers. Prior to 1950, Anaheim had 27 independent industries, employing 1,400 workers. By 1968, there were 460 industries, with a total of 48,500 workers (City of Anaheim, 2007; JRP 2007, pp. 13–14; CofA2007a, p. 6.7-17).

With the completion of the Interstate 5 freeway in 1953, the direction of Anaheim's economy took a turn toward what has become the mainstay of the city's prosperity today: tourism. The easy access of the freeway to large parcels of undeveloped land in Anaheim brought the Walt Disney company to the city in 1954 with plans to build the nation's first theme park, Disneyland. The park opened live on national television on July 17, 1955. Only three months later, Disneyland counted its one millionth guest (City of Anaheim, 2007). That same year, 61 Anaheim business leaders formed the Anaheim Visitor and Convention Bureau, seeking to increase the city's year-round appeal to tourists. The organization promoted the establishment of hospitality and retail businesses that would attract tourism dollars. The Anaheim Convention Center, which opened in 1967, was one of the Bureau's projects. The construction of Anaheim Stadium and the move of the California Angels to Anaheim in 1966 added Major League baseball to the Anaheim entertainment and recreation mix, which was further enhanced when the Stadium hosted the L.A. Rams in 1980 and two Olympic wrestling events in 1984 (City of Anaheim, 2007).

In 1986, Anaheim's population reached 250,000. In the 1990s, three large ranches in the hill and canyon area were developed as housing. In addition to housing development, Anaheim expanded its involvement in professional sports when the Mighty Ducks became the first major tenant of the newly constructed, city-owned Anaheim Arena (later called the Arrowhead Pond and more recently, the Honda Center) in 1993 (City of Anaheim, 2007).

Attuned to enhancing its appeal as a tourist destination, Anaheim celebrated its own history. In 1995, Anaheim Public Utilities commemorated its 100th year of service, and in 1997, the City Council designated the area bounded by North, South, East and West Streets, the initial Anaheim colony settlement, as the Anaheim Colony Historic District, recognizing its significant historic, architectural, cultural, and aesthetic value to the city. With the new millennium, Anaheim continued to recognize its history. In 2002, the Anaheim Public Library marked 100 years of service. Anaheim added two additional historic districts: the Five Points Historic District was created in 2004, and the Historic Palm District was created in 2006. Also in 2004, Anaheim's Water Utility operation celebrated its 125th anniversary. In 2005, Disneyland held an 18-month-long celebration to mark its 50th anniversary, drawing greater numbers of visitors to the city (City of Anaheim, 2007).

Many civic improvements also came with the new millennium. In 2001, the Anaheim Convention Center was renovated to become the largest convention center on the West Coast. That same year, the Disneyland Resort added Downtown Disney, the Grand Californian Hotel, and Disney's California Adventure. In 2002, Anaheim Stadium was renamed Angel Stadium of Anaheim. That same year, Anaheim implemented a $500 million Capital Improvement Program, including parks, street improvements, water and electric improvements, new commercial entertainment venues, and downtown revitalization. In 2003, the Anaheim City Council re-zoned the Platinum Triangle, an 800-acre area surrounding the stadium and arena, envisioned as the new "downtown of Orange County," to allow for mixed-use development. In May 2004, the City Council approved an updated General Plan and Zoning Code, intended to implement Anaheim's vision for all future growth and development. Anaheim partnered with EarthLink Municipal Networks to install the first and largest citywide Wi-Fi system in the United States in 2006 (City of Anaheim, 2007).

On October 5, 2006, 149 years after the land was deeded to the original settlers of Anaheim Colony, the city kicked off a 15-month-long celebration of its 150th Anniversary, commemorated with a large slate of activities and more than a dozen major capital improvement projects (City of Anaheim, 2007).

CULTURAL RESOURCES INVENTORY

A project-specific cultural resources inventory is a necessary step in staff's effort to determine whether the proposed project may cause significant impacts to historically significant cultural resources and would therefore, under CEQA, have an adverse effect on the environment.

The development of a cultural resources inventory entails working through a sequence of investigatory phases. Generally the research process proceeds from the known to the unknown. These phases typically involve doing background research to identify known cultural resources, conducting fieldwork to collect requisite primary data on not-yet-identified cultural resources in the vicinity of the proposed project, assessing the results of any geotechnical studies or environmental assessments completed for the proposed project site, and compiling recommendations or determinations of historical significance (see "Determining the Historical Significance of Cultural Resources," below) for any cultural resources that are identified.

This subsection describes the research methods used by the City of Anaheim (COA) and Energy Commission staff for each phase, including literature and records searches (California Historical Resources Information System and local records), Native American consultation, and field investigations. Staff also provides the results of this research in descriptions of each identified cultural resource, its historical significance, and the basis for its significance evaluation. Assessments of the project's impacts on historically significant cultural resources, potential impacts on previously unidentified, buried archaeological resources, and proposed mitigation measures for all significant impacts are presented in a separate subsection, "Direct/Indirect Impacts and Mitigation," below.

Staff's Project Area of Analysis

The inventorying of cultural resources within what staff defines as the appropriate area for the analysis of a project's potential impacts is the first step in the assessment of whether the proposed project may cause a significant impact to an important cultural resource and therefore have an adverse effect on the environment. The area that staff considers when identifying and assessing impacts to historical resources, called the "project area of analysis," is usually defined as the area within and surrounding the project site and associated linear facility corridors. This area is sufficiently large to facilitate considerations of archaeological, ethnographic, and built-environment resources.

- For archaeological resources, the area of analysis is minimally defined as the project site footprint, plus a buffer of 200 feet, and the project linear facilities routes, plus 50 feet to either side of the routes. For its archaeological area of analysis, staff has used the above surface parameters but has added 24 feet in depth in the power block area on the plant site, 26 feet in depth for the area of the jack-and-bore tunnel under the Diversion Channel, and six feet in depth along the off-site routes of the underground linear facilities.
- For ethnographic resources, the area of analysis may be expanded to take into account traditional use areas and traditional cultural properties which may be far-ranging, including views that contribute to the historical significance of the properties. The Native American Heritage Commission (NAHC) assists project cultural resources consultants and staff in identifying these resources, and consultation with Native Americans and other ethnic or community groups may contribute to defining the area of analysis. For the CPP, staff identified no ethnographic resources (see "Native American Consultation" subsection, below) and so defined no area of analysis for them.
- For built-environment resources, the area of analysis is minimally defined as one parcel deep from the project site footprint in urban areas, but in rural areas is expanded to include a 0.5-mile buffer from the project site and above-ground linear facilities to encompass resources whose setting could be adversely affected by industrial development. Staff's built-environment area of analysis corresponds to the urban definition here.
- For a historic district or a cultural landscape, staff defines the area of analysis based on the particulars of each siting case. For the CPP, staff defined no area of analysis for a cultural landscape.

As used by staff in this document, the term "construction areas" means the footprints of the several project components, including the plant site, the laydown area(s), and the several linear facility corridors, plus any new access roads and any borrow and disposal sites.

Determining the Historical Significance of Cultural Resources

CEQA requires the Energy Commission, as a lead agency, to evaluate the historical significance of cultural resources by determining whether they meet several sets of specified criteria. Under CEQA, the definition of a historically significant cultural resource is that it is eligible for listing in the CRHR, and such a cultural resource is referred to as a "historical resource, which is 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, subdivision (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, subd. (a)). The term, "historical resource," therefore, identifies a cultural resource that is historically significant, which equates to being eligible for the CRHR.

Consequently, under the CEQA Guidelines, to be historically significant, a cultural resource must meet the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the National Register of Historical Places (NRHP). In addition to being at least 50 years old,[3] a resource must meet at least one (and may meet more than one) of the following four criteria (Pub. Resources Code, § 5024.1):

- Criterion 1, is associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion 2, is associated with the lives of persons significant in our past;
- Criterion 3, embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values; or
- Criterion 4, has yielded, or may be likely to yield, information important to history or prehistory.

Historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (Cal. Code Regs., tit. 14, § 4852, subd. (c)).

Additionally, cultural resources listed in or formally determined eligible for the NRHP and California Registered Historical Landmarks numbered No. 770, and up, are automatically listed in the CRHR and are therefore also historical resources (Pub. Resources Code, § 5024.1, subd. (d)). Even if a cultural resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows a lead agency to make a determination as to whether it is a historical resource (Pub. Resources Code, § 21084.1).

The assessment of potentially significant impacts to historical resources and the mitigation that may be required of a proposed project to ameliorate any such impacts depend on CRHR-eligibility evaluations.

Literature and Records Searches

CHRIS Records Search

The California Historical Resources Information System, or CHRIS, is a federation of 11 independent cultural resources data repositories governed by the California State Office of Historic Preservation. These centers are located around the state, and each holds information about the cultural resources of several surrounding counties. Qualified cultural resources specialists obtain data on known resources from these centers and in turn submit new data from their ongoing research to the centers.

[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 potential five-year lag in the planning process.

Methods

On August 23, 2007, Laurie Solis, URS Project Archaeologist and consultant to the COA, requested a CHRIS records search from the South Central Coastal Information Center (SCCIC) at California State University, Fullerton (CofA2007a, p. 6.3-19). The requested search was to identify all recorded cultural resources located on or within a 1.0-mile radius of the boundaries of the 10-acre, proposed CPP project site, including:

- previously recorded prehistoric and historical archaeological sites;
- previously recorded historic built-environment resources;
- resources listed on the CRHR; and
- resources listed on the NRHP.

A local records search was also done in connection with a field evaluation of the potential CRHR eligibility of three vacant and deteriorated residences (3053 East Miraloma, 3065 East Miraloma, and 3065A East Miraloma), located near the southwest corner of the proposed CPP project site and slated for demolition. Jeremy Hollins of URS, a qualified architectural historian and consultant to the COA, carried out background research on-line and in the Orange County Assessor's Office, in the Bureau of Land Management land patent records, in the maps, files, and city directories in the Anaheim Heritage Reading Room of the Anaheim Muzeo, and in the Orange County Archives (Solis and Hollins 2007, pp. 7-1–7-4).

A further review of local historical records was done for a potentially CRHR-eligible historic architectural resource, 3233 East Miraloma. The URS Corporation subcontracted with JRP Historical Consulting, LLC, to research, evaluate, and record this residence that appeared to be older than 45 years and that was located adjacent to the CPP's underground transmission line, the recycled water pipeline, and the recycled water pump station (JRP 2007, p. i; Solis 2007 p. 5-5). JRP associate Cheryl Brookshear, a qualified architectural historian, reviewed inventories of known historic architectural resources in or just adjacent to the proposed CPP impact areas. She consulted the NRHP on-line database and the California State Office of Historic Preservation's listing of California Historical Landmarks and California Points of Historical Interest. To see if any local historical organizations had recognized as CRHR-eligible any built-environment resources in the project vicinity, she contacted the Orange County Planning Department, the Orange County Historical Society, and the City of Anaheim Historic Preservation Department. She also conducted background research at the following: California State Library, Sacramento; the Shields Library, University of California, Davis; the Orange County Archives; the University of California, Irvine, and the Local History Room of the Fullerton Public Library (JRP 2007, pp. 4–5).

Results

The COA CHRIS records search at the SCCIC returned information on four known prehistoric archaeological sites, two known historical archaeological sites, and three known historic-period built-environment resources located within a 1.0-mile radius of the proposed CPP project site. The SCCIC records search found no NRHP-listed resources, CRHR-listed resources, California Historical Landmarks, or California Points of Historical Interest in that same area. The SCCIC identified reports from five prior cultural resources studies covering parts of that area. These resources and reports will be discussed below.

At the request of Ms. Brookshear, Mike Sands, the Neighborhood Preservation Coordinator for the COA Historic Preservation Department, searched the department's files and found no previously recognized historical resources. Mr. Sands, however, identified nine buildings earmarked for future evaluation. Among them was 3233 East Miraloma, the residence to be evaluated by Ms. Brookshear, which will be discussed below.

While the other eight structures identified by Mr. Sands are all located within a mile of the proposed CPP project, no further information on them is available at this time (JRP 2007, p. 4). Through use of the "Street View" feature of Google Maps, staff was able to tentatively identify what kind of building each of these was, and this identification is included in Cultural Resources Table 4, below.

Previous Pedestrian Archaeological Surveys

The COA CHRIS records search identified reports from five prior cultural resources studies covering parts of the area within a 1.0-mile radius of the proposed CPP site. These studies dated from 1994 to 2002 and were conducted for proposed development projects. Two of these studies were pertinent to the CPP project, with one of them, Padon 1998, covering part of the route of the proposed CPP project's underground transmission line, and the other, McKenna, et al., 2002, including the entire route of the proposed natural gas pipeline and parts of the routes of the proposed CPP project's off-site linear facilities (Solis 2007, p. 5-5).

Padon 1998, Methods

The Padon study, relevant to the proposed CPP's transmission line, was a 1998 review of archived cultural resources information in the impact area of the Orange County Water District's Groundwater Replenishment System. The impact area covered 5,000 acres along both sides of 13 miles of the Santa Ana River (Padon 1998, p. 5), which in the vicinity of the proposed CPP project included only the Carbon Canyon Creek Diversion Channel and the Santa Ana River floodplain southwest of where the Diversion Channel joins the river. This review covered the Diversion Channel where the proposed CPP underground transmission line would intersect it at East Miraloma Avenue.

Padon 1998, Results

The study identified a Native American burial (site CA-OR-517) 0.8 miles from the proposed project site and three prehistoric food processing sites (CA-OR-428, CA-OR-429, and CA-OR-430) about a mile from the proposed project site (Padon 1998, p. 15; Solis 2007, p. 5-5). The study concluded that the riverine area had a high potential for significant prehistoric and historic remains (Padon 1998, p. 2). These sites are discussed below.

McKenna, et al., 2002, Methods

The McKenna, et al., 2002 study was for a CALTRANS repaving project that necessitated the cultural resources pedestrian survey of Kraemer Avenue between Orangethorpe and East Miraloma. This survey included the entire route of the CPP's proposed natural gas pipeline.

McKenna, et al., 2002, Results

No archaeological deposits or potentially historic built-environment resources were identified, but the survey coverage was inclusive of only the right-of-way, consisting of the paved street (McKenna, et al., 2002).

Previous Windshield or Intensive Built-Environment Surveys

Another of the CHRIS-identified, prior cultural resources studies covering parts of the area within a 1.0-mile radius of the proposed CPP site, Conkling, et al., 1994, included a survey of built-environment resources.

Conkling, et al., 1994, Methods

This was a study of a large area in northeast Anaheim slated for redevelopment. This 1994 assessment study surveyed five vacant lots (none of them near proposed CPP project construction areas) for archaeological deposits and assessed 42 potentially historic buildings that had been identified in an earlier phase of cultural resources identification for the redevelopment project. Among the 42 potentially historic buildings were the three houses, since demolished, at the southwest corner of the proposed CPP project site (3053 East Miraloma, 3065 East Miraloma, and 3065A East Miraloma), and a fourth house (3233 East Miraloma), which is extant, located adjacent to the proposed underground transmission line, the recycled water pipeline, and the recycled water pump station.

Conkling, et al., 1994, Results

None of these houses was assessed for CRHR eligibility because in 1994 they were not 100 years old, the CEQA threshold for potential CRHR eligibility at that time (Conkling, et al., 1994, pp. 2, 6). These four resources will be discussed below.

Native American Consultation

Methods

On August 20, 2007, Ms. Solis sent a letter asking the Native American Heritage Commission (NAHC) to search its Sacred Lands File for any Native American traditional cultural properties. She also asked for a list of Native Americans who had heritage ties to Orange County and wanted to be informed about new development projects there. The NAHC responded on August 23, 2007, providing contact information for six Native Americans.

Ms. Solis sent certified letters, dated September 5 and September 27, 2007, to these six persons, describing the proposed CPP project and requesting information on known cultural resources that could be affected by the project. On November 14, 2007, Ms. Solis made follow-up telephone calls to two persons affiliated with the Juaneño Band of Mission Indians (CofA2007a, pp. 6.3-18–6.3-19; G&B 2008a).

On March 19, 2008, Energy Commission staff also requested from the NAHC a list of Native Americans interested in development in Orange County, and on that same day, staff received a list of 12 contacts from the NAHC. Staff then sent letters informing the 12 Native American individuals or groups about the proposed CPP project on March 24, 2008.

Results

The NAHC reported to the COA on August 23, 2007, that the search of its Sacred Lands File had not resulted in the identification of any known Native American heritage sites (G&B 2008a).

On November 14, 2007, in a telephone call, Mr. Alfred Cruz, the Cultural Resources Coordinator and designated Most Likely Descendent (MLD) for the Juaneño Band of Mission Indians Band, informed Ms. Solis that there might be a number of sites in the vicinity of the project and asked that he be contacted to examine any prehistoric archaeological finds made during project construction. In the other telephone call, Ms. Sonia Johnston, the Tribal Vice Chairperson of the Juaneño Band, stated that she knew of no Native American sacred or archaeological sites within or adjacent to the project's construction areas, but asked that Mr. Alfred Cruz be contacted if any prehistoric archaeological finds are made during project construction (CofA2007a, pp. 6.3-18–6.3-19; G&B 2008a).

Staff received no responses from the 12 Native Americans to whom informational letters regarding the proposed CPP project were sent.

Geoarchaeological Literature Summary

To establish a more factual basis for proposing mitigation measures for potential project impacts to potentially CRHR-eligible resources, staff asked the COA to provide geoarchaeological information about the proposed project site.

Geoarchaeology is a subfield of archaeology that uses the concepts and methods of the earth sciences to conduct archaeological research. The broader goal of geoarchaeology is to firmly establish the most basic elements of archaeological interpretation, which are the physical contexts of archaeological sites and the human material residues that are a part of them, in order to understand the structure of archaeological deposits and their origins and development. Geoarchaeology typically draws on a suite of concepts and methods from geomorphology (the study of landform development and history), stratigraphy (the study of the character and age of sequences of geologic deposits), pedology (the study of soils and soil development), and sedimentology (the study of the composition, character, and age of geologic sediments). For many proposed projects, a geoarchaeological investigation is essential to the analysis of their potential impacts on buried prehistoric archaeological deposits because such an investigation provides a factual assessment of the likelihood that such deposits may be present and establishes the likely character of any such deposits.

Geoarchaeology can provide factual evidence about the potential presence of subsurface archaeological resources, either through the data in published geoarchaeological or Quaternary science studies identifying the age and origins of the soils and sediments at a proposed project's site, and/or through the acquisition of new data obtained by excavating through the soils and sediments of a project's site and identifying their age through various dating techniques and their origins through examination of their physical characteristics. A geoarchaeology field study offers an actual subsurface window into a proposed project site's third dimension and a time scale for the soils and sediments there. Thus it provides a greater assurance of identifying the extent of a project's potential impacts to potentially CRHR-eligible buried archaeological resources.

The primary purpose of a geoarchaeological investigation is not to locate archaeological deposits, but rather to assess the likelihood that such deposits may lie buried in the portions of a proposed project's location that will be subject to ground disturbance. A geoarchaeological field investigation seeks to identify and date buried soils (paleosols) that may at one time have been a ground surface on which prehistoric peoples could have left remains of their activities. Such paleosols, if found, may extend across the entire project site and can therefore become the object of focused archaeological monitoring during project-related ground disturbance. If the paleosols lie deeper than any project excavations except those for the power block, archaeological monitoring could be limited to just that area and to only the depth of the paleosols.

Geoarchaeology has its limits. Its use is not justified on all project sites. For example, on a proposed project site where it is known that all native soils and sediments were stripped to bedrock and replaced with fill, geoarchaeology would be pointless. For less disturbed sites, geoarchaeology can be most useful in establishing that no ancient ground surface underlies a project site above the greatest depth to which the project proposes to excavate. Establishing this informs staff that no likelihood exists that prehistoric archaeological deposits will be encountered during project-related ground disturbance. Geoarchaeology cannot with such certainty inform staff that prehistoric archaeological deposits will be present on a proposed project site, but if a geoarchaeological study identifies a buried ground surface less than 14,000 years old—the most commonly accepted span of time that humans have lived in the Western Hemisphere—that is 100 percent more information than staff would otherwise have and at the very least provides a factual basis on which staff can more precisely formulate contingency mitigation measures, including archaeological monitoring, as CEQA requires.

A geoarchaeological investigation for a proposed project typically involves two stages:

1. A review of maps, aerial photography, and published literature in the fields of archaeology, geomorphology, sedimentology, pedology, stratigraphy, and Quaternary studies pertinent to the area in which a project is proposed; and

2. Field work in the project's construction areas entailing trenches and/or "potholes"[4]excavated to the greatest depth the project would reach, in which the

[4] A pothole is a short trench, approximately 3 meters long, allowing stratigraphy to be observed from outside the trench, but not intended for human entry.

exposed soil and sediment layers are analyzed, recorded, and dated, with the goal of identifying those layers where archaeological deposits would be most likely to occur.

On May 5, 2008, Energy Commission staff requested geoarchaeological information from the COA, providing two options as possible responses—a field study or a literature study (CEC 2008hh, Data Requests 15 and 16). The COA opted for the latter, which staff had specified as a study:

- to identify the geologic landforms on which the construction areas are located; and
- to provide a summary of the known archaeological resources that have been found on those landforms, emphasizing the kinds of buried archaeological deposits that have been found on those landforms, the stratigraphy in, above, and below the deposits, and the depths at which the archaeological deposits occur.

Methods

In undertaking the literature study, Ms. Solis found that published information pertinent to the area in which the CPP is proposed was not available in the fields of geomorphology, sedimentology, pedology, stratigraphy, and Quaternary studies. So she relied on the regional geological information in the AFC and the historical geography information in Padon's 1998 summary of prehistoric sites associated with the Santa Ana River to respond to staff's request (G&B 2008d, Data Responses 15 and 16).

Results

In its June 5, 2008 responses to staff's Data Requests, the COA provided Ms. Solis's general summary of the regional geological setting and of prehistoric sites in the area. This summary will be discussed further below in the "Applicant's Geoarchaeological Field Investigations" subsection.

Field Investigations

Applicant's Pedestrian Archaeological Survey

Most of the proposed CPP construction areas had not previously been surveyed for cultural resources, so the cultural resources consultants for the COA undertook a pedestrian archaeological field survey of the surface of these areas.

Methods

Ms. Solis and Brent Leftwich conducted the pedestrian archaeological field surveys on August 21, 2007, and on October 3, 2007, covering an area equal to the project's footprint plus a 200-foot-wide zone beyond the footprint. They walked a zig-zag pattern across 5-meter transects over the proposed project site and walked along the sidewalks on both sides of the streets where the transmission line and pipelines would be installed. Soils and sediments were exposed for the archaeologists' inspection over some parts of the proposed project site, but only minimally along the linear facility routes, where only the built environment could be observed. Ground visibility was estimated at 0-20 percent. Such soils and sediments as could be observed were noted to be significantly disturbed by erosion, bioturbation, and development (CofA2007a, p. 6.7-23; Solis 2007, pp. 1-8, 6-1).

Results

The COA archaeological field survey of the proposed CPP project site and linear facility routes identified no new archaeological sites, but the ground visibility conditions were not conducive to reaching a definitive conclusion about the presence of archaeological deposits (CofA2007a, p. 6.7-24; Solis 2007, p. 6-1).

Geotechnical Testing

Project designers use geotechnical testing to gather data on the weight-bearing and stability characteristics of the subsurface soils and sediments on project sites and on the depth of the local water table. Testing usually entails the examination of extracted cores and the measurement of soil resistance, friction, and moisture content with a cone penetrometer. The descriptions of subsurface soil and sediment layers in the geotechnical boring logs can provide some information, albeit extremely limited, on soils that are present and that could be of archaeological interest. COA-provided geotechnical data were available only for the proposed CPP main plant site.

Methods

On August 31, 2007, MACTEC Engineering and Consulting (MACTEC) limited their testing to drilling five borings to depths ranging between 30 and 50.5 feet. The five borings were placed in those parts of the proposed main plant site where the foundations for heavy equipment would be constructed (MACTEC 2007, p. 5; fig. 2).

Results

The MACTEC geotechnical study showed artificial fill to a depth of 1.0–2.5 feet from the surface over the entire site, but the report noted that the fill could be deeper in the northern part of the site, where underground tanks, now removed, had formerly been located.[5] Native alluvial sediments were described as variably dense, silty sand and poorly graded sand with some isolated layers of sandy silt. Boring to 50.5 feet did not reach ground water (MACTEC 2007, pp. 4, 6). The geotechnical boring logs noted no materials that archaeologists associate with human subsistence activities, such as charcoal, shell, or fire-affected clay (MACTEC 2007, figs. A-1.1–A-1.5). Staff, however, cannot be certain that these materials, if present, would have been observed by the geologists or would be routinely included in their descriptions of strata encountered in the borings.

Applicant's Geoarchaeological Field Investigations

With its Data Request 16, staff sought published geoarchaeological information assessing the potential for subsurface prehistoric archaeological deposits at the proposed CPP project site. The COA reported that such published information was not available and provided a general discussion of the regional geological setting and the historical geographic setting (G&B 2008d, Data Response 16). Staff did not find the COA's response to Data Request 16 sufficiently site-specific to meet staff's needs to develop effective mitigation measures to reduce to less than significant the potential

[5] The removal and former location of these tanks is documented in the environmental site assessment studies done for the COA to gauge the extent of soil remediation measures that would be required for the proposed CPP project site (AMEC 2007a; AMEC 2007b; AMEC 2007c; URS 2007a).

CPP impacts on potentially CRHR-eligible buried prehistoric archaeological deposits that might be discovered during construction. Consequently, on July 15, 2008, staff presented new, additional Data Request asking the COA to conduct a geoarchaeological field study at the proposed CPP project site to provide the required site-specific information on the potential for buried prehistoric archaeological deposits (CEC 2008hh, Data Request 56). Between June 8 and June 10, 2009, the COA conducted the geoarchaeological field study, and on June 22, the COA submitted the preliminary results of the study to staff.

Methods

The COA's consultant geoarchaeologist, Jay Rehor, and two assisting archaeologists excavated three 30-meter long, 1-meter-wide trenches and six 3-meter long, 1-meter-wide potholes, using a backhoe equipped with a 36-inch-wide bucket. The planned depth of the longer trenches was to have been 3.8 meters, with aluminum hydraulic speed shoring employed to retain the walls so the geoarchaeologist and archaeologists could enter the trenches to record the stratigraphy. The shoring proved infeasible due to the unconsolidated nature of the encountered sands, from a depth of less than 3 feet down to the greatest depth reached. All available means of retaining vertical walls would have obscured the stratigraphy, so the geoarchaeologist was forced to make his observations from the stable, paved ground surface. The archaeologists sorted through the removed materials, and a sample was set aside and screened for cultural materials through ¼-inch hardware mesh (CofA2009f, pp. 1–2).

Results

No archaeological or other cultural materials were found, nor were paleobotanical specimens encountered. Observation of micro-bedding resulted in identifying characteristic stream channel deposits, including eddy bars, lag deposits, and fluvial dunes, indicative that the project area was "part of an active braided channel belt for much of the middle to late Holocene." No developed paleosols were identified, which is consistent with a dynamic environment in which surfaces were not exposed for sufficient time for soils to develop or where surfaces were consistently eroded away. Mr. Rehor indicated that the evidence suggests that the CPP project site has a low geoarchaeological potential (CofA2009f, pp. 2–3).

Mr. Rehor collected six bulk samples for radiocarbon dating, taken from finer-grained sediments more likely to contain preserved organic content. He obtained three date ranges from upper, middle, and low-lying sediments, but the ranges do not run from oldest to youngest, starting with the deepest, as would be expected. Rather, the date range from the lowest sample is the oldest (7940–7690 Cal BP,[6] taken about 4 meters below the surface), but the date range from the uppermost sample (6280–6000 Cal BP, taken about 1.2 meters below the surface) is older than the date range from the middle sample (23500–2290 Cal BP, taken about 1.7 meters below the surface). Mr. Rehor

[6] "BP" means years before 1950. "Cal" means the dates have been calibrated to compensate for the variation over time in the amount of radiocarbon present in the atmosphere. Calibration results in more accurate and comparable dates.

interprets this anomaly as the result of the Santa Ana River's erosion, transport, and redeposition on the project site of organic material from an older surface (CofA2009f, p. 3).

Applicant's Windshield Survey for Built-Environment Resources

Most of the proposed CPP construction areas had not previously been surveyed for built-environment resources. The cultural resources consultants for the COA undertook the evaluation and recordation of the four known built-environment resources potentially subject to impacts from the CPP.

Methods

The COA's consulting architectural historians carried out a field study of three residences located on the proposed CPP project site and, subsequently, another field study of a residence located along the routes of the proposed CPP linear facilities. The four residences appeared to be 45 years of age or older and consequently were evaluated for potential CRHR eligibility. The several buildings associated with the food service currently extant on the proposed CPP project site (3071 East Miraloma) were constructed no earlier than 1967 and so were not sufficiently old to require an evaluation of their CRHR eligibility (Solis 2007 p. 5-5; Solis and Hollins 2007, pp. 5-7–5-26; JRP 2007; CofA2007a, pp. 6-24–6-26).

Ms. Solis and URS architectural historian Jeremy Hollins (Solis and Hollins 2007, abstract) evaluated the CRHR eligibility of the three residences formerly located near the southwest corner of the proposed CPP project site (3053 East Miraloma, 3065 East Miraloma, and 3065A East Miraloma). Owned by the COA, at the time of the field visit these three vacant and deteriorated residences were slated for demolition as a risk to public health and safety and have since been demolished. On August 23, 2007, Mr. Hollins recorded in some detail the interior and exterior features of the three buildings and completed Department of Parks and Recreation (DPR) 523 "Primary" and "Building Structure, and Object" forms for them, including an evaluation of CRHR eligibility for each (Solis and Hollins 2007, pp. 7-1–7-4; attachments).

Cheryl Brookshear and Rand Herbert of JRP Historical Consulting, LLC, evaluated the CRHR eligibility of the fourth residence (3233 East Miraloma), which is extant. The proposed CPP project's recycled water pipeline and pumping station would be constructed next to the western and northern property lines of this residence, and the CPP underground transmission line would be laid in the street in front of this building. Ms. Brookshear visited the property on September 26-27, 2007, and recorded it on DPR 523 "Primary" and "Building Structure, and Object" forms (JRP 2007, p. 5; Appendix B).

Results

Ms. Solis's and Mr. Hollins's CRHR eligibility evaluation of the three residences (3053 East Miraloma, 3065 East Miraloma, and 3065A East Miraloma) recommended none of them as CRHR-eligible under any of the criteria (Solis and Hollins 2007, p. 5-12). Jeremy Hollins dated the construction of 3053 East Miraloma to 1910, and the construction of the other two houses to 1954. His review of historic maps, however, suggested that these three building were moved to the East Miraloma location from elsewhere in the late 1950s or early 1960s. Mr. Hollins concluded, consequently, that these buildings lacked integrity of location. He also found that they lacked integrity of materials and workmanship due to inappropriate alterations, and lacked integrity of setting and integrity of feeling due to the industrialization of the area (Solis and Hollins 2007 pp. 5-1–5-12).

Ms. Brookshear and Rand Herbert identified the extant residence at 3233 East Miraloma Avenue as having been built in 1935 as a residence associated with a small orange grove, a rural historic landscape once common throughout Orange County. They recommended that the house was not eligible for the CRHR or the NRHP under any of the four CRHR-eligibility criteria. Moreover, because the house was greatly enlarged after the 1938 flood, its integrity of design was compromised (JRP 2007, p. 23; DPR 523 forms).

Summary of CRHR-Eligible Archaeological Resources

Prehistoric Archaeological Resources

The previously identified and newly identified prehistoric archaeological resources located within one mile of the proposed CPP project are listed, and the information concerning them is summarized, in Cultural Resources Table 2. A brief discussion of these resources follows Table 2.

CULTURAL RESOURCES Table 2
Prehistoric Archaeological Resources Located Within One Mile of the Proposed CPP Project

Resource Designation	Type of Resource	CRHR Eligibility	Project Impact
Previously Identified:			
CA-Ora-428	Food processing locus.	Not determined.	None.
CA-Ora-429	Food processing locus.	Not determined.	None.
CA-Ora-430	Food processing locus.	Not determined.	None.
CA-Ora-517	Human burial; found at depth of 5–6 feet during backhoe trenching; no artifacts associated.	Not determined.	None.
Newly Identified: None			

The four known prehistoric archaeological sites located within a 1.0-mile radius of the proposed CPP site included three food processing loci, which featured portable milling stones, and one human burial. None of them was evaluated for eligibility for the CRHR or the NRHP, but their locations at a distance from the proposed CPP project site would prevent them being impacted by the project. These sites do, however, evidence use of the immediate area in prehistory.

The COA archaeological field survey of the proposed CPP project site and linear facility routes identified no new prehistoric archaeological sites (CofA2007a, p. 6.7-24; Solis 2007, p. 6-1).

Historical Archaeological Resources

The previously identified and newly identified historical archaeological resources located within one mile of the proposed CPP project are listed, and the information concerning them is summarized, in Cultural Resources Table 3. A brief discussion of these resources follows Table 3.

CULTURAL RESOURCES Table 3
Historical Archaeological Resources Located Within One Mile of the Proposed CPP Project

Resource Designation	Type of Resource	CRHR Eligibility	Project Impact
Previously Identified:			
P 30-001670, reported in December, 2006	Large, buried refuse deposit; 1930s-1940s; on native soils, covered by seven feet of fill; discovered in trench associated with the Ground Water Replenishment System.	Not determined.	None.
P 30-001671, reported in December, 2006.	Refuse deposit; mid-1940s; no depth or dimensions; identified by artifacts in backdirt of trench associated with the Ground Water Replenishment System.	Not determined.	None.
Newly Identified: None			

The two known historical archaeological sites located within a 1.0-mile radius of the proposed CPP site were both large, buried refuse deposits dating to circa 1940. Neither of them was evaluated for eligibility for the CRHR or the NRHP, but their locations at a distance from the proposed CPP project site would prevent them being impacted by the project. Their presence in the immediate area of the proposed CPP suggests at least one historical archaeological site type that could also be present on the CPP site.

The COA archaeological field survey of the proposed CPP project site and linear facility routes identified no new historical archaeological sites (CofA2007a, p. 6.7-24; Solis 2007, p. 6-1).

Summary of CRHR-Eligible Ethnographic Resources

Unless further communications with Native Americans disclose sites of concern, at this time no CRHR-eligible ethnographic sites have been identified that could be impacted by the construction of the proposed CPP project.

Summary of CRHR-Eligible Built-Environment Resources

The previously identified and newly identified historic-period built-environment resources located within one mile of the proposed CPP project are listed, and the information concerning them is summarized, in Cultural Resources Table 4. A discussion of these resources follows Table 4.

CULTURAL RESOURCES Table 4
Built-Environment Resources Located Within One Mile of the Proposed CPP Project

Resource Designation	Type of Resource	CRHR Eligibility	Information Source	Project Could Impact Physically	Project Could Impact Visually
Previously Identified:					
P 30-176705 220 East Santa Fe Avenue	Placentia Co-operative Orange Association Building; 1930 packinghouse	Not eligible for CRHR due to lack of integrity.	SCCIC	No, too far from project.	No, too far from project.
P 30-176706 100 East Santa Fe Avenue	Bradford Brothers Packinghouse; 1922 packinghouse	Not eligible for CRHR due to lack of integrity.	SCCIC	No, too far from project.	No, too far from project.
P 30-176707 207 A-E Crowther Avenue	Placentia Orange Growers Association Building; 1935 packinghouse	Not eligible for CRHR due to lack of integrity.	SCCIC	No, too far from project.	No, too far from project.
Newly Identified:					

Resource Designation	Type of Resource	CRHR Eligibility	Information Source	Project Could Impact Physically	Project Could Impact Visually
3053 East Miraloma Avenue	Residence; built in 1910; probably moved to this location	Not eligible for CRHR.	COA cultural resources consultant (URS)	No, demolish-ed.	No, demolish -ed.
3065 East Miraloma Avenue	Residence; built in 1954; probably moved to this location	Not eligible for CRHR.	COA cultural resources consultant (URS)	No, demolish-ed.	No, demolish -ed.
3065A East Miraloma Avenue	Residence; built in 1954; probably moved to this location	Not eligible for CRHR.	COA cultural resources consultant (URS)	No, demolish-ed.	No, demolish -ed.
3233 East Miraloma Avenue	Residence; built in 1935	Not eligible for CRHR due to lack of integrity.	COA cultural resources consultant (JRP)	No.	No; altera-tions to setting all under-ground.
2831 East Coronado Street	Residence; no information available.	Not determined.	COA Historic Preservation Department	No.	No, too far from project.
3006 East Coronado Street	Residence; no information available.	Not determined.	COA Historic Preservation Department	No.	No, too far from project.
1373 North Miller Street	Residence; no information available.	Not determined.	COA Historic Preservation Department	No.	No, too far from project.
1401 North Miller Street	Residence; no information available.	Not determined.	COA Historic Preservation Department	No.	No, too far from project.
1397 North Jefferson Street	Commercial; no information available.	Not determined.	COA Historic Preservation Department	No.	No, too far from project.

Resource Designation	Type of Resource	CRHR Eligibility	Information Source	Project Could Impact Physically	Project Could Impact Visually
2983 East Miraloma Avenue	Residence; no information available.	Not determined.	COA Historic Preservation Department	No.	Yes, but resource unlikely to be CRHR-eligible due to degrad-ed integrity of setting.
2901 La Jolla Street	Residence, now part of auto-painting business (?); no information available.	Not determined.	COA Historic Preservation Department	No.	No, too far from project.
2901 La Jolla Street	Commercial (auto-painting shop?); no information available.	Not determined.	COA Historic Preservation Department	No.	No, too far from project.

The SCCIC records search identified three known historic-period built-environment resources (220 East Santa Fe Avenue, 100 East Santa Fe Avenue, and 207 A-E Crowther Avenue) located within a 1.0-mile radius of the proposed CPP project site. All of these were packinghouses associated with Anaheim's orange growing and packing industry (CofA2007a, p. 6.7-23). The recorder of these buildings recommended that they were not eligible for the CRHR or NRHP.

The COA's URS archaeologist and architectural historian assessed three now-demolished houses (3053 East Miraloma, 3065 East Miraloma, and 3065A East Miraloma), and their JRP architectural historian assessed one extant additional house (3233 East Miraloma), all four located less than 0.5 mile from the proposed CPP project. None was recommended as eligible for the CRHR.

The Neighborhood Preservation Coordinator for the COA Historic Preservation Department identified nine buildings earmarked by his department for future evaluation, including 3233 East Miraloma, the residence evaluated by JRP. The other eight structures are all located within a mile of the proposed CPP project, and, through the use of the "Street View" feature of Google Maps, staff was able to tentatively identify what kind of building each of these was (see Cultural Resources Table 4, above), but no recommendations or determinations of CRHR eligibility have been made for these resources.

In summary, there are 15 built-environment resources located within one mile of the proposed CPP project having potential historic interest. Seven resources, known to be 45 years of age or older, and about which some recorded information was obtained, were all recommended by their recorders as not eligible for the CRHR, with which staff agrees, so any impacts from the proposed project on them would not be significant. Additionally, three resources have already been demolished, and three are located at too great a distance from the proposed project to be affected by it. The remaining one, 3233 East Miraloma Avenue, while not CRHR-eligible, would not be significantly affected by the project because the project components adjacent to it would all be installed underground.

Eight additional built-environment resources were identified by the COA Historic Preservation Department as of local historical interest but no information was available on their age or CRHR eligibility. All but one of these eight were located at too great a distance from the proposed CPP project to be subject to any kind of impact from it. The proposed project could have a visual impact on the remaining one of the eight, 2983 East Miraloma Avenue (located about 600 feet west of the project), but this residence, if evaluated, would not be recommended as CRHR-eligible because its integrity of setting and integrity of feeling are already greatly compromised by the commercial and industrial buildings all around it.

Staff considered the potential for identifying a cultural landscape/a historic district inclusive of the proposed CPP construction areas. Area-wide land use that could form the basis for identifying a cultural landscape would be limited to either the previous use for citrus production or the current use for light industry. The former is only sparsely represented now and so could not be a justifiable basis for defining a cultural landscape. The latter land use is relatively recent in this part of Anaheim and so its age does not provide a justifiable basis for defining a cultural landscape, unless it could be demonstrated that this land use was in some way exceptionally significant in local, state, or national history.

Summary of All CRHR-Eligible Resources Subject to CPP Impact

No CRHR-eligible cultural resources on or near the present surface of the project's construction areas that could be significantly impacted by the project-related ground disturbance, construction, or operation of the proposed CPP project were identified through the records of known resources or through the COA's field work.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE OF IMPACTS TO HISTORICAL RESOURCES

Under CEQA, "a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment" (Pub. Resources Code, § 21084.1). Thus, staff analyzes whether a proposed project would cause a substantial adverse change in the significance, that is, the CRHR eligibility, of all historical resources identified in the Cultural Resources Inventory as CRHR-eligible. The significance of an impact depends on:

- The cultural resource impacted;
- The nature of the resource's historical significance;
- How the resource's historical significance is manifested physically and perceptually;
- Appraisals of those aspects of the resource's integrity that figure importantly in the manifestation of the resource's historical significance; and
- How much the impact would change those integrity appraisals.

DIRECT/INDIRECT IMPACTS AND MITIGATION

In the abstract, direct impacts to cultural resources are those associated with project development, and construction. 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 built-environment resources 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 which may result from changed circumstances that result from project activities, such as increased erosion due to site clearance and preparation, or inadvertent damage or outright vandalism to exposed cultural resources due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction causes obsolescence and demolition or creates improved accessibility with consequent vandalism and/or greater weather exposure.

Project-related ground disturbance at a proposed plant site, along proposed linear facilities, and at a proposed laydown area has the potential to directly impact archaeological resources, unidentified at this time. The potential direct, physical impacts of the proposed project 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 historic built-environment resources.

Construction Impacts and Mitigation

CEQA advises a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, and a 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 Regs., tit. 14, §§ 15064.5, subd. (f) and 15126.4, subd. (b)). To identify construction-related impacts to cultural resources that would need to be mitigated, staff first identifies all CRHR-eligible cultural resources (above), since only project impacts to CRHR-eligible cultural resources require mitigation and so must be evaluated to determine if they are substantial and adverse.

Staff identified no known CRHR-eligible archaeological, ethnographic, or built-environment resources that the construction or operation of the proposed CPP would impact. Only the project's potential to adversely impact at-this-time-unidentified buried archaeological resources requires a consideration of the need for contingency mitigation measures.

Identification and Assessment of Direct Impacts on Archaeological Resources and Recommended Mitigation

Construction generally entails the subsurface disturbance of the ground, which can affect archaeological resources that could be CRHR-eligible under Criterion 4: "likely to yield information important in history or prehistory." The proposed CPP construction activities that involve ground disturbance primarily entail foundation excavation for plant equipment and transmission line poles, trench excavation for underground transmission lines and pipelines, and jack-and-bore tunneling under Carbon Canyon Creek Diversion Channel for the underground transmission line. No additional off-site areas, however, would be needed for either borrowing imported dirt or disposing of unsuitable on-site dirt, so ground disturbance would be limited to the proposed project site and the pipeline and underground transmission line routes (CofA2007a, p. 3-39; G&B 2008d, Data Response 11).

Because neither the COA nor staff identified any prehistoric or historical archaeological sites on or near the present surface of the project plant site and linear routes, because contacted Native Americans disclosed no archaeological sites in the area, and because the applicant's geoarchaeological field investigation indicated that prehistoric buried archaeological deposits are unlikely on the project site and adjacent areas, impacts from ground disturbance associated with the proposed CPP project would not affect prehistoric archaeological resources on or below the surface of the project site and adjacent linear routes.

The negative results from the geoarchaeological field investigation, however, do not preclude the possible presence of buried historical archaeological deposits on the plant site. This is the case because historical archaeological deposits of sufficient age to be potentially eligible for the CRHR could post-date the agricultural use of the project site and vicinity, such that these deposits would not be associated with the presence of a recognizable paleosol due to the disruption resulting from plowing. Additionally, the proposed jack-and-bore tunneling under Carbon Canyon Creek Diversion Channel for the underground transmission line, expected to reach a depth of 26 feet (CofA2007a, p. 4-2; G&B 2008d, Data Response 14), would disturb soils and sediments which, because they are located adjacent to a creek and lie deeper than the sediments evaluated on the project site, could be of a different geomorphic character and therefore have a different geoarchaeological potential. Consequently, staff cannot be confident that the negative results of the plant site geoarchaeological investigation extend to this location, and the tunneling disturbance could, therefore, affect as-yet-unidentified buried prehistoric archaeological resources.

Since no known surface archaeological deposits on and adjacent to the plant site were identified, and the COA has provided persuasive geoarchaeological evidence of the probable absence of previously unidentified buried prehistoric deposits on and adjacent to the plant site, staff concludes that the proposed CPP project would not impact either known archaeological deposits or unidentified prehistoric archaeological deposits. However, staff cannot conclude that the CPP project would not impact unknown potentially CRHR-eligible buried historical archaeological deposits on the plant site and buried prehistoric archaeological deposits in the construction area associated with the jack-and-bore tunneling under Carbon Canyon Creek Diversion Channel.

Consequently, in conformity with the CEQA provision cited above, staff recommends the adoption of Conditions of Certification **CUL-1** through **CUL-7**, providing for the unexpected discovery of cultural resources during construction.

The COA also recognized the possibility that intact buried prehistoric and historical archaeological deposits could be encountered during project construction (CofA2007a, p. 6.7-36). The COA therefore suggested a number of measures intended to mitigate potential impacts to archaeological resources that could be discovered during the proposed CPP's project-related ground disturbance, including the following (CofA2007a, pp. 6.7-37–6.7-38):

Archaeological Monitoring. The applicant shall arrange for a qualified professional archaeological monitor to be present during project-related excavation and trenching.

Evaluation and Documentation. If archaeological resources are discovered during earth-moving activities, all construction activities within 50 feet of the find (or as deemed appropriate by the monitoring archaeologist) shall cease until the archaeologist evaluates the significance of the resource. If the resource is determined to be significant, the archaeologist shall follow the research design set forth in the Cultural Resources Monitoring and Mitigation Plan (CRMMP). The archaeologist shall complete a report of the excavations and findings.

Personnel Training. Training will be given to construction personnel by the monitoring archaeologists on procedures for the handling of discovered archaeological resources, including the need to stop work until a qualified archaeologist has assessed the significance of the find and implemented appropriate mitigation measures and the prohibition of unauthorized collection of cultural resources.

Protection and Preservation of Remains. In the event human remains are encountered, construction in the area of the remains will cease, and the remains will stay in situ pending definition of an appropriate plan. The Orange County Coroner will be contacted to determine the origin of the remains. In the event the remains are Native American in origin, the Native American Heritage Commission will be contacted, as provided in the CEQA Guidelines, Section 15064.5 subd. (e).

The COA, in its final comments on the cultural resources analysis in the PSA, conveyed its understanding that, based on the results of the geoarchaeological field investigation, staff might modify its standard cultural resources conditions providing procedures for treating the unexpected discovery of cultural resources during construction (GB 2009g, p. 4). Staff, in consideration of the geoarchaeological results, recommends required archaeological monitoring in just one of the project's construction areas and required cultural resources awareness training for all workers involved in ground-disturbing activities in all of the project's construction areas. These conditions of certification are intended to provide for the identification, evaluation, and appropriate treatment of any buried historical archaeological deposits encountered during project-related excavations on or near the project site and for the identification and recordation of any buried prehistoric archaeological sites encountered during jack-and-bore tunneling under the Carbon Canyon Creek Diversion Channel.

The applicant's suggested mitigation measures and staff's additional recommendations are incorporated into the proposed Conditions of Certification **CUL-1** through **CUL-7**, below, intended to provide for the contingency of discovering archaeological resources during CPP construction-related ground-disturbing activities. Staff's proposed **CUL-1** requires a Cultural Resources Specialist (CRS) to be retained and available during CPP construction-related excavations to evaluate any discovered buried resources and, if necessary, to conduct data recovery as mitigation for the project's unavoidable impacts on them. **CUL-2** requires the project owner to provide the CRS with all relevant cultural resources information and maps. **CUL-3** requires the CRS to write and submit for Energy Commission Compliance Project Manager (CPM) approval a Cultural Resources Monitoring and Mitigation Plan (CRMMP). **CUL-4** requires the CRS to write and submit to the CPM a final report on all CPP cultural resources monitoring and mitigation activities and to include the geoarchaeological final report as an appendix. **CUL-5** requires the project owner to train workers to recognize cultural resources and instruct them to halt construction and notify the CRS if cultural resources are discovered. **CUL-6** requires the archaeological monitoring of the jack-and-bore tunneling under the Carbon Canyon Creek Diversion Channel. **CUL-7** requires the project owner to halt ground-disturbing activities in the area of an archaeological discovery and to fund data recovery, if the discovery is evaluated as CRHR-eligible.

Identification and Assessment of Direct Impacts on Built-Environment Resources and Recommended Mitigation

The only built-environment resources identified by the COA and staff in the vicinity of the proposed CPP project are at some distance from the project. Thus its only potential impact on them would be to their integrity of setting and integrity of feeling resulting from the introduction of new, tall elements (four 85-foot-tall stacks), out of scale relative to the surrounding structures. But none of the historic built-environment resources in the vicinity of the proposed CPP project is considered a CRHR-eligible historical resource, so potential impacts from the project do not have to be evaluated or mitigated.

Identification and Assessment of Direct Impacts on Ethnographic Resources and Recommended Mitigation

No ethnographic resources were identified by the COA or staff, so no mitigation measures for proposed CPP project impacts would be required for this type of cultural resources.

Indirect Impacts

Neither the COA nor staff identified any indirect impacts to any identified cultural resources in the impact areas of the proposed CPP project, and so no mitigation measures for indirect impacts would be required for any class of cultural resources.

Summary of Significant Impacts to CRHR-Eligible Cultural Resources Requiring Mitigation

No significant impacts to known CRHR-eligible cultural resources that would require mitigation were identified in the project's construction areas. Staff's proposed measures for identifying, evaluating, and possibly mitigating impacts to previously unknown archaeological resources discovered during project-related ground disturbance, Conditions of Certification **CUL-1** through **CUL-7**, ensure that impacts to previously unknown but CRHR-eligible archaeological resources so discovered would be mitigated to a less-than-significant level.

Operation Impacts and Mitigation

During operation of the proposed CPP, if a leak should develop in the gas or water pipelines supplying the plant, or the underground transmission line should require repair, extensive excavation and disturbance of previously undisturbed soils and sediments could become necessary. Such repairs could impact previously unknown subsurface archaeological resources in areas unaffected by the original trench excavations. The measures proposed for mitigating impacts to previously unknown CRHR-eligible archaeological resources discovered during the original project-related ground disturbance at the main project site and along linear facilities, proposed Conditions of Certification **CUL-1** through **CUL-7**, would continue to apply and so also serve to mitigate impacts from repairs occurring during the later 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, subd. (h), 15065, subd. (a)(3), 15130, and 15355).

The COA identified seven proposed or approved projects within one mile of the proposed CPP project site or within 0.5 mile of the proposed CPP transmission line (CofA2007a, pp. 6.18-3–6.18-4):

- Kaiser Permanente Orange County Anaheim Medical Center (3400 East La Palma Avenue)
- The Crossings (condominiums) (3530 East La Palma Avenue);

- Industrial Park (1041 North Shepard Street)
- Boeing site redevelopment (Miraloma Avenue and Miller Street)
- Concourse Bowling addition (3364 East La Palma Avenue)
- La Jolla Groundwater Basin (West La Jolla Street)
- Gualberto Valadez Middle School (West La Jolla Street)

These projects must be considered as contributing to potential cumulative impacts on the cultural resources within this area. Cumulative impacts to cultural resources in the project vicinity could occur if impacts on cultural resources from the proposed CPP project, when added to those of the other seven projects would be cumulatively considerable.

Staff assumes that cultural resources studies would have been completed for these seven projects as part of the local lead agency's CEQA review. Consequently, staff assumes that these studies identified CRHR-eligible cultural resources and potential project impacts to these cultural resources, and that any impacts have either been avoided or mitigated to a less-than-significant level. Staff, however, has not reviewed the cultural resources studies for these seven projects.

This FSA has identified cultural resources near the proposed CPP project site, assessed potential CPP project impacts to these cultural resources, and determined that construction of the proposed CPP would not result in any significant impacts to known cultural resources. Staff has also provided conditions of certification to mitigate any significant impacts to CRHR-eligible archaeological resources discovered during CPP project-related ground disturbance. Proponents of future projects in the vicinity of CPP can mitigate impacts to as yet undiscovered CRHR-eligible subsurface archaeological resources to less-than-significant levels by requiring archaeological monitoring protocols for ground disturbance that are developed on the basis of previous reports and surveys and refined by the results of geoarchaeological analyses, by evaluating resources discovered during monitoring, and by avoidance or data recovery. Impacts to human remains can be mitigated by following the protocols established by state law in Public Resources Code, section 5097.98.

Since any impacts from the proposed CPP project to CRHR-eligible cultural resources discovered during CPP project-related ground disturbance would be mitigated to a less-than-significant level by the project's compliance with Conditions of Certification **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 proposed CPP project to be cumulatively considerable, when viewed in conjunction with other projects.

COMPLIANCE WITH LORS

If the conditions of certification (below) are properly implemented, the proposed CPP project would result in a less-than-significant impact on known cultural resources and on any new archaeological resources discovered during project-related ground disturbance. The proposed CPP project would therefore be in compliance with CEQA and the other applicable state laws, ordinances, regulations, and standards listed in Table 1. Similarly, the project would be in compliance with the County of Orange's General Plan, which requires CEQA review of project impacts to cultural resources within the county, and in compliance with COA Municipal Code requiring consideration of resources of historical value.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no agency or public comments on the cultural resources analysis in the PSA.

CONCLUSIONS AND RECOMMENDATIONS

California Energy Commission staff's cultural resources analysis has determined that the proposed Canyon Power Plant (CPP) project would have no impact on known CRHR-eligible archaeological resources, ethnographic resources, built-environment resources, historic districts, or cultural landscapes in the project's construction areas. With the adoption of cultural resources Conditions of Certification **CUL-1** through **CUL-7**, the CPP project would have no significant impact on as-yet-unidentified buried archaeological deposits. Additionally, with the adoption and implementation of these conditions, the project would be in conformity with all applicable laws, ordinances, regulations, and standards (LORS). Consequently, staff recommends that the Commission adopt **CUL-1** through **CUL-7**.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance (includes "preconstruction site mobilization," "construction ground disturbance," and "construction grading, boring and trenching," as defined in the General Conditions for this project) the project owner shall obtain the services of a Cultural Resources Specialist (CRS), and one or more alternate CRSs, 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. No ground disturbance shall occur prior to CPM approval of the CRS and alternates, unless such activities are specifically approved by the CPM. Approval of a CRS may be denied or revoked for reasons including but not limited to non-compliance on this or other Energy Commission 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 Title 36, Code of Federal Regulations, part 61 (36 C.F.R., 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;

2. At least three years of archaeological or historical, as appropriate (per nature of predominant cultural resources on the project site), resource mitigation and field experience in California; and

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 implement effectively the Conditions.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a B.S. or B.A. degree in anthropology, archaeology, historical archaeology or a related field and one year experience monitoring in California; or

2. an A.S. or A.A. 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 specialist(s), e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

<u>Verification:</u>

1. At least 45 days prior to the start of ground disturbance, 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 proposed new CRS the AFC and all cultural resources documents, field notes, photographs, and other cultural resources materials generated by the project. If there is no alternate CRS in place to conduct the duties

of the CRS, a previously approved monitor may serve in place of a CRS so that project-related ground disturbance may continue up to a maximum of 3 days without a CRS. If cultural resources are discovered then ground disturbance will remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.

3. At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resources monitoring required by this Condition.

4. At least 5 days prior to additional CRMs beginning on-site duties during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to their qualifications.

5. At least 10 days prior to any technical specialists beginning tasks, the resume(s) of the specialists shall be provided to the CPM for review and approval.

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

CUL-2 Prior to the start of ground disturbance, 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 footprints of the power plant, all linear facility routes, all access roads, and all laydown areas. 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 map submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

If construction of the project would proceed in phases, maps and drawings not previously provided shall be provided to the CRS and CPM 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.

Weekly, until ground disturbance is completed, the project construction manager shall provide to the CRS and CPM a schedule of project activities for the following week, including the identification of area(s) where ground disturbance will occur during that week.

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 ground disturbance, 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. At least 15 days prior to the start of ground disturbance, if there are changes to any project-related footprint, the project owner shall provide revised maps and drawings for the changes to the CRS and CPM.

3. At least 15 days prior to the start of each phase of a phased project, the project owner shall submit the appropriate maps and drawings, if not previously provided, to the CRS and CPM.

4. Weekly, during ground disturbance, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.

5. Within 5 days of changing the scheduling of phases of a phased project, the project owner shall provide written notice of the changes to the CRS and CPM.

CUL-3 Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by or under the direction of the CRS, to the CPM for review and approval. The authors' names shall appear on the title page of the CRMMP. 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 CRM, and the project owner's on-site construction manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless such activities are specifically approved by the CPM.

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

1. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions of Certification 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."

2. 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 data types.

3. A detailed monitoring plan for the jack-and-bore tunneling for the underground transmission line under Carbon Canyon Creek Diversion Channel, including the monitoring of the excavation of the jack-and-bore entry and exit pits, the examination

of auger-backdirt sediments, the logging of auger-backdirt sediment descriptions, the screening of samples of the auger backdirt for the presence of cultural materials, and the recordation of any archaeological deposits encountered.

4. A statement that all encountered cultural resources over 50 years old shall be recorded on Department of Parks and Recreation (DPR) 523 forms 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.

5. A statement that the project owner will pay all curation fees for artifacts recovered and for related documentation produced during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities.

6. A statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resource materials that are encountered during ground disturbance and cannot be treated prescriptively.

7. A description of the contents and format of the final Cultural Resource Report (CRR), which shall be prepared according to ARMR guidelines.

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall submit the CRMMP to the CPM for review and approval.

2. At least 30 days prior to the start of ground disturbance, in a letter to the CPM, the project owner shall agree 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 final Cultural Resources Report (CRR) to the CPM for approval. The final CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The final CRR shall report on all field activities including dates, times and locations, results, samplings, and analyses. All survey reports, DPR 523 forms, geoarchaeological final reports, data recovery reports, and any additional research reports not previously submitted to the California Historical Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as appendices to the final CRR.

If the project owner requests a suspension of ground disturbance and/or 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 ground disturbance and/or 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 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.

2. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the final 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.

3. Within 90 days after completion of ground disturbance (including landscaping) , if cultural materials requiring curation were collected, the project owner shall provide to the CPM a copy of an agreement with, or other written commitment from, a curation facility that meets the standards stated in the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, to accept cultural materials, if any, from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

4. Within 10 days after CPM approval of the CRR, the project owner shall provide documentation to the CPM confirming that copies of the final CRR have been provided to the SHPO, the CHRIS, and the curating institution, if archaeological materials were collected

CUL-5 Prior to and for the duration of ground disturbance activities, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment in any aspect of project-related ground disturbance. 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 may be discontinued when ground disturbance is completed or suspended, but must be resumed when ground disturbance, such as landscaping, resumes. 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. A discussion of what such artifacts may look like when partially buried, or wholly buried and then freshly exposed;

4. A discussion of what prehistoric and historical archaeological deposits look like at the surface and when exposed during construction, and the range of variation in the appearance of such deposits;

5. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt project-related ground disturbance 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;

6. 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;

7. An informational brochure that identifies reporting procedures in the event of a discovery;

8. An acknowledgement form signed by each worker indicating that they have received the training; and

9. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

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

Verification:

1. At least 30 days prior to the beginning of ground disturbance, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval.

2. At least 15 days prior to the beginning of ground disturbance, the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.

3. On a monthly basis, until ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers 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 monitor the excavation of the jack-and-bore entry and exit pits and examine, log, and screen auger backdirt samples, as detailed in the CRMMP, to identify and record the presence of any archaeological deposits encountered.

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 monitoring logs shall be provided by the CRS to the CPM, if requested 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 project site, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

In the event that the CRS believes 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 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.

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.

<u>Verification:</u>

1. At least 30 days prior to the start of ground disturbance, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log.

2. Monthly, 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 and shall attach any new DPR 523A forms completed for finds treated prescriptively, as specified in the CRMMP.

3. At least 24 hours prior to implementing a proposed change in monitoring level, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for changing the monitoring level.

4. Daily, as long as no cultural resources are found, 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 of communication acceptable to the CPM.

5. At least 24 hours prior to reducing or ending daily reporting, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for reducing or ending daily reporting.

CUL-7 The project owner shall grant authority to halt project-related ground disturbance 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 that a cultural resource over 50 years of age is found (or if younger, determined exceptionally significant by the CPM), or impacts to such a resource can be anticipated, ground disturbance shall be halted or redirected in the immediate vicinity of the discovery sufficient to ensure that the resource is protected from further impacts. Monitoring and daily reporting as provided in **CUL-6** shall continue during all ground-disturbing activities elsewhere on the project site. The halting or redirection of ground disturbance 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 CRHR eligibility, and recommendations for data recovery from any cultural resources discoveries, whether or not a determination of CRHR eligibility has been made.

2. If the discovery would be of interest to Native Americans, the CRS has notified all Native American groups, identified in the FSA, that expressed a desire to be notified in the event of such a discovery.

3. The CRS has completed field notes, measurements, and photography for a DPR 523 "Primary" form. Unless the find can be treated prescriptively, as specified in the CRMMP, the "Description" entry of the DPR 523 "Primary" form shall include a recommendation on the CRHR eligibility of the discovery. The project owner shall submit completed forms to the CPM.

4. 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.

<u>Verification:</u>

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt project-related ground disturbance 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. Within 48 hours of the discovery of an archaeological or ethnographic resource, the project owner shall ensure that the CRS notifies all Native American groups that expressed a desire to be notified in the event of such a discovery.

3. Unless the discovery can be treated prescriptively, as specified in the CRMMP, completed DPR 523 forms for resources newly discovered during ground disturbance 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 the CRS decides is more appropriate for the subject cultural resource.

CULTURAL RESOURCES ACRONYM GLOSSARY AND DEFINITION OF TERMS

CANYON POWER PLANT PROJECT

AFC	Application for Certification
Area of Analysis	The area within and around a project site that staff considers when compiling an inventory of cultural resources and when assessing potential impacts.
AD	After the Birth of Christ
ARMR	Archaeological Resource Management Report
BC	Before the Birth of Christ
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
COA	City of Anaheim
Conditions	Conditions of Certification
CPP	Canyon Power Plant
CRHR	California Register of Historical Resources
CRM	Cultural Resources Monitor
CRMMP	Cultural Resources Monitoring and Mitigation Plan
CRR	Cultural Resource Report
CRS	Cultural Resources Specialist
DPR 523	Department of Parks and Recreation cultural resource inventory form
FSA	Final Staff Assessment
LORS	laws, ordinances, regulations, and standards
MCR	Monthly Compliance Report
MLD	Most Likely Descendent
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
Paleosol	A buried soil horizon that may at one time have been a ground surface on which prehistoric peoples could have left remains of their activities.
PSA	Preliminary Staff Assessment
Project Site	The bounded area(s) identified by the applicant as the area within which they propose to build all the components of their project.
SCCIC	South Central Coastal Information Center, part of the CHRIS
SHPO	State Historic Preservation Officer
Staff	Energy Commission cultural resources technical staff
WEAP	Worker Environmental Awareness Program

REFERENCES

The *tn: 00000* in a reference below indicates the transaction number under which the item is catalogued in the Energy Commission's Docket Unit. The transaction number allows for quicker location and retrieval of individual items docketed for a case or used for ease of reference and retrieval of exhibits cited in briefs and used at Evidentiary Hearings.

Advisory Council 2007—National Advisory Council on Historic Preservation. "Archeology Guidance." Guidance Point No. 17, pp. 13 and 14. 5/30/2007. http://www.achp.gov/archguide/system/files/Complete_Printable_Guidance.pdf

AHS 2005—Anaheim Historical Society, Inc. "Anaheim Timeline." http://www.anaheimhistoricalsociety.com/timeline.htm. Accessed 6/30/2008.

AMEC 2007a—AMEC/C. Confar (tn: 46322). "Phase I Environmental Site Assessment Proposed Power Generation/Peaker Site: 3051, 3056 and 3071 East Miraloma Avenue, Anaheim, California 92806," Volume I, November, 2006. Prepared for City of Anaheim. Submitted to CEC/Docket Unit on 12/27/2007.

AMEC 2007b—AMEC/C. Confar (tn: 46323). "Phase I Environmental Site Assessment Proposed Power Generation/Peaker Site: 3051, 3065 and 3071 East Miraloma Avenue, Anaheim, California 95806," Volume II, November 2006. Prepared for City of Anaheim. Submitted to CEC/Docket Unit on 12/27/2007.

AMEC 2007c—AMEC/N. Starr (tn: 46324). "Additional Phase II Subsurface Assessment Proposed Power Generation/Peaker Site: 3051, 3065 and 3071 East Miraloma Avenue, Anaheim, California 92806," May, 2007. Prepared for City of Anaheim. Submitted to CEC/Docket Unit on 12/27/2007.

Bean and Shipek 1978—L. J. Bean and F C. Shipek. "Luiseño," in *Handbook of North American Indians, Vol. 8*. Robert F. Heizer, ed. Washington, D. C.: Smithsonian Institution, 1978.

Bean and Smith 1978—L. J. Bean and C. R. Smith, "Gabrielino," in *Handbook of North American Indians, Vol. 8*. Robert F. Heizer, ed. Washington, D. C.: Smithsonian Institution, 1978.

Brock 2008—Steve Brock, PB Power (tn: 47004). E-mail to Che McFarlin, California Energy Commission, re: off-site pipeline diameters and lengths. 7/9/08. Submitted to CEC/Docket Unit on 7/11/2008.

Byrd and Raab 2007—Brian F. Byrd and L. Mark Raab, "Prehistory of the Southern Bight: Models for a New Millenium," in *California Prehistory: Colonization, Culture, and Complexity*. Terry L. Jones and Kathryn A. Klar, eds. New York: Altamira Press, 2007.

Caltrans 2004—California Department of Transportation. "Environmental Handbook." Volume 2 (Archaeological and Historical Resources), January, 2004.

Carosso 1949—Vincent P. Carosso, “Anaheim, California: A Nineteenth-Century Experiment in Commercial Viticulture.” *Bulletin of the Business Historical Society*, vol. 23, no.2 (June, 1949), pp. 78-86.

CEC 2008hh—CEC/C. McFarlin (tn: 47049). Canyon Power Plant Data Request 56. Submitted to CEC/Docket Unit on 07/15/2008.

City of Anaheim, 2007—“Anaheim's History Walk.” http://www.anaheim.net/era.htm?id=AM_1857_final. Accessed 6/27/2008.

City of Anaheim 2008—“A Brief History of Modern Day Anaheim.” http://www.anaheim.net/article.asp?id=216. Accessed 6/27/2008.

CofA2007a—City of Anaheim/S. Sciortino (tn: 43903). City of Anaheim’s Canyon Power Plant Application for Certification, Volumes I & II. Submitted to CEC/Docket Unit on 12/28/2007.

CofA2009f—City of Anaheim/S. Wilson (tn 52120). Preliminary Report, Canyon Power Plant Geoarchaeological Study, 3071 Miraloma Avenue, Anaheim, California. Submitted to CEC/Docket Unit on 6/23/09.

Conkling, et al., 1994—Steven W. Conkling, Deborah McLean, and Brad Sturm, “Cultural Resources Assessment for Five Vacant lots and 42 Potentially Historic Buildings within the Northeast Anaheim Redevelopment Area, Orange County, California,” December, 1994. South Central Coastal Information Center (California Historical Resources Information System), Report No. OR-2501.

G&B 2008a— Galati & Blek/D. Wiseman (tn: 45606). Data Adequacy Responses. Submitted to CEC/Docket Unit on 03/07/2008.

G&B 2008d— Galati & Blek/M. Cosens (tn: 46614). Data Responses to Data Requests 1-55. Submitted to CEC/Docket Unit on 06/05/2008.

GB 2009f—Galati & Blek/S. Galati (tn 51589). SCPPA’s Initial Comments on the Preliminary Staff Assessment, dated 5/15/09. Submitted to CEC/Docket Unit on 5/15/09.

GB 2009g—Galati & Blek/M. Mills (tn 51881). SCPPA’s Final Comments on the Preliminary Staff Assessment, dated 6/9/09. Submitted to CEC/Docket Unit on 6/9/09.

JRP 2007—JRP Historical Consulting. “Historic Resources Inventory and Evaluation Report: Canyon Power Plant,” October, 2007. Appendix D-1 in Vol. II, City of Anaheim’s Canyon Power Plant Application for Certification. Submitted to CEC/Docket Unit on 12/28/2007.

MACTEC 2007—MACTEC Engineering and Consulting, Inc., “Report of Geotechnical Investigation: Proposed City of Anaheim 200-MW Peaking Power Plant,” October, 2007. Prepared for PB Americas, Inc. Appendix F in Vol. II, City of Anaheim's Canyon Power Plant Application for Certification. Submitted to CEC/Docket Unit on 12/28/2007.

McKenna, et al., 2002—Jeanette A. McKenna, Chuck Ferguson, and M. Abraham McKenna, "OR-2591: Historic Property Survey Report of Negative Findings," May, 2002. Prepared for the California Department of Transportation. South Central Coastal Information Center (California Historical Resources Information System), Report No. OR-2591.

Moratto 1984—Michael J. Moratto, *California Archaeology*, Orlando, Fla.: Academic Press, 1984.

Padon 1998—Beth Padon, "Cultural Resources Review for Groundwater Replenishment System Program EIR/Tier I/EIS, Orange County Water District and County Sanitation Districts of Orange County," June, 1998. South Central Coastal Information Center (California Historical Resources Information System), Report No. OR-1836.

OHP 2008—California Office of Historic Preservation. "Preservation Matters," Spring, 2008.

Smith 1995—C. R. Smith, "An Introduction to California's Native People: Missionization," http://www.cabrillo.edu/~crsmith/anth6_missions.html, n.d.

Solis 2007—Laurie Solis. "Cultural Resources Survey for the Anaheim Municipal Power Station Project, Anaheim, California", October, 2007. Appendix D-3 (Confidential) in Vol. II, City of Anaheim's Canyon Power Plant Application for Certification. Submitted to CEC/Docket Unit on 12/28/2007.

Solis and Hollins 2007—Laurie Solis and Jeremy Hollins, "Anaheim Historic Resource Evaluation: 3053, 3065, & 3065A E. Miraloma Avenue, Anaheim, Orange County, CA," September 2007. Appendix D-2 in Vol. II, City of Anaheim's Canyon Power Plant Application for Certification. Submitted to CEC/Docket Unit on 12/28/2007.

Stratton 2008—Susan Stratton, Chief, Project Review Unit, California Office of Historic Preservation. Personal communication between Dr. Stratton and Michael D. McGuirt, Energy Commission staff, 9/10/08.

URS 2007a—URS/C. Shen (tn: 46325). "Additional Phase II Environmental Investigation Report," November, 2007. Prepared for City of Anaheim. Submitted to CEC/Docket Unit on 12/27/2007.

HAZARDOUS MATERIALS MANAGEMENT

Testimony of Alvin J. Greenberg, Ph.D. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed Canyon Power Plant (CPP), along with staff's proposed mitigation measures, indicates that hazardous materials use at the site 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, section 25531 et seq., the applicant would be required to develop a risk management plan. To ensure the adequacy of this plan, staff's proposed conditions of certification require that the risk management plan be submitted for concurrent review by the Energy Commission staff. In addition, staff's proposed conditions of certification require that staff review and approve the risk management plan prior to delivery of any hazardous materials to the CPP project site. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia.

INTRODUCTION

The purpose of this hazardous materials management analysis is to determine if the proposed Canyon Power Plant (CPP) 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 site. 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 those impacts to the extent feasible.

This analysis does not address the potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and provide them 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 applicable requirements for the protection of workers from these risks.

Aqueous ammonia (19% ammonia in aqueous solution) is the only acutely hazardous material proposed to be either used or stored at the CPP project in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (CofA 2007a, Table 6.15-2). Aqueous ammonia will be used to control oxides of nitrogen (NO_x) emissions through selective catalytic reduction. The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with the 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 high 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.

Other hazardous materials, such as mineral and lubricating oils, cleaning detergents, and welding gasses will be present at the proposed CPP project. Hazardous materials used during construction would include gasoline, diesel fuel, motor oil, hydraulic fluid, welding gases, lubricants, solvents, paint, and paint thinner. No acutely toxic hazardous materials will be used on site during construction. None of these materials pose significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, their physical state, and/or their environmental mobility. Handling of hazardous materials during construction would comply with all applicable regulations and would be guided by A Hazardous Materials Business Emergency Plan and a Chemical Inventory Program developed by the construction contractor (CofA 2007a, Section 6.15.2.1).

Although no natural gas is stored, the project will also involve the handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. The proposed CPP would connect via a new 3,240-foot long natural gas pipeline to a new interconnection at East Orangethorpe Ave. and Kraemer Blvd. (CofA 2007a, Section 3.4.6). The CPP project would 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, REGULATIONS, AND STANDARDS

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

HAZARDOUS MATERIALS MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	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)	Established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on risk management plans (42 USC §112(r))	Requires states to implement a comprehensive system informing 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 172.800	The U.S. Department of Transportation (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 facilities that store oil that could leak into navigable waters.
Title 49, Code of Federal Regulations, Part 190	Outlines gas pipeline safety program procedures.
Title 49, Code of Federal Regulations, Part 191	Addresses transportation of natural and other gas by pipeline: annual reports, incident reports, and safety-related condition reports. Requires operators of pipeline systems to notify the DOT of any reportable incident by telephone and then submit a written report within 30 days.
Title 49, Code of Federal Regulations, Part 192	Addresses transportation of natural and other gas by pipeline and minimum federal safety standards, specifies minimum safety requirements for pipelines including material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the surrounding land. This part also contains regulations governing pipeline construction (which must be followed for Class 2 and Class 3 pipelines) and the requirements for preparing a pipeline integrity management program.
Federal Register (6 CFR Part 27) interim final rule	A regulation of the U.S. Department of Homeland Security that requires facilities that use or store certain hazardous materials to submit information to the department so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
Title 8, California Code of Regulations, section 5189	Requires facility owners to develop and implement effective safety management plans that ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the Risk Management Plan (RMP) process.
Title 8, California Code of Regulations, section 458 and sections 500 to	Sets forth requirements for the 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 of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, the American

515	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 25531 to 25543.4	The California Accidental Release Program (CalARP) requires the preparation of a Risk Management Plan (RMP) and off-site consequence analysis (OCA) and submittal to the local Certified Unified Program Agency for approval.
California Health and Safety Code, section 41700	Requires that “No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.
California Public Utilities Commission General Order 112-E and 58-A	Contains standards for gas piping construction and service.
Local	
COA Fire Department Hazardous Materials Section	Requires new/modified businesses to complete a Hazardous Materials Business Emergency Plan and Chemical Inventory Forms for business handling acutely hazardous materials in excess of TQ (55 gal., 500 lbs., or 200 cu. ft.) Regulates enforcement responsibility for the implementation of Title 23, Division 3, Chapter 16 and 18 of CCR, as it relates to hazardous material storage and petroleum UST cleanup.

The Certified Unified Program Agency (CUPA) with the responsibility to review Risk Management Plans (RMPs) and Hazardous Materials Business Plans (HMBPs) is the Anaheim Fire Department (CofA 2007a, Section 6.15.5.5). With regard to seismic safety issues, the site is located in Seismic Risk Zone 4. Construction and design of buildings and vessels storing hazardous materials will meet the seismic requirements of the current Uniform Building Code and the 1998 California Building Code (CofA 2007a, Section 6.3.3.1).

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 that could cause public health impacts. These include:

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

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction, and air temperature, affect both 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 their associated health risks. When wind speeds are low and the atmosphere stable, dispersion is severely reduced but can lead to increased localized public exposure.

Recorded wind speeds and directions are described in the **Air Quality** section (6.2) and **Appendix B-1** of the Application for Certification (AFC) (CofA 2007a). Staff agrees with the applicant that use of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and an ambient temperature of 86.9°F are appropriate for conducting the worst-case off-site consequence analysis (CofA 2007a, Table 6.15-3).

TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The site topography is predominantly flat (about 218 feet above mean sea level), with a slight slope in a southerly direction. The Los Angeles Basin in which the proposed site is located is bordered by mountain ranges to the north, east, and south, with the Palos Verde Peninsula and coastline to the west (CofA 2007a, Sections 3.3.1 and 3.3.2). The area within 5 miles of the project site has a gradual east-west slope, with the terrain rising sharply to the north and east approximately 6 miles from the site where the Chino Hills and Santa Ana Mountains begin (CofA 2007a Section 6.16.1).

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 major bearing on health risk. Sensitive receptors and residences in the project vicinity are listed in Appendix I-1 of the AFC and shown in Figure 6.16-1 of the AFC (CofA 2007a). The nearest sensitive receptor is a residence located at 2983 East Miraloma Ave., approximately 887 feet west of the site boundary. This residence is planned to be redeveloped for commercial use, but a caretaker unit would still exist at this location (CofA 2007a, Section 6.16.1).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD 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 the 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 utilized the most current public health exposure levels (both acute and chronic) that are established 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 by which they 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 and administrative controls concerning hazardous materials usage. Engineering controls are the physical or mechanical systems, such as storage tanks or automatic shut-off valves, that can prevent the spill of hazardous material from occurring, or which can either limit the spill to a small amount or confine it to a small area. Administrative controls are the rules and procedures that workers at the facility must follow that will help to prevent accidents or to 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 by the applicant (CofA 2007a, Section 6.15). 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 6.15-2** of the Response to Data Request #17 (CPP 2008x) 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 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-sized 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 mitigation measures also include 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, as reduced by 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 an insignificant level, staff will propose additional prevention and response controls until the potential for causing harm to the public is reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

Hazardous chemicals such as mineral and lubricating oils, cleaning detergents, welding gasses, and other various chemicals would be used and stored in relatively small amounts. (See **Hazardous Materials Appendix B** for a list of all chemicals proposed for use and storage at CPP). In conducting the analysis, staff determined in Steps 1 and 2 that these materials, although present at the proposed facility, pose a minimal potential for off-site impacts since they will be stored in small quantities, have low mobility/volatility, or have low levels of toxicity. These hazardous materials are eliminated from further consideration.

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 large quantity hazardous materials: natural gas and aqueous ammonia. However, the project will be limited to using, storing, and transporting only those hazardous materials listed in Appendix B of this document as per staff's proposed condition **HAZ-1**.

Large Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or possible explosion risk because of its flammability. Natural gas is composed mostly of 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 occurs 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 can explode under certain conditions (as demonstrated by the recent natural gas detonation in Belgium in July 2004).

While natural gas would be used in significant quantities, it would not be stored on site. It would be delivered via a new 3,240-foot long pipeline to a new interconnection at the CPP site. The proposed pipeline route would travel 580 ft. east from the proposed site on Miraloma Ave. to Kraemer Blvd., then north 2,660 ft. on Kraemer Blvd. to East Orangethorpe Ave. to connect to SCGC's transmission line L-1218 on East Orangethorpe Ave. (CofA 2007a, Section 3.4.6). The risk of a fire and/or explosion on site can be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. The National Fire Protection Association (NFPA) code 85A requires both the use of double-block and bleed valves for gas shut off and 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, thereby 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 would significantly reduce the potential for equipment failure because of either improper maintenance or human error.

Since the proposed facility will require the installation of a new gas pipeline off-site, impacts from this pipeline need to be evaluated. The new gas pipeline proposed for this project would be constructed, owned and operated by Southern California Gas Company (SCGC) (CofA 2007a, Section 3.4.6). The design of the natural gas pipeline is governed by laws and regulations discussed here. These LORS require use of high quality arc welding techniques by certified welders and inspection of welds. Many failures of older natural gas lines have been associated with poor quality welds, or corrosion. Current codes address corrosion failures by requiring use of corrosion resistant coatings and cathodic corrosion protection. Another major cause of pipeline failure is damage resulting from excavation activities near pipelines. Current codes address this mode of failure by requiring clear marking of the pipeline route. An additional mode of failure is damage caused by earthquake. Existing codes also address seismic hazard in design criteria (see discussion below). Evaluation of pipeline performance in recent earthquakes indicates that pipelines designed to modern codes perform well in seismic events while older lines frequently fail. Staff believes that existing regulatory requirements are sufficient to reduce the risk of accidental release from the pipeline to insignificant levels.

Failures of gas pipelines, according to data from the U.S. Department of Transportation (the National Transportation Safety Board) from the period 1984 – 1991 and data from the National Response Center for the period 1990 - 2004 , occur as a result of pipeline corrosion, pipeline construction or materials defects, rupture by heavy equipment excavating in the area such as bulldozers and backhoes, weather effects, and earthquakes. Given the gas line failures which occurred in the Marina District of San Francisco during the 1989 Loma Prieta earthquake, the January 1994 Northridge earthquake in Southern California, the January 1995 gas pipeline failures in Kobe, Japan, the January 19, 1995 gas explosion in San Francisco, the pipeline explosion in Belgium in July 2004, and the natural gas storage fire in Texas in August 2004, the safety of the gas pipeline is of paramount importance. However, it must be noted that those pipelines which failed in 1989 to 1995 were older and not manufactured nor installed to modern code requirements. The February 2001 Nisqually Earthquake near Olympia Washington caused no damage to natural gas mains and there was only one reported gas line leak due to a separation of a service line going into a mobile home park. The Belgium gas pipeline explosion was due to construction equipment rupturing the line, not due to earthquake or structural failure.

If loss of containment occurs as a result of pipe, valve, or other mechanical failure or external forces, significant quantities of compressed natural gas could be released rapidly. Such a release can result in a significant fire and/or explosion hazard, which could cause loss of life and/or significant property damage in the vicinity of the pipeline route. However, the probability of such an event is extremely low if the pipeline is constructed according to present standards.

According to DOT statistics, the frequency of reportable incidents is about 0.25 for all pipeline incidents per 1,000 miles per year or 2.5×10^{-4} incidents per mile per year. DOT has also evaluated and categorized the major causes of pipeline failure. To summarize, the four major causes of accidental releases from natural gas pipelines are: Outside Forces - 43%, Corrosion -18%, Construction/Material Defects -13%, and Other - 26%.

Outside forces are the primary causes of incidents. Damage from outside forces includes damage caused by use of heavy mechanical equipment near pipelines (e.g., bulldozers and backhoes used in excavation activities), weather effects, vandalism, and earthquake-caused rupture as seen in the Marina District of San Francisco during the 1989 Loma Prieta Quake and in Kobe, Japan in January 1995.

The fourth category, “Other” includes equipment component failure, compressor station failures, operator errors and sabotage. The average annual service incident frequency for natural gas transmission systems varies with age, the diameter of the pipeline, and the amount of corrosion.

Older pipelines have a significantly higher frequency of incidents. These result from the lack of corrosion protection and use of less corrosion resistant materials compared to modern pipelines, limited use of modern inspection techniques, and higher frequency of incidents involving outside forces. The increased incident rate due to outside forces is the result of the use of a larger number of smaller diameter pipelines in older systems, which are generally more easily damaged and the uncertainty regarding the locations of older pipelines.

The safety requirements for pipeline construction vary according to the population density and land use, which characterize the surrounding land. The pipeline classes are defined as follows (Title 49, Code of Federal Regulations, Part 192):

Class 1: Pipelines in locations within 220 yards of ten or fewer buildings intended for human occupancy in any 1-mile segment.

Class 2: Pipelines in locations within 220 yards of more than ten but fewer than 46 buildings intended for human occupancy in any 1-mile segment. This class also includes drainage ditches of public roads and railroad crossings.

Class 3: Pipelines in locations within 220 yards of more than 46 buildings intended for human occupancy in any 1-mile segment, or where the pipeline is within 100 yards of any building or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12 month period (the days and weeks need not be consecutive). (The proposed project gas pipeline would fall into this class.)

Class 4: Pipelines in locations within 220 yards of buildings with 4 or more stories above ground in any 1-mile segment.

In the United States, extensive federal and state pipeline codes and safety enforcement minimize the risk of severe accidents related to natural gas pipelines. In November 2000, the DOT Office of Pipeline Safety proposed a program requiring the preparation of risk management plans for gas pipelines throughout the United States. These risk management plans will include the use of diagnostic techniques to detect internal and external corrosion or cracks in pipelines and to perform preventive maintenance. The pipeline owner will be required to develop and implement these plans as per the regulation adopted May 2004 (49 CFR Part 192). The regulations prescribe minimum requirements for a pipeline Integrity Management Program to be prepared and followed by every operator of a pipeline segment located in a high consequence area. A high consequence area is defined as any location where the pipeline traverses a Class 3 or 4 area (see above) or other areas under specified circumstances. The integrity management program must contain the required elements as described in section 192.911 including an identification of all high consequence areas, a baseline assessment plan including methods of assessing pipeline integrity and a schedule for completing the assessment, an identification of threats to each pipeline segment including a risk assessment, an evaluation of mitigation measures, implementation procedures, and monitoring procedures. The regulations also include requirements for reassessment intervals, which range from 7 to 20 years depending on the type of reassessment and the operating percentage of the pipeline.

The following safety features will be incorporated into the design and operation of the natural gas pipeline (as required by current federal and state codes): (1) while the pipeline will be designed, constructed, and tested to carry natural gas at a certain pressure, the working pressure will be less than the design pressure; (2) butt welds will be X-rayed and the pipeline will be tested with water prior to the introduction of natural gas into the line; (3) the pipeline will be surveyed for leakage annually (4) the pipeline will be marked to prevent rupture by heavy equipment excavating in the area; and (5) valves at the meter will be installed to isolate the line if a leak occurs. These requirements will be administered by the federal government and the CPUC.

The natural gas pipeline will be designed to meet all standards of the California Public Utilities Commission General Order 112 and 49 CFR Parts 190 through192 (CofA 2007a, Sections 6.15.5.1.4 and 6.15.5.2.7). 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).

Staff concludes that compliance with existing LORS would be sufficient to ensure minimal risks of pipeline failure.

Aqueous Ammonia

Aqueous ammonia would be used to control the emission of oxides of nitrogen (NO_x) from the combustion of natural gas at the CPP project. The accidental release of aqueous ammonia without proper mitigation can result in significant down-wind concentrations of ammonia gas. CPP would store 19% aqueous ammonia solution in an above-ground stainless steel ammonia tank with a maximum capacity of 10,000 gallons (CofA 2007a, Section 6.15.2.3.1). The tank would be surrounded by an above ground secondary containment basin capable of holding the full contents of the tank plus the rainfall associated with a 24-hour 25-year storm. The secondary containment would be designed with a screen cover that contains 204 six-inch diameter drain holes. This cover would reduce ammonia evaporation. The truck unloading area would be constructed with a sloped concrete pad that would drain into a separate containment area (CofA 2007a Section 6.15.2.3.1).

Based on staff's analysis described above, aqueous ammonia is the only hazardous material that may pose a significant risk of off-site impact. The use of aqueous ammonia can result in the release of ammonia vapor in the event of a spill. This is a result of its moderate vapor pressure and the large amounts of aqueous ammonia that will be used and stored on site. However, the use of aqueous ammonia poses far less risk than the use of the far more hazardous anhydrous ammonia (ammonia that is not diluted with water).

To assess the potential impacts associated with an accidental release of aqueous ammonia, staff uses four benchmark exposure levels of ammonia gas occurring off site. These include:

1. the lowest concentration posing a risk of lethality, 2,000 parts per million (ppm);

2. the concentration immediately dangerous to life and health level of 300 ppm;

3. the emergency response planning guideline level 2 of 150 ppm, which is also the RMP level 1 criterion used by U.S. Environmental Protection Agency (EPA) and California; and

4. the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm.

If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will also assess the probability of occurrence of the release, the severity of the consequences, and 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, as well as their applicability to different populations and exposure-specific conditions, is provided in **HAZARDOUS MATERIALS Appendix A**.

Section 6.15.2.3.1 of the AFC (CofA 2007a) describes the modeling parameters used for the worst-case and the alternative accidental releases of aqueous ammonia in the applicant's off-site consequence analysis (OCA). Pursuant to the California Accidental Release Program (CalARP) regulations (federal risk management plan regulations do not apply to sources that store or use aqueous ammonia solutions below 20%), the OCA was performed for the worst-case release scenario, which involved the failure and complete discharge of the storage tank, as well as an alternative release scenario involving a spill during truck unloading. Ammonia emissions from the two potential release scenarios were calculated following methods provided in the RMP off-site consequence analysis guidance, U.S. EPA, April 1999. The default meteorological data necessary for emission and dispersion calculations were supplemented by historical climate records for Anaheim. A temperature of 86.9°F, a wind speed of 1.5 meters per second, and atmospheric stability class F were used for emission and dispersion calculations for the worst-case scenario. Potential off-site ammonia concentrations were estimated using the ALOHA numerical dispersion model (CofA 2007a, Section 6.15.2.3.1).

HAZARDOUS MATERIALS MANAGEMENT Table 2 shows the applicant's modeled distance to three benchmark criteria concentrations.

HAZARDOUS MATERIALS MANAGEMENT Table 2
Distance to Selected Toxic Endpoints

Scenario	Distance in Feet to 2,000 ppm (Lethal Concentration)	Distance in Feet to IDLH (300 ppm)	Distance in Feet to CalARP's (200 ppm)
Worst Case	~0.014 miles	0.043	0.053
Alternative	0.009	0.027	0.034

Source: Table 6.15-4 of the AFC (CPP 2007a)

Figure 6.15-1 of the AFC shows how far each benchmark concentration would reach from the ammonia tank site. Ammonia concentrations exceeding 200 ppm would not extend beyond the facility fence line for either scenario and it is doubtful that concentrations would exceed 75 ppm off-site.

Since the applicant's modeling is very conservative and most likely overestimates the airborne concentration of ammonia should an accidental release occur from the storage tank or during transfer operations, staff concludes that the applicant's modeling demonstrates no off-site impact. Staff therefore believes that the applicant's proposed engineering controls will ensure protection of public health.

Mitigation

The potential for accidents resulting in the release of hazardous materials is greatly reduced through implementation of a safety management program that would include the use of both engineering and administrative controls. Elements of both facility controls and the safety management plan are summarized below.

Engineering Controls

Engineering controls help to prevent accidents and releases (spills) from moving off site and affecting communities by incorporating engineering safety design criteria in the design of the project. The engineered safety features proposed by the applicant for use at the CPP project include:

- storage of containerized hazardous materials in their original containers which are designed to prevent releases and are appropriately labeled;
- 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;
- physical separation of stored chemicals in isolated containment areas in order to prevent accidental mixing of incompatible materials, which could result in the evolution and release of toxic gases or fumes;
- construction of a covered containment area surrounding the aqueous ammonia storage tank, capable of holding the entire contents of the tank plus the volume of rainfall associated with a 24-hour 25-year storm;
- construction of a sloped concrete pad surrounding the aqueous ammonia truck unloading area that drains into a secondary containment structure;
- process protective systems including continuous tank level monitors with automatic alarms that are triggered at set high and low level points, automated leak detectors, temperature and pressure monitors, alarms, and emergency block valves.

Administrative Controls

Administrative controls also help prevent accidents and releases (spills) from moving off site and affecting neighboring communities by establishing worker training programs, process safety management programs, and complying with all applicable health and safety laws, ordinances, and standards.

A worker health and safety program will be prepared by the applicant and include (but not be limited to) the following elements (see the **Worker Safety and Fire Protection** section 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 the operation and maintenance of systems utilizing hazardous materials;
- fire safety and prevention; and
- emergency response actions including facility evacuation, hazardous material spill clean-up, and fire prevention.

At the facility, the project owner will be required to designate an individual with the responsibility and authority to ensure a safe and healthful work place. The project health and safety official will oversee the health and safety program and have the authority to halt any action or modify any work practice to protect the workers, facility, and the surrounding community in the event of a violation of the health and safety program.

The applicant will also prepare a risk management plan for aqueous ammonia, as required by both CalARP regulations and Condition of Certification **HAZ-2**. This condition also includes the requirement for a program for the prevention of accidental releases and responses to an accidental release of aqueous ammonia. A hazardous materials business plan will also be prepared by the applicant that would incorporate state requirements for the handling of hazardous materials (CofA 2007a, Section 6.15.4.2). Other administrative controls would be required in proposed Conditions of Certification **HAZ-1** (limitations on the use and storage of hazardous materials and their strength and volume) and **HAZ-3** (development of a safety management plan). Proposed Condition **HAZ-4** would require that the aqueous ammonia storage tank be designed to certain specifications.

On-Site Spill Response

In order to address the issue of spill response, the facility will prepare and implement an emergency response plan that includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, and prevention equipment and capabilities, as well as other elements as required by state law (Health and Safety Code sections 25500 to 25541) and local law regarding Hazardous Materials Business Plans. (see section on **Worker Safety/Fire Protection** for a more detailed discussion of the requirements of these emergency response plans). Emergency procedures will be established which include evacuation, spill cleanup, hazard prevention, and emergency response.

The Anaheim Fire Department (AFD) would be the first responder for hazardous materials incidents. The AFD has a six-person Type I Hazardous Materials Response Team, and backup support would be provided by Hazmat response teams from Irvine, Santa Ana, and Huntington Beach through mutual aid agreements with the AFD (AFD 2008). Staff finds that the available local hazmat teams are capable of responding to a hazardous materials emergency call from CPP with an adequate response time. (See staff's section on **Worker Safety and Fire Protection** in this FSA.)

Transportation of Hazardous Materials

Hazardous materials including aqueous ammonia will be transported to the facility by tanker truck. 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.

Staff reviewed the applicant's proposed transportation routes for hazardous materials delivery. Trucks would travel on SR-91, exit at Kraemer Bld., and follow Kraemer north to East Miraloma Avenue to the project site (G&B 2008d, response to data request 19). There are no schools located along this route (CofA 2007a, Figure 6.16-1) and both streets are designated hazardous materials transportation routes.

Ammonia can be released during a transportation accident and the extent of impact in the event of such a release would depend upon the location of the accident and 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 upon three factors:

- the skill of the tanker truck driver;
- the type of vehicle used for transport; and
- accident rates.

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 (SR-91). Staff believes it is appropriate to rely upon the extensive regulatory program that applies to the shipment of hazardous materials on California highways to ensure safe handling in general transportation (see Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, DOT regulations 49 CFR subpart H, §172–700, and California Department of Motor Vehicles (DMV) regulations on hazardous cargo). These regulations also address the issue of driver competence. See AFC section 6.11 for additional information on regulations governing the transport of hazardous materials.

To address the issue of tanker truck safety, aqueous ammonia will be delivered to the proposed facility in DOT-certified vehicles with design capacities of 6,500 gallons. These vehicles will be designed to DOT Code MC-307. These are high-integrity vehicles designed to haul caustic materials such as 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 that 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 risk of a hazardous materials transportation accident.

Staff used the data from the Davies and Lees (1992) article, which references both the 1990 Harwood et al. and 1993 Harwood studies, to determine that the frequency of release for the transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per 1,000,000 miles traveled on well-designed roads and highways. The maximum use of aqueous ammonia each year of the operation of the proposed CPP project will require about 8 tanker truck deliveries of aqueous ammonia per year, each delivering about 6,500 gallons (G&B 2008d, Response to Data Request # 18). Each delivery will travel approximately 0.8 miles from SR-91 along Kraemer Blvd. and Miraloma Ave. to the facility.

This would result in about 6.4 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 1,000,000.

In addition, staff used a transportation risk assessment model (developed by staff) in order to calculate the probability of an accident resulting in a release of a hazardous material due to delivery from the freeway to the facility. Results show a risk of 0.4 in 1,000,000 for one trip from SR-91 and a total annual risk of 3.3 in 1,000,000 for 8 deliveries. This risk was calculated using accident rates on various types of roads (in this case, urban multilane undivided) with distances traveled on each type of road computed separately. Although it is an extremely conservative model in that it includes risk of accidental release from all modes of hazardous materials transportation and does not distinguish between a high-integrity steel tanker truck and other less secure modes, the results still show that the risk of a transportation accident is insignificant.

Staff therefore believes that the risk of exposure to significant concentrations of aqueous ammonia during transportation to the facility is insignificant because of the remote possibility that an accidental release of a sufficient quantity could be dangerous to the public. The transportation of similar volumes of hazardous materials on the nation's highways is neither unique nor infrequent. 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.

In order to further ensure that the risk of an accident involving the transport of aqueous ammonia to the power plant is insignificant, staff proposes an additional administrative control in proposed Condition of Certification **HAZ-6** that would require the use of only one specific route to the site, that being the shortest route from an interstate (SR-91 to Kraemer Blvd. to East Miraloma to the facility).

Based on the environmental mobility, toxicity, the quantities at the site, and frequency of delivery, it is staff's opinion that aqueous ammonia poses the predominate risk associated with both use and hazardous materials transportation. Staff concludes that the risk associated with the transportation of other hazardous materials to the proposed project does not significantly increase the risk of ammonia transportation.

Seismic Issues

It is possible that an earthquake could cause the failure of a hazardous materials storage tank. An earthquake could also cause failure of the secondary containment system (berms and dikes), as well as the failure of electrically controlled valves and pumps. The failure of all of these preventive control measures might then result in a vapor cloud of hazardous materials that could move off site and affect 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, have all heightened concerns about earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused both to several large storage tanks and to smaller tanks associated with the water treatment system of a cogeneration facility. The 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 which should be followed when 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 failed as a result of that earthquake. Referring to the sections on **Geologic Hazards and Resources** and **Facility Safety Design** in the AFC, staff notes that the proposed facility will be designed and constructed to the standards of the 1998 California Building Code for Seismic Zone 4 (CofA 2007a, Section 6.3.3.1). Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake (with newer tanks), staff determined that tank failures during seismic events are not probable and do not represent a significant risk to the public.

Site Security

The applicant proposes to use hazardous materials identified by the U.S. EPA as requiring the development and implementation of special site security measures to prevent unauthorized access. The U.S. EPA published a Chemical Accident Prevention Alert regarding site security (EPA 2000a), the U.S. Department of Justice published a special report entitled *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 (DOE) published the draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002). The energy generation sector is one of 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. This rule was implemented with the publication of Appendix A, the list of chemicals, on November 2, 2007. While the rule applies to aqueous ammonia solutions of 20% or greater and this proposed facility plans to utilize a 19% aqueous ammonia solution, staff still believes 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 plan will be prepared for the proposed facility prior to operations. Perimeter security measures utilized for this facility would include a 20-foot-tall masonry wall surrounding the perimeter, a remote-controlled hydraulic security gate at the plant's main entrance equipped with a video surveillance system that would enable operators to monitor access to the site from the control room, and additional video cameras throughout the plant to monitor critical plant structures (CofA 2007a, Section 3.5.11).

In order to ensure that neither this project nor a shipment of hazardous material is the target of unauthorized access, staff's proposed Conditions of Certification **HAZ-7** and **HAZ-8** address both construction security and operation security plans. These plans would require implementation of site security measures consistent with the above-referenced documents.

The goal of these conditions of certification is to provide for the minimum level of security for power plants necessary for the protection of California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for the CPP project 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 the 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 used an internal vulnerability assessment decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the North American Electric Reliability Council's (NERC) 2002 guidelines, the U.S. DOE VAM-CF model, and the U.S. Department of Homeland Security regulations published November 2007 in the Federal Register (Interim Final Rule 6 CFR Part 27). Staff determined that this project would fall into the category of low vulnerability. Staff therefore proposes that certain security measures be implemented but does not propose that the project owner conduct its own vulnerability assessment.

These security measures include perimeter fencing and breach detectors, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contacts in the event of a 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 properly licensed and trained drivers. 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 through 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. DOE, or the NERC, after consultation with both appropriate law enforcement agencies and the applicant.

CUMULATIVE IMPACTS AND MITIGATION

Staff analyzed the potential for the existence of cumulative impacts. A significant cumulative hazardous materials impact is defined as the simultaneous uncontrolled release of hazardous materials from multiple locations in a form (gas or liquid) that could cause a significant impact where the release of one hazardous material alone would not cause a significant impact. Existing locations that use or store gaseous or liquid hazardous materials, or locations where such facilities might likely be built, were both considered. Staff found that no existing or proposed facilities within a distance that could possibility contribute to a cumulative impact met this criteria. The nearby area is comprised of light industrial and commercial establishments with some residential areas. Staff believes that while cumulative impacts are theoretically possible, they are not probable because of the many safeguards implemented to both prevent and control an uncontrolled release. The chances of one uncontrolled release occurring are remote. The chance of two or more occurring simultaneously, with resulting airborne plumes mingling to create a significant impact, are even more remote. Staff believes the risk to the public is insignificant.

The applicant's modeling of a worst-case release of aqueous ammonia from the proposed project site predicts that significant levels of ammonia vapors would not occur off-site and therefore no cumulative impacts would be expected even if a nearby facility were to store and use hazardous materials and have an accidental release concurrent with that from the proposed CPP (CofA 2007a, Section 6.15.3). The applicant will develop and implement a hazardous materials handling program for CPP independent of any other projects considered for potential cumulative impacts. Staff believes that the facility, 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 off-site 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 CPP site and another facility at the same time. Therefore, staff concludes that the facility would not contribute to a significant hazardous materials-related cumulative impact.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments have been received from the public or agencies on the topic of hazardous materials management.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the CPP project would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of hazardous materials management.

CONCLUSIONS

Staff's evaluation of the proposed project (with proposed mitigation measures) indicates that hazardous material use will pose no significant impact to 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 a Risk Management Plan (RMP). To ensure the adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by the Anaheim Fire Department and by Energy Commission staff. In addition, staff's proposed conditions of certification require the review and approval of the RMP by staff prior to the 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, in addition to site security matters.

Staff recommends that the Energy Commission impose the proposed conditions of certification, presented herein, to ensure that the project is designed, constructed, and operated to comply with all 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 staff are required and implemented, 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. Condition of Certification **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in **Appendix B** of the staff assessment, unless there is prior approval by the Energy Commission compliance project manager. Condition of Certification **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 Condition of Certification (**HAZ-3**) requiring the 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 the 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. This plan would additionally prevent the mixing of incompatible materials that could result in toxic vapors. Condition of Certification **HAZ-4** requires that the aqueous ammonia storage tank be designed to certain specifications. The transportation of hazardous materials is addressed in Conditions of Certification **HAZ-5** and **HAZ-6**. Site security during both the construction and operations phases is addressed in Conditions of Certification **HAZ-7** and **HAZ-8.**

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 or strengths 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 contained at the facility.

HAZ-2 The project owner shall concurrently provide a Business Plan and a Risk Management Plan (RMP) prepared pursuant to the California Accidental Release Program (CalARP) to the Anaheim Fire Department (AFD) and the CPM for review. After receiving comments from the AFD 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 AFD for information and to the CPM for approval.

Verification: At least thirty (30) 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 thirty (30) days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the Certified Unified Program Agency for information and to the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of aqueous ammonia and other liquid hazardous materials by tanker truck. The plan 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. This plan shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least thirty (30) days prior to the delivery of any liquid hazardous material to the facility, the project owner shall provide a Safety Management Plan 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.

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 all vendors delivering aqueous ammonia to the site to use only tanker truck transport vehicles which meet or exceed the specifications of DOT Code MC-307. The project owner shall provide this direction in a letter to the vendor(s) at least thirty (30) days prior to the receipt of aqueous ammonia on site.

Verification: At least thirty (30) days prior to 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 At least thirty (30) days prior to receipt of any hazardous materials on site, the project owner shall direct all vendors delivering any hazardous material to the site to use only the route approved by the CPM. Trucks will travel on SR-91 to Kraemer Blvd. to Miraloma Avenue to the plant site. The project owner shall obtain approval of the CPM if an alternate route is desired.

Verification: At least thirty (30) days prior to receipt of any hazardous materials on site, the project owner shall submit to the CPM for review and approval copies of notices to hazardous materials vendors describing the required transportation route.

HAZ-7 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.

<u>Verification:</u> 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 also prepare a site-specific security plan for the commissioning and operational phases that will be available to the CPM for review and approval. The project owner shall implement site security measures that address physical site security and hazardous materials storage. The level of security to be implemented shall not be less than that described 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 operated 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 determine the accuracy of employee identity and employment history and shall be conducted in accordance with state and federal laws 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 contractors who 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 compliance 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(s) present 24 hours per day, 7 days per week;

    <u>or</u>

    b. power plant personnel on site 24 hours per day, 7 days per week, **or** if power plant personnel are not on-site 24 hours per day, 7 days per week, all plant alarms, intrusion detectors, and CCTV systems shall be monitored at all times from a remote location when the site is unmanned, and **all** of the following:

        1. the CCTV monitoring system required in item 9, above, shall include cameras able to pan, tilt, and zoom; that 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 from a monitor in the power plant control room; **and**

        2. perimeter breach detectors **<u>or</u>** on-site motion detectors.

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to those security plans. The CPM may authorize modifications to these measures, or may require additional measures such as protective barriers for critical power plant components—transformers, gas lines, and compressors—depending upon 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 both appropriate law enforcement agencies and the applicant.

Verification: At least thirty (30) days prior to the initial receipt of hazardous materials on site, the project owner shall notify the CPM that a site-specific operations site security plan is 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 that updated certification statements have been 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.

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.

REFERENCES

AFD (Anaheim Fire Department) 2008 – Electronic mail correspondence with Deputy Chief of Operations, Larry Waterhouse. July 9.

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

California Air Resources Board 2001. *"Guidance for the Permitting of Electrical Generation Technologies"*. Nov. 15.

CofA 2007a – City of Anaheim/S. Sciortino (tn: 43903). City of Anaheim's Canyon Power Plant Application for Certification Volume I & II. Submitted to CEC/Docket Unit on 12/28/2007.

Davies, P.A. and Lees, F.P. 1992. *The Assessment of Major Hazards: The Road Transport Environment for Conveyance of Hazardous Materials in Great Britain*. Journal of Hazardous Materials, 32: 41-79.

Environmental Protection Agency (EPA). 2000a. Chemical *Accident Prevention: Site Security.* Environmental Protection Agency, Office of Solid Waste and Emergency Response. February 2000.

Harwood, D.W., J. G. Viner, and E.R. Russell. 1990. *Truck Accident Rate Model for Hazardous Materials Routing*. Transportation Research Record. 1264: 12-23.

Harwood, D.W., J. G. Viner, and E.R. Russell. 1993. *Procedure for Developing Truck Accident and Release Rates for Hazmat Routing*. Journal of Transportation Engineering. 119(2): 189-199.

G&B 2008d – GB/M. Cosens (tn: 46614). Data Responses to Data Requests 1-55. Submitted to CEC/Docket Unit on 06/05/2008.

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

North American Electric Reliability Council (NAERC) 2002. *Security Guidelines for the Electricity Sector,* Version 1.0, June 14, 2002.

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

U.S. Department of Energy (US DOE). 2002. Draft Vulnerability Assessment Methodology, Electric Power Infrastructure. Office of Energy Assurance, September 30, 2002.

U.S. Department of Justice (US DOJ). 2002. Special Report: Chemical Facility Vulnerability Assessment Methodology. Office of Justice Programs, Washington, D.C. July 2002.

THIS PAGE INTENTIONALLY LEFT BLANK

HAZARDOUS MATERIALS
Appendix A

Basis for Staff’s Use of 75 Parts Per Million Ammonia Exposure Criteria

THIS PAGE INTENTIONALLY LEFT BLANK

BASIS FOR STAFF'S USE OF 75 PARTS PER MILLION AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 parts per million (PPM) to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by the U.S. Environmental Protection Agency and the California Environmental Protection Agency 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 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. California Environmental Quality Act 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 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]	)SH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 minutes	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 minutes	Protects nearly all segments of general population from irreversible effects.
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 minutes, 4 times per 8-hour day	No toxicity, including avoidance of irritation.
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 minutes	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 minutes 30 minutes 10 minutes	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 hours	No toxicity or irritation on continuous exposure for repeated 8-hour work shifts.
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 minutes	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) warned 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, TABLE 1

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

THIS PAGE INTENTIONALLY LEFT BLANK

HAZARDOUS MATERIALS
Appendix B

Hazardous Materials Proposed for Use at the CPP

THIS PAGE INTENTIONALLY LEFT BLANK

HAZARDOUS MATERIALS Appendix B
Hazardous Materials Proposed for Use and Storage On-site at the CPP

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site
Acetylene	74-86-2	Welding	Health: hazardous if inhaled Physical: combustible, flammable	270 cubic feet
Antiscalent (neat) acrylate polymers	mixture	RO System	Health: None Physical: None	400 gallons
Aqueous Ammonia 19% Solution	7664-41-7	NO_X reduction in SCR	Health: irritation to permanent damage from inhalation, ingestion, and skin contact Physical: reactive, vapor is combustible	10,000 gallons
Diesel Fuel	Mixture	Black start generator	Health: Low-toxicity Physical: Flammable liquid	500 gallons
Dispersant/Corrosion Inhibitor (neat) acrylic polymer	9011-14-7	Scale/corrosion control (cooling tower, circulating water)	Health: None Physical: None	400 gallons
Dryer Desiccant	Silica, Amorphous 7631-86-9	Instrument air	Health: Dust may cause irritation, dust is irritant to respiratory tract. Expected to be hazardous if ingested. Possible cancer hazard. Physical: Not regulated	300 pounds
Hydraulic fluid	Mixture	Rotating equipment	Health: hazardous if ingested Physical: may be flammable/combustible	110 gallons
Lubrication Oil (turbine synthetic lube oil)	None	Rotating equipment	Health: hazardous if ingested Physical: may be flammable/combustible	600 gallons
Mineral Oil	8042-47-5	Transformers	Health: eye and skin irritant, inhalation of mist may cause lung irritation Physical: None	35,000 gallons
Motor Oil	64742-47-8	Construction vehicles and equipment	Health: hazardous Physical: None	110 gallons
Natural Gas (Methane)	74-82-8	Fuel for power plant	Health: Asphyxiant. Effects are due to lack of oxygen. Physical: flammable gasses	N/A
Non-oxidizing Biocide (Isothiazolin)	26172-55-4	Biocide for cooling system	Health: None Physical: None	400 gallons
Paint	Mixture	Painting	Health: various Physical: various	50 gallons
Propane	74-98-6	Miscellaneous heating activities	Health: low toxicity Physical: flammable	75 pounds

RO Membrane Cleaners (Tetrasodium EDTA)	64-02-8	RO system	Health: None Physical: None	400 gallons
Sodium Bisulfite (38%)	7631-90-5	Dechlorination (RO system)	Health: Harmful if swallowed. Contacts with acids liberates toxic gas. Irritating to eyes, respiratory system, and skin. Possible sensitizer. Physical: Corrosive	400 gallons
Sodium Hypochlorite (12%)	7681-52-9	Biocide/biofilm control (raw water tank, cooling tower circulating water)	Health: toxic and corrosive Physical: corrosive	400 gallons
Sulfur Hexaflouride	2551-62-4	Switchyard breakers	Health: asphyxiant, effects are due to lack of oxygen Physical: non-flammable	6,000 pounds
Sulfuric Acid (93%)	7664-93-9	pH control (cooling tower circulating water, RO system)	Health: irritant to eyes, poisonous if inhaled, extreme irritant, corrosive, and toxic to tissue Physical: corrosive	400 gallons
Transmission Fluid	None	Construction vehicles and equipment	Health: None Physical: None	100 gallons
Unleaded Gasoline	Mixture	Construction vehicles	Health: irritant Physical: flammable liquid	200 gallons
Various Detergents	None	Combustion turbine cleaning	Health: None Physical: None	220 gallons
Waste Fluids (i.e. motor oil, transmission fluid, hydraulic fluid, and antifreeze)	None		Health: None Physical: None	45 gallons
Waste Paint, Thinners, and Solvents	None		Health: None Physical: None	45 gallons
Waste Welding Materials	None		Health: None Physical: None	45 gallons

Source: G&B 2008d, Response to Data Request #17, Tables 6.15-1 and 6.15-2

a. Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act.

LAND USE

Testimony of David Flores

SUMMARY OF CONCLUSIONS

As provided in this land use analysis, the proposed project is consistent with the city of Anaheim's General Plan and zoning designation with approval of a Conditional Use Permit. Staff has provided findings of conformity and conditions of certification that would bring the Canyon Power Plant project in conformity with the city of Anaheim municipal code.

Energy Commission staff concludes that Canyon Power Plant project would not:

- Result in any impacts to existing industrial operations or future use in the area;
- Physically disrupt or divide an established community;
- Conflict with any applicable habitat conservation plan or natural community conservation plan; or
- Result in unmitigated project-related impacts on surrounding land uses.

INTRODUCTION

The land use analysis of the Canyon Power Plant (CPP) project focuses on the project's consistency with land use plans, ordinances, regulations, and policies, and the project's compatibility with existing or reasonably foreseeable[1] land uses. In addition, a power plant and its related facilities generally have the potential to create impacts in the areas of air quality, noise, public health, traffic and transportation, and visual resources. These individual resource areas are discussed in detail in separate sections of this document.

[1] "Reasonably foreseeable" is defined in the California Environmental Quality Act (CEQA) as approved projects under construction; approved related projects not yet under construction; unapproved (planned) projects, with related impacts, currently under environmental review; and projects under review by the Lead Agency or other relevant public agencies. Planned developments, such as those identified in an airport Master Plan, may also be considered, provided there is evidence that measures are actually being taken to implement the plans. The analysis must also take into consideration the most probable development patterns and future activities that are a reasonably foreseeable consequence of the initial project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following table contains all land use LORS applicable to the proposed project.

Land Use Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	**Description**
Federal	None
State	None
Local	
City of Anaheim	
General Plan- Industrial Area Land Use Element	The land use element allows for a wide variety of industrial related uses from business parks, technology centers, light manufacturing, and warehouses. The land use element assigns floor area ratio (FAR), the ratio of the total net floor area of a building to the total lot area.
Economic Development Element	Discourages land uses that compromise the integrity of the area's industrial and office park setting.
Public Services and Utilities Element	Coordinates with Southern California Edison and other suppliers regarding electricity supply and distribution to provide a continual source of reliable and efficient energy. Ensure that adequate electricity capacity exists for planned development.
Redevelopment Plan Alpha	The Redevelopment Plan Alpha is the largest redevelopment project area in the COA taking in approximately 2,500 acres, including both the downtown area and the industrial area known as The Canyon, in which the project is located. The goals for the Redevelopment Plan Alpha include: • Enhancing the long term viability of The Canyon by preserving the integrity of industrially-designated land uses; • Improving urban design standards; • Providing additional employment-generated uses, such as commercial and mixed-use development; and • Enhancing water recharge basins as visual and recreational amenities, where appropriate.
General Plan - Northeast Area Specific Plan	The Northeast specific plan has been designed to meet the following objectives: • Establishing the best mix of land uses based on long-range economic , planning, and environmental considerations; • Improving the marketability of existing land uses; • Redeveloping and improving underutilized parcels; • Optimizing municipal revenues from sales and property taxes; • Generating sufficient revenue to fund necessary public improvements; • Providing adequate public services and facilities to all properties; and improving the overall appearance of the area. The Northeast Area Specific Plan designates Development Areas 1 and 1A to provide for and encourage the development of industrial uses and their related facilities. The Canyon project is within the Area 1 designation project area.
Northeast Area Specific Plan Cont.	The development standards within the Development Area 1 are similar to the industrial zones, although a few exceptions relate to building height limitations, permitted uses, and landscape requirements along arterial roadways.

Applicable Law	Description
Municipal Code	The city of Anaheim Municipal Code contains ordinances that deal with planning, building, subdivision, permitting, and zoning standards, requirements, and restrictions. Titles 18, also known as the Zoning Ordinance of the city of Anaheim, specifically provides regulations that implement the goals, objectives, and policies of the Anaheim General Plan, pursuant to the mandated provisions of State Planning and Zoning Law, California Environmental Quality Act (CEQA), and other applicable state and local requirements. The Northeast Specific Plan references and incorporates applicable portions of the Anaheim Municipal Code as it relates to development within its specific plan boundaries (see discussion below). The following sections are specifically applicable to the proposed project: • §18.10 Defines "I" Zone • §18.120 Defines uses subject to Conditional Use Permit within the Northeast Area Specific Plan • §18.10.050 Provides regulations for building height in the industrial zone. • §18.66 Conditional Use Permit process and authority. • §18.60 Site plan review process. • §18.46 Provides regulations for fences, hedges, and walls.

SETTING

The proposed site for the CPP project is located in the city of Anaheim, in the northern part of Orange County. To the north of the project site is the city of Placentia, to the south is the Santa Ana River corridor, the city of Orange, and a small unincorporated area within Orange County. The Santa Ana River runs east-west approximately one mile south of the project area.

The project site is served by two major freeways. Highway 57 runs north-south through the city of Anaheim, and is approximately one-mile west of the project area. Highway 91 run east-west through the city of Anaheim and is also approximately one-mile south of the project site. (See **Land Use Figure 1**).

The CPP and associated construction laydown areas will be located on approximately 10-acres of disturbed land located at 3071 East Miraloma Avenue. Access to the project site will be at the southeast corner of the project site from East Miraloma Avenue. A second gate entrance will be accessible via East Miraloma Avenue with a third gate off the alley to the east of the project site. (see **Land Use Figure 2**).

The project's proposed transmission route (see **Land Use Figure 1**).

GENERAL PLAN LAND USE DESIGNATIONS AND ZONING WITHIN THE ONE-MILE RADIUS OF THE PROJECT STUDY AREA

The CPP plant site and construction laydown location, and all linear facilities with the exception of a small portion of the gas pipeline which is located on Orangethorpe Avenue in the city of Placentia are located within the Northeast Specific Plan Area boundaries and zoned Industrial (Development Area 1), with a General Plan land use designation of Industrial “I”, as defined in the Northeast Specific Plan of the city of Anaheim General Plan.

Land Use Tables 2 and **3** and **Land Use Figures 3 and 4** show the general plan and zoning designations within a one-mile radius of the proposed project site, excluding the transmission line corridor.

Land Use Table 2
General Plan Land Use Designations within the One-Mile Radius Project Study Area

Direction	Jurisdiction	Designation
North	City of Placentia	Manufacturing and Residential
	City of Anaheim	Industrial
South	City of Orange	Industrial and Residential
	City of Anaheim	Industrial -General
East	City of Placentia	Rural Residential (1 dwelling unit per acre) Open Space
	City of Anaheim	Industrial, Water, and General
West	City of Anaheim	Industrial and General
	City of Placentia	Manufacturing and Residential

Source: CPP008a, Figures 6.9-2

Land Use Table 3
Zoning Designations within the One-Mile Radius Project Study Area

Direction	Jurisdiction	Designation
North	City of Placentia	Manufacturing (M) Low Medium Residential (R-2) High Density Residential (R-3)
	City of Anaheim	Industrial Area (Development Area 1)
South	City of Orange	SCLA Specific Plan (SP) - Industrial
	City of Anaheim	Industrial and Industrial
East	City of Placentia	Single Family Residential (R-1)
	City of Anaheim	Single Family Residential
West	City of Anaheim	Industrial-Commercial
	City of Placentia	Single Family Residential (R-1)-Manufacturing

Source: CPP007a, AFC Supplement Land Use and Zoning Legend

AFC Appendix B provides a list of the assessors parcel numbers for properties that would comprise the plant site and laydown areas.

There will be four new underground 69 kV circuits leaving the project site. Two will proceed underground and to the south side of East Miraloma Avenue approximately 100 feet to rise up and connect to the existing 69kV overhead Vermont–Yorba Lines via new transition structures. The second two 69kV underground circuits will proceed eastward approximately 4,000 feet in East Miraloma Avenue, turn south on Miller, then proceed approximately 3,000 feet to connect to the Doling–Yorba 69kV line at East La Palma Avenue.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff has analyzed the information provided in the Application for Certification (AFC) and acquired from other sources to determine consistency of the Canyon Power Plant Project (CPP) with applicable federal, state, and local laws, ordinances, regulations, and standards and the potential for the CPP project to have significant adverse land use-related impacts. Staff has also assessed mitigation measures proposed by the applicant and conditions developed by staff to reduce any potential impacts to a less than significant level, as well as the feasibility and enforceability of those proposed mitigation measures and recommended conditions of certification.

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

State/CEQA

Significance criteria used in this document are based on the CEQA Guidelines and LORS utilized by other governmental agencies. Land use impacts may be considered significant if the project would:

- Convert Farmland
    - Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
    - 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 non-agricultural uses.
- Physically disrupt or divide an established community.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.
- Preclude, interfere with, or unduly restrict existing or future permitted uses.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project. This includes, but is not limited to, a General Plan, community or specific plan, local coastal program, airport land use compatibility plan, or zoning ordinance.
- Have individual environmental effects which, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable, compound, or increase other environmental impacts.

In general, a power plant and its related facilities may also be incompatible with existing or planned land uses, resulting in potentially significant impacts, if it creates unmitigated noise, dust, or a public health or safety hazard or nuisance; or results in adverse traffic or visual impacts. Please see other sections of this document, as noted, for a detailed discussion of any additional potential project impacts, recommended mitigation, and conditions of certification.

The CPP project is consistent with the applicable land use LORS adopted by the federal government, the state of California and the city of Anaheim as identified in the Conflict with any Applicable Land Use Plan, Policy, or Regulation section of this analysis. Conditions of certification have been proposed to make the project consistent with the LORS, where necessary.

Based on Energy Commission staff's independent review of the AFC and local Municipal Code, staff has determined that the project would comply with all land use LORS for the city of Anaheim, and Orange County. Energy Commission staff has proposed Condition of Certification **LAND-1** as a means of verifying that the project, if certified, would be built in accordance with the city's minimum Industrial Zoning District standards.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Power Plant Site

The City of Anaheim Planning Department has formulated the Northeast Specific Plan that proposes to increase commercial and industrial development in the planning area, and continues to designate the area of Orange Thorpe Avenue to the north, Kramer Blvd to the east, E. La Palma Avenue to the south and State Route 57 to the west for industrial uses.

The proposed project would be erected on a site that was formerly used for food catering for a fleet of approximately 75 to 100 trucks. The proposed CPP site has no potential to physically divide the existing community. The site is located in an established industrial and mixed commercial area in the city of Anaheim. The power plant would be located entirely on private property and neither the size nor nature of the project would result in a physical division of an established community. No new physical barriers would be created by the project (public access across the site is not currently allowed) and no existing roadways or pathways would be blocked. Given its location, the project would not alter existing residential, recreational, commercial, institutional, and other industrial land use patterns in the area.

The proposed CPP site would comply with the City of Anaheim's LORS. The proposed project is appropriately sited in an area designated for industrial development in the General Plan. The City's General Plan policies concerning the Industrial Corridor are generally supportive of new industrial projects for economic development reasons, rather than restrictive or prohibitive. Staff has concluded that the proposed project does not conflict with any of the relevant land use policies contained in the Anaheim General Plan.

Power plants are not specifically listed as permitted in the Industrial "I" District, and this zoning district is the City's intensive industrial zoning category, permitting a range of light and heavy industrial uses, including public utility facilities. See the Compliance with LORS section of this analysis on the city's interpretation of this matter. The project complies with all of the applicable development standards (lot, and yard requirements) set forth in the Zoning Ordinance for the "I" District.

The proposed project represents further development of a site already committed to industrial use and, therefore, would not introduce a new industrial use into a non-industrial area.

The construction laydown area for CPP is immediately west of the project site, which is part of the proposed power plant site, and would not conflict with existing or planned land uses in this industrialized area. Temporary, construction-related impacts at the project site, such as increased noise and dust, may affect adjacent land uses. With applicant and staff proposed mitigation, these construction impacts are not expected to be significant. Please see the **AIR QUALITY** and **NOISE** sections of this Final Staff Assessment (FSA) for discussions of impacts and mitigation. Staff has found that operation of the CPP would not cause significant, unmitigated adverse noise, dust, public health hazard or nuisance, or traffic impacts on nearby land uses.

Conversion of Farmland

There are no properties within five- mile radius of the proposed project site that are mapped as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance by the California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP). The CPP would require off-site linears, but would not bring about any changes in the environment that could result in the conversion of farmland to nonagricultural use. Therefore, the proposed project would not result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a nonagricultural use or conflict with existing agricultural zoning or Williamson Act contracts. The project would have no impact with respect to farmland conversion.

Physical Division of an Existing Community

The proposed CPP project site is located in the northeastern corner of the city of Anaheim and within the Northeast Specific Plan Area. The power plant would be located entirely on private property, on an existing parcel, and generally within the footprint of an existing manufacturing building. The proposed project site is designated for development in the Anaheim General Plan and Northeast Specific Plan as an Industrial area. The power plant facilities and adjacent construction parking and laydown areas would take access from existing roadways or roads planned for construction in conjunction with the power plant and other nearby projects. No existing roadways or pathways would be blocked or removed from service. Reclaimed and backup water supply, wastewater disposal line and natural gas pipeline connections would be undergrounded within the city of Anaheim's road right-of-way. Neither the transmission nor utility lines would present a new physical barrier within the community as they will be buried underground. Arrival and departure of construction personnel and delivery of materials and supplies would occur along existing roadways and would not significantly contribute to existing traffic congestion (see condition of certification **TRANS-1** in the **TRAFFIC AND TRANSPORTATION** section of this staff assessment).

Staff does not expect temporary construction related effects, such as dust and noise, to impact adjacent land uses. Project implementation would result in the continued industrial use of an industrial site. Please see the **Air Quality** and **Noise** sections of this document for a complete discussion of construction impacts and mitigation. Therefore, implementation of the proposed project would have a less than significant impact on community transportation or interaction and would not divide the community.

Conflict with any Applicable Habitat or Natural Community Conservation Plan

The proposed project site is not subject to any Habitat or Natural Community Conservation Plan or within the boundaries of any wildlife preserve or critical habitat area.

Conflict with any Applicable Land Use Plan, Policy, or Regulation

As required by California Code of Regulations, section 1744, Energy Commission staff evaluates the information provided by the applicant in the AFC to determine if elements of the proposed project would conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, or that would normally have jurisdiction over the project except for the Energy Commission's exclusive authority. This includes all applicable federal, state, and local laws, ordinances, regulations, and standards, including those adopted by the city of Anaheim and Orange County. From a CEQA perspective, the analysis places particular emphasis on any environmental effect that may be avoided or mitigated by conformity with the applicable LORS.

City of Anaheim General Plan

All properties that would make up the proposed CPP project site, including transmission corridors, utility and access easements, and construction parking and laydown areas, would be within the city of Anaheim jurisdictional boundaries and would, therefore, be subject to the current city of Anaheim LORS, including the city of Anaheim General Plan (2004), Municipal (Zoning) Code, Northeast Area Specific Plan, and permitting requirements, except for the Energy Commission's exclusive jurisdiction.

The Anaheim General Plan contains the seven required elements, identified in Government Code, section 65302, including Land Use, Circulation, Housing, Noise, Safety, and the Green, which combines the Conservation and Open Space elements. It also contains three non-mandatory elements, including the Community Design Element, the Public Services and Facilities Element, and the Community Design Element. The Anaheim General Plan is the basis for determining acceptable land uses and related park, road, and other infrastructure needs within the city of Anaheim. The Land Use Element designates the general distribution, location and extent of various land uses, such as housing, business, industry, open space, including agriculture, natural resources, recreation, and enjoyment of scenic beauty, education, public buildings and grounds, solid and liquid waste disposal facilities, and other public and private uses of land. It also includes a statement of population density and building intensity for the various land use districts and identifies areas covered by the plan which are subject to flooding.

The general land use goals for the Anaheim community are intended to guide the development of the city as a balanced community, with residential, commercial, and industrial development; a diversified economic base; adequate city services and infrastructure; and development standards which result in an aesthetically pleasing environment that reflects community needs. The Land Use Element also contains the following goals and policies that directly affect land use and development of the Northeast Specific Plan Area:

Goal 4.1:	Promote development that integrates with minimizes impacts to surrounding land uses.
Policy 1:	Ensure that land uses develop in accordance with the Land Use Plan and Zoning Code in an effort to attain land use compatibility.
Policy 3:	Ensure that developers consider and address project impacts upon surrounding neighborhoods during the design and development process.
Policy 4:	Require new or expanded uses to provide mitigation or buffers between existing uses where potential adverse impacts could occur.
Goal 16.1:	Preserve and project the image of the Canyon as one of the most prominent business centers in Orange County.
Policy 6:	Protect and enhance the integrity and desirability of industrial sites from non-industrial uses.
Policy 9:	Ensure quality development through Zoning Code development standards and the Community Design Element policies and guidelines.

*Verification of Compliance: The CPP project is zoned as Industrial "I", as provided in the Northeast Specific Plan Area. The CPP Project is located in area that is industrialized with various types of businesses ((i.e., transmission tower just west of the project site). This area allows "public utility" uses, which the city has determined includes power plants (*Public Services and Utilities Element). *The project will meet the necessary requirements under the zoning, general plan, and specific plan as it relates to setback, landscaping, development standards. Therefore the CPP project is consistent with Policies and Goals in that the project will meet the appropriate setback requirements for the industrial zone, and security fencing will be appropriate in providing security to the CPP facility.*

City of Anaheim Municipal Code – Planning and Zoning

Chapter 18 of the Anaheim Municipal Code contains ordinances that deal with planning and zoning standards, requirements, and restrictions. Article 1 of this chapter, also known as the Anaheim Zoning Ordinance, specifically provides regulations that implement the goals, objectives, and policies of the Anaheim General Plan, pursuant to the mandated provisions of the State Planning and Zoning Law, CEQA, and other applicable state and local requirements. While the proposed project is subject to all applicable Anaheim Municipal Code requirements, the sections of the Anaheim Zoning Ordinance that apply specifically to the land use aspects of the proposed project are discussed below. Additional city of Anaheim code requirements are addressed in other technical sections of this staff assessment.

Section 18.10.050 Specific Zoning Requirements

This section of the municipal code requires maximum building heights of 100 feet unless permitted under a conditional use permit. All structures within the CPP project site will comply with the maximum building height.

Title 18.10 Maximum Lot coverage

This Title of the zoning code requires a maximum Floor Area Requirement (FAR) of 0.35 to 0.50. This corresponds to maximum lot coverage for a one story building of 50%. The CPP project site will comply with the required density.

Industrial Zoning District “I”

Areas designated for industrial development within the Northeast plan boundaries are identified as Specific Plan (SP) - Industrial “I”. The Industrial “I” designation is intended to accommodate a broad range of industrial activities and development consistent with the uses and regula0tions set forth in Chapter 18 of the Anaheim Municipal Code.

The proposed project site is zoned Industrial “I”, which is consistent with the Industrial General Plan Land Use designation. Section §18.10.050 of the Anaheim Municipal Code (AMC) identifies the uses allowed, development standards and restrictions, and minimum design and performance standards for projects within the Industrial Zoning District. This section also states that buildings in the industrial zone have a height limitation of 100 feet unless permitted under a conditional use permit. The Northeast Specific Plan designates the project site as industrial, but indicates that land uses are implemented consistent with the city’s requirements for “I” districts. There are no project structures whose height will exceed 100 feet.

As noted in the Northeast Specific Plan, a power-generating plant is identified as a conditionally permitted use in §18.44.030]. The following chapter identifies the findings that typically must be made by the Anaheim Planning Commission to grant a Conditional Use Permit (CUP).

The applicant discussed the use permitting requirements with the city of Anaheim planning staff. City of Anaheim planning staff indicated that in evaluating the project, they would review the proposed use, the surrounding land uses, and any deviations to the development standards of the zone district. The following use permit findings are required in order to approve any deviations to adopted development standards:

1. The proposed use is desirable for the public convenience or welfare;

Verification of Compliance: As discussed in this analysis, The CPP project would be consistent with the intent of the Northeast Area Specific Plan to promote an orderly development and establish a balanced and functional mix of land uses consistent with the goals and objectives of the specific plan. The project will provide an additional source of energy supply to the growing community of Anaheim and immediate surrounding communities. In addition, the northeast area of Anaheim will continue to secure new development projects which would provide additional employment opportunities to the area. The CPP project would provide the energy needs to these new projects as they are developed.

2. The proposed use will not impair the character and integrity of the zoning district and surrounding area;

Verification of Compliance: The project site is located in a industrial setting and does not currently adjoin an existing residential, interim residential, recreation, agricultural residential, interim agricultural zones, office-residential mix, commercial, or an office zone.

Staff has proposed condition of certification ***LAND-1*** *to ensure compliance with the remaining property development regulations within the "I" Industrial Zone (Section 18.44).*

3. The proposed use will not be detrimental to the public health, safety, or general welfare of the citizens of the city of Anaheim;

Verification of Compliance: The public health analysis indicates that the construction and operation of the project is not expected to generate a significant adverse cancer or short- or long-term non-cancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed project uses a highly conservative methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the project would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area. For a more detailed discussion, see the ***PUBLIC HEALTH*** *section of this staff assessment.*

The purpose of the Energy Commission's conditions of certification is to prevent adverse affects that a project may generate to the public health, safety and welfare. The proposed project has conditions of certification from approximately twenty technical areas that mitigate any adverse impact to a level below significant. In addition to the ***PUBLIC HEALTH*** *section, also see the* ***AIR QUALITY, SOIL AND WATER RESOURCES****, and* ***NOISE AND VIBRATION*** *sections of this staff assessment.*

4. That the size and shape of the site proposed for the use is adequate to allow the full development of the proposed use, in a manner not to detrimental to either the particular are or health and safety;

Verification of Compliance: The purpose of the Energy Commission's conditions of certification on a project is to prevent adverse affects to the public health, safety and welfare. Conditions of certification are basically comprised of two components; mitigation measures required by CEQA and requirements that the project comply with state or local LORS. For this project, Energy Commission staff reviewed city LORS for applicability to the project and proposed conditions of certification on the project in the Public Health, Hazardous Materials, Noise, and the Land Use sections of the FSA to make the project comply or conform accordingly to the identified city LORS.

Chapter 18.60 Off-Street Parking Ordinance

As provided in this chapter, public utility facilities, including electrical substations must provide one space for each 500 square feet of office space and work area within a strucuture, and also, one space for each project vehicle. The applicant will comply with the off-street parking ordinance by providing sufficient parking for approximately 9 permanent employees. Staff has proposed condition of certification **LAND-1** to ensure compliance with the off-street parking ordinance (Chapter 18).

Land Use Compatibility

The project and related appurtenances would be located within the city of Anaheim Northeast Specific Plan boundaries, in an area that supports both heavy and mixed industrial/commercial activities (see **Land Use Figure 1**). The proposed project site has a General Plan land use designation of "I" Industrial. The project is consistent with other uses currently permitted within that land use designation, provided all requirements for a conditional use permit are met. Surrounding properties are proposed primarily for manufacturing, warehousing, and related industrial. As noted in the discussion above, the primary purpose of the Northeast Specific Plan - Industrial Zoning District "I" designation is to identify and encourage industrial development in areas suitable for this type of use.

When a jurisdictional authority, such as the city of Anaheim, establishes zoning districts, it is that agency's responsibility to ensure the compatibility of adjacent zoning districts and permitted uses, and incorporate conditions and restrictions that ensure those uses will not result in a significant adverse impact ("minimum of detriment") to surrounding properties. Therefore, staff assumes that permitted industrial uses or those deemed equivalent to a permitted use sited on properties zoned "I" are compatible with surrounding uses and zoning districts. Those uses operating under a valid use permit would also be considered compatible.

Energy Commission staff has determined that, as discussed in other sections of this document, the CPP project would not result in unmitigated project-related impacts to surrounding properties. (See the **AIR QUALITY, HAZARDOUS MATERIALS, NOISE, PUBLIC HEALTH, TRAFFIC AND TRANSPORTATION,** and **VISUAL RESOURCES** sections of this document for a complete discussion of noise, dust, public health hazards or nuisance; and adverse traffic or visual impacts.)

Sensitive Receptors

A proposed siting location may be considered inappropriate if a new source of pollution or hazard is located within close proximity to a sensitive receptor. From a land use perspective, sensitive receptor sites are those locations where people who would be more adversely affected by pollutants, toxins, noise, dust, or other project-related consequence or activity are likely to live or gather. Children, those who are ill or immune-compromised, or the elderly are generally considered more at risk from environmental pollutants. Therefore, schools, along with day-care facilities, hospitals, nursing homes, and residential areas, are considered to be sensitive receptor sites for the purposes of determining a potentially significant environmental impact. Depending on the applicable code, close proximity is defined as "within 1000 feet" of a school (California Health & Safety Code, section 42301.6-9) or within 0.25 mile of a sensitive receptor, under CEQA. Proximity is not necessarily the deciding factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

There is no childcare, hospitals, or medical facilities within a one-mile radius of the CPP project site. The nearest school (Melrose Elementary) is approximately one-mile from the project site. Residences are not a permitted use in the I Zoning District, except for on-site living quarters for security personnel, although four, residents are within close proximity of the project site. The nearest home is approximately 1,200 feet west of the project. These homes are considered legally non-conforming within a commercial/industrial zone. Staff has concluded that the CPP project would not pose a significant public health hazard to sensitive receptors in the general vicinity of the project site (please see the **PUBLIC HEALTH** section).

CUMULATIVE IMPACTS AND MITIGATION

A cumulative impact consists of an impact that is created as a result of the combination of the proposed project together with other projects causing related impacts. When the proposed project is viewed together with the effects of other projects in the area, cumulative impacts may be significant. A number of projects are proposed for development in the CPP site vicinity that could contribute to cumulative effects. These include a new middle school located in the city of Placentia, located approximately 1.5 miles west from the project site. It is anticipated that the project will be completed in the fall of 2009. Also, adjacent to the middle school, the Orange County Water District has certified the construction of the La Jolla Groundwater Recharge Basin Project. The construction has not been announced as per this writing. Kaiser's Hospital has received approval for a proposal to construct a new, 360 bed hospital on La Palma Avenue in the city of Anaheim. This proposal is approximately 5-miles east of the project site. It has been determined that the construction of these facilities will not result in a significant cumulative impact to land use during the construction or during the operation of the CPP project, as the CPP site is consistent with the City's long-range planning policies for industrial development in this area; therefore, cumulative land use impacts are not considered significant.

The proposed project is not expected to make a significant contribution to regional impacts related to new development and growth. The CPP is planned to serve the City of Anaheim's existing and anticipated electrical needs of its jurisdictional boundaries.

PUBLIC AND AGENCY COMMENTS

No comments were received.

CONCLUSIONS AND RECOMMENDATIONS

The city of Anaheim's General Plan Land Use Element establishes the area that includes the CPP site as an area planned for industrial and commercial uses. The city of Anaheim General Plan emphasizes the importance of industrial and commercial uses over other uses to improve the economic base of the city. Furthermore, the CPP project meets the following criterion:

- The CPP project would not physically disrupt or divide an established community or conflict with any applicable habitat conservation plan or natural community conservation plan; result in any impacts to existing agricultural operations or future use; convert farmland to non-agricultural use; or conflict with existing agricultural zoning or Williamson Act contracts.
- The proposed project is consistent with the applicable 2004 General Plan policies and strategies and the project's proposed location is zoned Specific Plan - Industrial, which is consistent with the Industrial land use designation.
- This project is consistent with the city of Anaheim Comprehensive General Plan, the Northeast Specific Plan and the City of Anaheim Zoning Ordinances and Municipal Code.
- The city of Anaheim reviewed staff's recommended conditions of certification in the land use analysis, and no additional land use conditions of certification are required of the CCP project.
- Staff has evaluated the CCP project for compliance with the conditional use permit (CUP) requirements, and concluded the CUP could be granted.
- Full implementation of **LAND-1** would make the project consistent with applicable LORS.

Staff recommends that the Commission adopt the following conditions of certification if it approves the project.

PROPOSED CONDITION(S) OF CERTIFICATION

LAND-1 The project owner shall design and construct the project in accordance to the standards found in the I Zone ("Industrial") of the Anaheim Municipal Code (Chapter 18.10) which includes the following:

- No minimum lot size, width, depth, and yard area;
- Off-street parking and loading spaces shall be provided as stipulated;
- Signage requirements;
- Loading requirements;

- Lighting requirements; and
- Fencing requirements.

Verification: At least 90 calendar days prior to the start of construction, including any grading or site remediation on the power plant project site or its associated easements, the project owner shall submit the proposed development plan to the city of Anaheim Planning Department for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the city of Anaheim.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from the city of Anaheim, along with any changes to the proposed development plan, to the CPM for review and approval.

REFERENCES

CofA 2007a – City of Anaheim/S. Sciortino URS2007a. City of Anaheim's Canyon Power Plant Application for Certification Volume I & II.

CEC 2008g – CEC/M. Jones. Data Adequacy Recommendation. 01/28/2008.

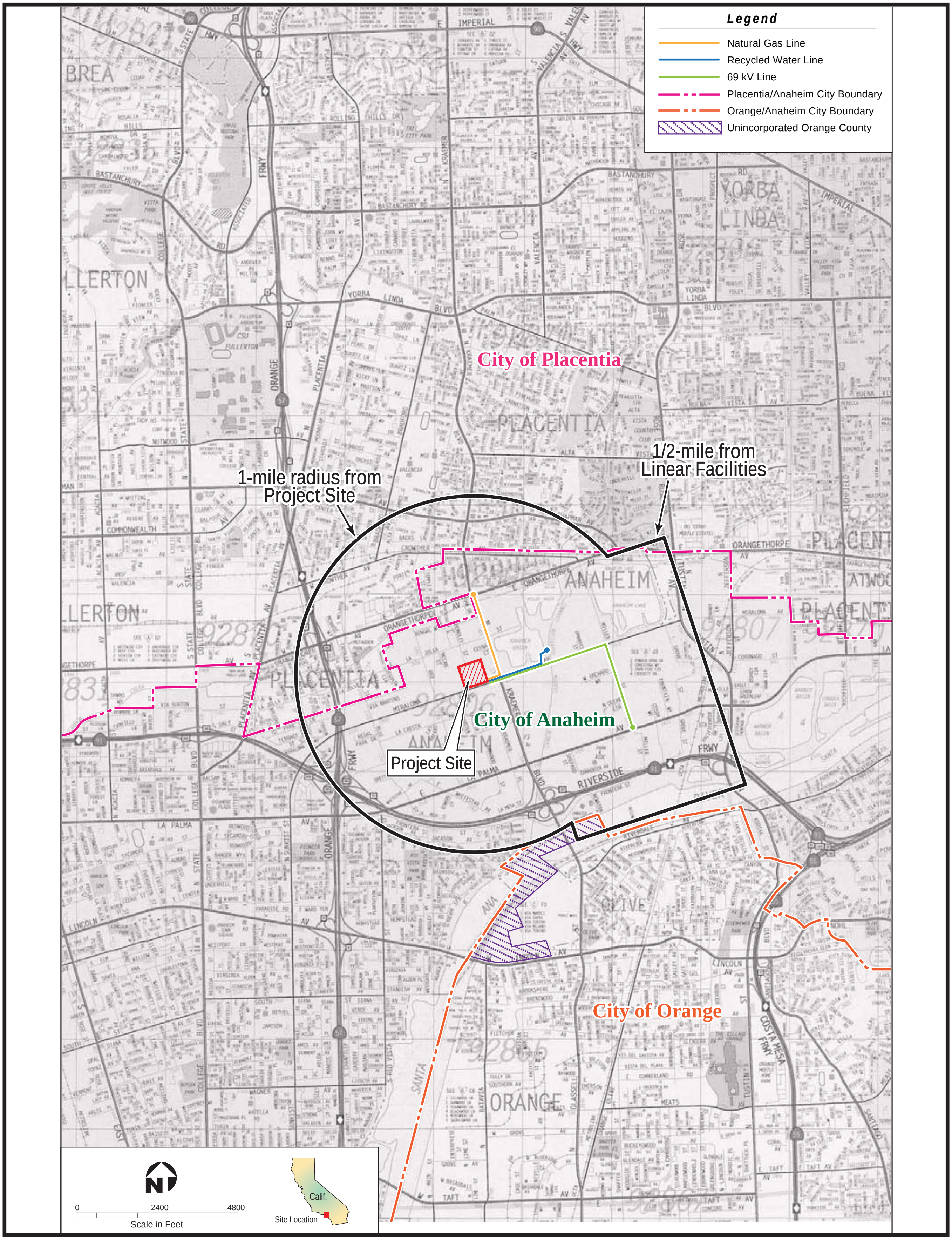
City of Anaheim General Plan. 2004

City of Anaheim Zoning Ordinance

City of Anaheim, Northeast Area Specific Plan, 1994.

LAND USE - FIGURE 1

Canyon Power Project - Location Map & Transmission Route

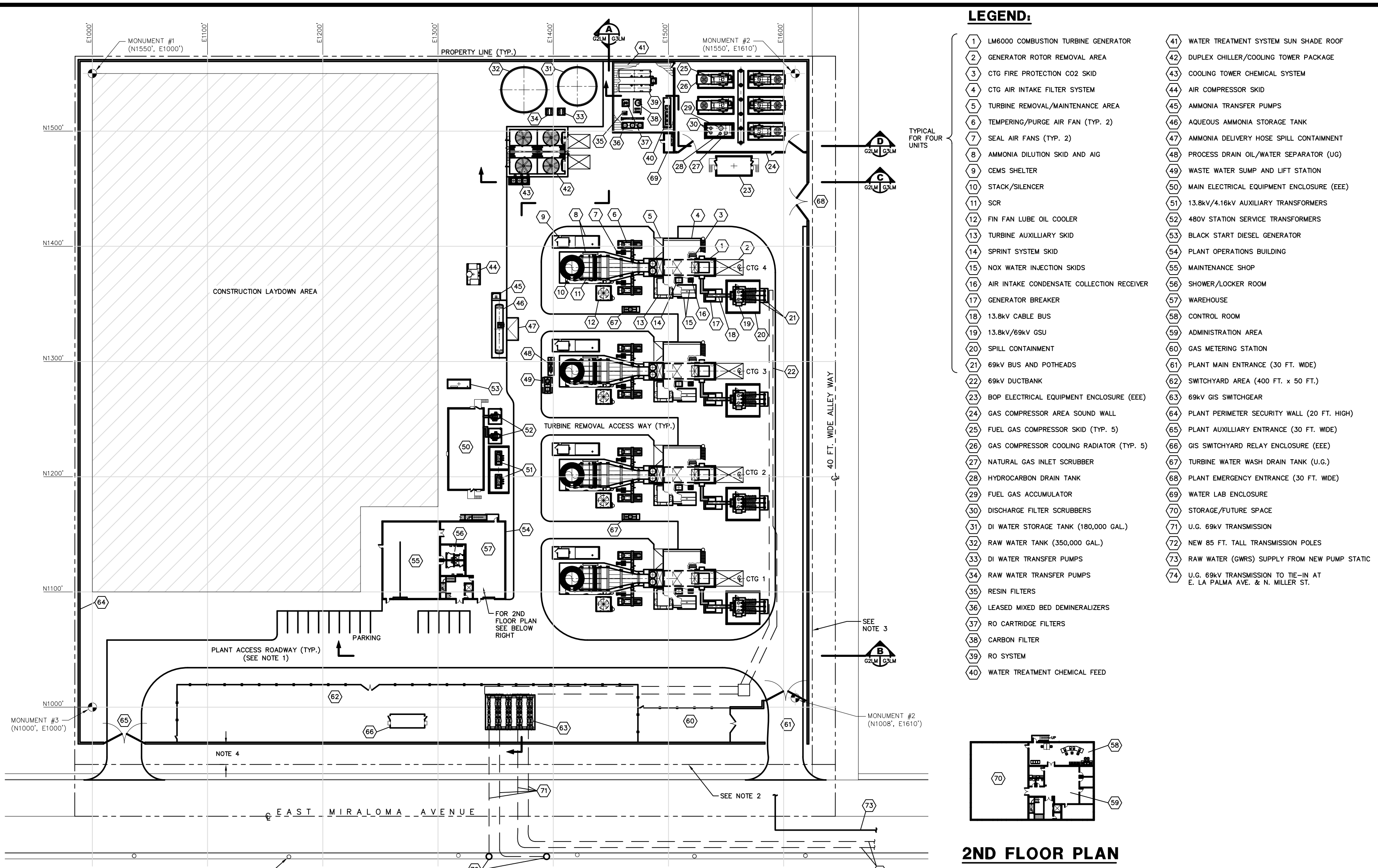


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: AFC Figure 6.9-1

LAND USE - FIGURE 2

Canyon Power Project - Access Into the CPP Project Site



PLOT PLAN

NOTES:

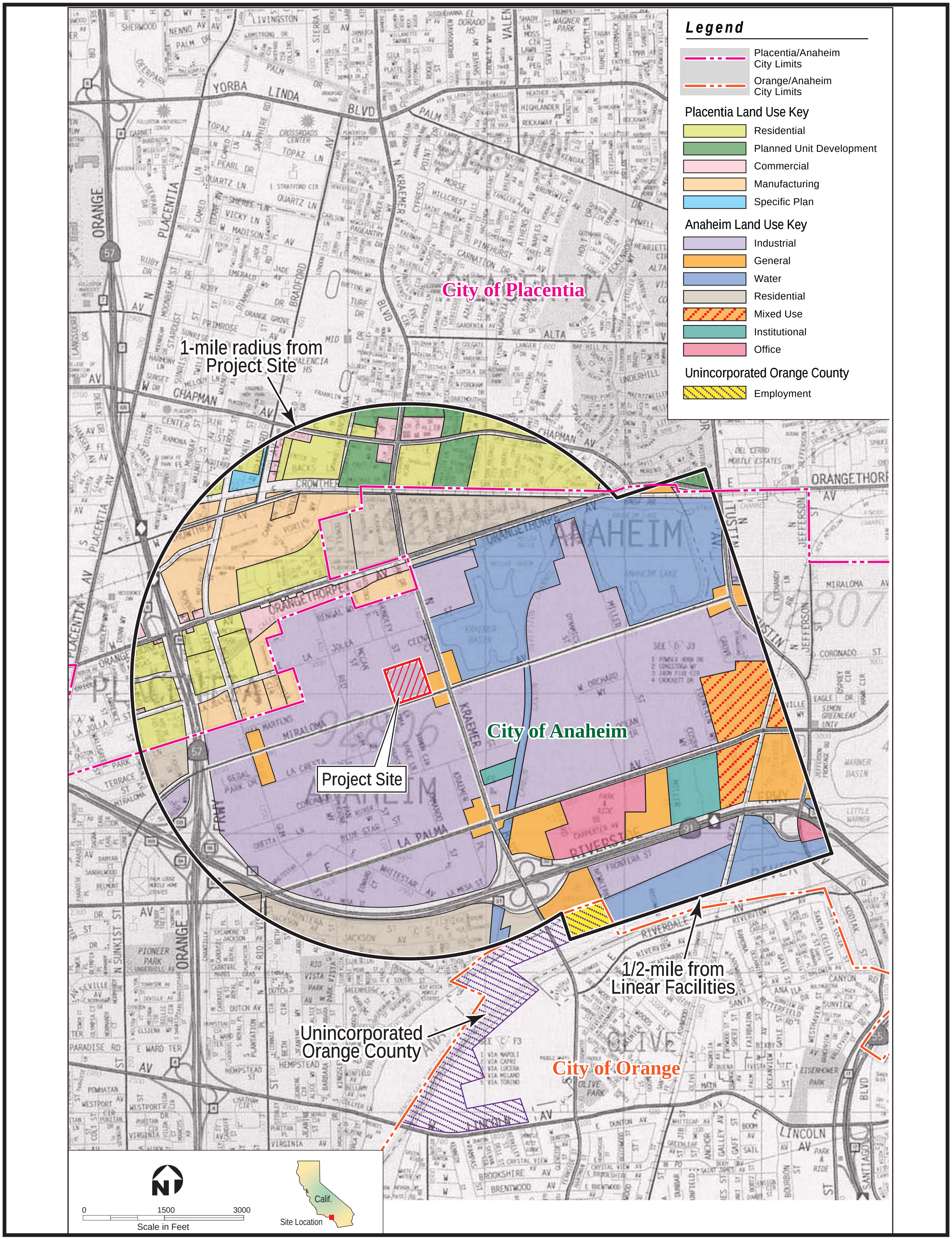
1. ALL PLANT ACCESS ROADWAYS ARE 24 FT. WIDE WITH 40 FT. INSIDE TURNING RADIUS UNLESS OTHERWISE NOTED.
2. 45 FT. EASEMENT FROM CENTER OF E. MIRALOMA AVENUE.
3. 20 FT. ALLEY WAY EASEMENT FROM PROPERTY LINE.
4. 15 FT. MINIMUM FROM E. MIRALOMA AVENUE EASEMENT LIMIT TO EXTERIOR FACE OF SOUND WALL.

PROJECT CONTROL MONUMENT LOCATIONS

MONUMENT NO.	PLANT GRID		ELEVATION (NGVD88)	NAD-83	
	EASTING	NORTHING		EASTING	NORTHING
1	1000	1550	219.01'	6,071,829.74'	2,259,980.96'
2	1610	1550	219.01'	6,072,416.23'	2,260,148.70'
3	1000	1000	216.01'	6,071,980.99'	2,259,452.16'
4	1610	1008	218.24'	6,072,565.27'	2,259,627.60'

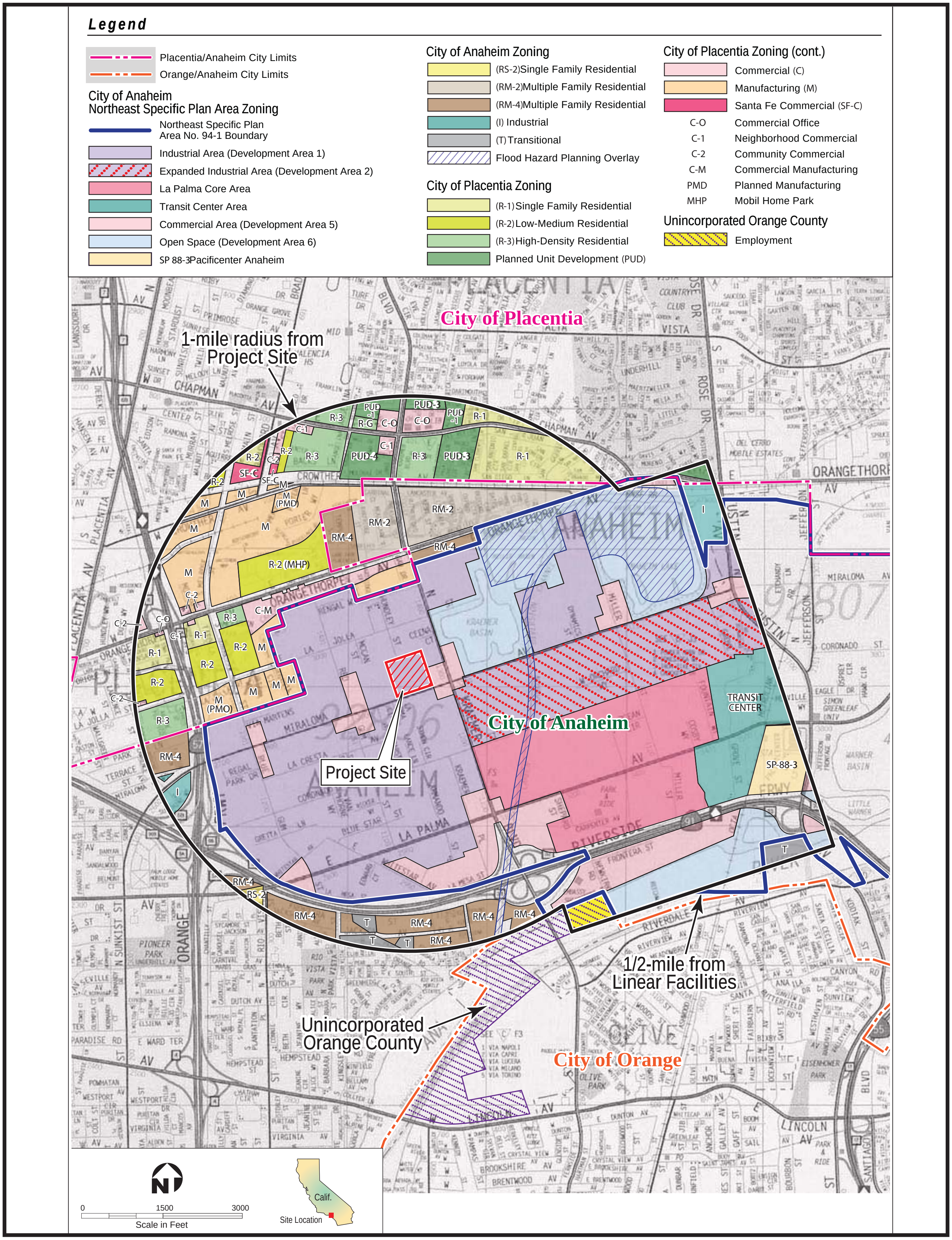
SOURCE: AFC Figure 3-7

LAND USE - FIGURE 3
Canyon Power Project - General Plan Map



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009
SOURCE: AFC Figure 6.9-3

LAND USE - FIGURE 4
Canyon Power Project - Zoning Map/Specific Plan



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009
SOURCE: AFC Figure 6.9-4

NOISE AND VIBRATION

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The Canyon Power Plant (CPP), 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, directly, indirectly, or cumulatively. The applicant has proposed appropriate mitigation, in the form of good design practice and selection of appropriate project equipment, that would avoid any significant adverse impacts.

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 all combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices such as blasting or pile driving. The ground-borne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the CPP project, and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations and standards (LORS). For an explanation of technical terms used in this section, please refer to **Noise Appendix A**, immediately following.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

NOISE Table 1
Laws, Ordinances, Regulations and Standards

Applicable Law	Description
Federal:	
Occupational Safety & Health Act (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure
U.S. Environmental Protection Agency (USEPA)	Assists state and local government entities in development of state and local LORS for noise
State:	
California Occupational Safety & Health Act (Cal-OSHA): 29 U.S.C. § 651 et seq., Cal. Code Regs., tit. 8, §§ 5095-5099	Protects workers from the effects of occupational noise exposure
Local:	
City of Anaheim Municipal Code, Sound Pressure Levels (Chapter 6.70)	Limits noise level at the property line of project site. Limits hours of construction.
City of Anaheim General Plan, Noise Element (Chapter 9)	References the noise limit as specified in the City of Anaheim Municipal Code. References the limit on hours of construction as specified in the City of Anaheim Municipal Code.
City of Placentia Municipal Code, Noise Control	Limits hours of construction

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration, (OSHA) adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **Noise Appendix A, Table A4**, immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

Guidelines are available from the U.S. Environmental Protection Agency (USEPA) to assist state and local government entities in developing state and local LORS for noise. Because there are existing local LORS that apply to this project, the USEPA guidelines are not applicable.

There are no federal laws governing off-site (community) noise.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the “vibration level,” which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of perception is 65 vibrational decibel (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 the Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. This model also defines a simple tone, or “pure tone,” as one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by five A-weighted decibels (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 federal OSHA standards (see **Noise Appendix A, Table A4**).

LOCAL

City of Anaheim LORS

The project is located within the City of Anaheim. The City of Anaheim Municipal Code (CofA 2004b) and the City of Anaheim General Plan (CofA 2004a) apply to this project.

Chapter 6.70 of the municipal code, Sound Pressure Levels, limits noise levels at the property line of noise producing stationary noise sources. It states that no person within the city shall create any sound radiated for an extended period of time from any premises which produces a sound pressure level at any point on the property line in excess of 60 dBA. This limit is referenced in the City’s general plan. However, for the CPP, the City of Anaheim has defined the noise level limit at the project site property line to be 65 dBA. A letter from the City of Anaheim granting this variance is included in the AFC (CofA 2007a, AFC §6.12.1.4.2, Appendix G). Therefore, staff uses this 65 dBA limit as the applicable operational noise level limit at the CPP project site boundaries.

According to the City of Anaheim Municipal Code, construction is allowed between the hours of 7:00 a.m. and 7:00 p.m. This requirement is referenced in Noise Element of the City of Anaheim General Plan.

City of Placentia LORS

Section 23.81.170 of the City of Placentia Municipal Code, Noise Control, limits construction activities to between the hours of 7:00 a.m. and 7:00 p.m. on weekdays, and between the hours of 9:00 a.m. and 6:00 p.m. on Saturdays, with no construction work allowed on Sundays and federal holidays. This restriction applies only to the portion of the natural gas pipeline for this project that would be within the City of Placentia. The City of Placentia's noise LORS do not apply to projects that are located outside the city's jurisdictional boundaries. Therefore, even though the noise-sensitive receptor identified as ML4 in this analysis is located in the City of Placentia, because the source of the noise, the CPP, would be located outside the city's jurisdictional boundaries, the City of Placentia's noise LORS do not apply. Nevertheless, the CPP complies with this City's noise LORS at this receptor.

SETTING

The proposed CPP project site is located at 3071 East Miraloma Avenue in the City of Anaheim, Orange County, California. The land use designation of the project site is industrial (see **Noise Figure 1**). The immediate project area consists of primarily industrial and commercial uses, with residential uses farther away. Sources of noise in the area include vehicle traffic on local roads, activities at industrial shops, train traffic, and aircraft and helicopter over flights (CofA 2007a, AFC §6.12.1.3).

Sensitive noise receptors[1] in the vicinity of the project include four residential homes located east, north, west, and south of the project site, between approximately 1,200 and 2,130 feet from the center of the site.

For purposes of evaluating impacts on residential uses, the project noise is compared with measured nighttime ambient noise levels, when residents are trying to sleep.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and either eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA's guidelines (Cal. Code Regs., tit. 14, App. G) describes some characteristics that could signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. 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;

[1] A sensitive noise receptor, also referred to as a noise-sensitive receptor, is a receptor at which there is a reasonable degree of sensitivity to noise (such as residences, schools, hospitals, elder care facilities, libraries, cemeteries, and places of worship).

2. exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels;

3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying Item 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 by more than 5 dBA at the nearest sensitive receptor, including those receptors that represent the area's minority population.

Staff has concluded that an increase in background noise levels up to and including 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA, however, is clearly significant. An increase of between 5 and 10 dBA should be considered adverse, but could be either significant or insignificant, depending upon the particular circumstances of a particular case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level;[2]

2. the duration and frequency of the noise;

3. the number of people affected; and

4. the land use designation of the affected receptor sites.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary; and
- the use of heavy equipment and noisy[3] activities is limited to daytime hours.

Staff uses the above method and threshold to protect the most sensitive populations, including the area's minority population.

---

[2] 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.

[3] Noise that draws legitimate complaint.

Ambient Noise Monitoring

In order to establish a baseline for the comparison of predicted project noise with existing ambient noise, the applicant has presented the results of an ambient noise survey (CofA 2007a, AFC §6.12.1.2.2; Tables 6.12-2, 6.12-3). This survey was performed from Wednesday, August 22 through Thursday, August 23, 2007, using acceptable equipment and techniques. The noise survey monitored existing noise levels at the following four locations, shown in **Noise Figure 2**:

1. Location ML1: Near the closest residence to the project site. This is a single-family residence located at 2983 East Miraloma Avenue within the city of Anaheim, approximately 1,200 feet west of the center of the project site. This location was monitored continuously from 4:00 p.m. on August 22 through 5:00 p.m. on August 23, 2007.

2. Location ML2: Near a single-family residence located at 3233 East Miraloma Avenue, within the city of Anaheim, approximately 2,130 feet east of the center of the project site. This location was monitored from 12:00 p.m. to 1:00 p.m., and again from 6:55 p.m. to 7:55 p.m., on August 22, 2007, and from 12:00 a.m. to 1:00 a.m. on August 23, 2007.

3. Location ML3: Near a single-family residence located at 3030 Coronado Avenue, within the city of Anaheim, approximately 1,725 feet south of the center of the project site. This location was monitored from 1:05 p.m. to 2:05 p.m., and again from 8:00 p.m. to 9:00 p.m., on August 22, 2007, and from 2:10 a.m. to 3:10 a.m. on August 23, 2007.

4. Location ML4: Near a single-family residence located at 2997 La Jolla Avenue, within the city of Placentia, approximately 1,850 feet north of the center of the project site. This location was monitored from 2:10 p.m. to 3:10 p.m., and again from 9:05 p.m. to 10:05 p.m., on August 22, 2007, and from 1:05 a.m. to 2:05 a.m. on August 23, 2007.

As explained above, the noise environment in the vicinity of the project site is dominated by transportation-related and industrial sources.

NOISE Table 2 summarizes the ambient noise measurements (CofA 2007a, AFC §6.12.1.2.2; Tables 6.12-2, 6.12-3).

NOISE Table 2
Summary of Measured Noise Levels

Measurement Sites	Measured Noise Levels, dBA			
	Nighttime Hours L_{50}	Average During Daytime Hours[2] L_{50}	Nighttime Hours L_{90}	Average During Daytime Hours[2] L_{eq}
ML1, Residence at 2983 East Miraloma Avenue	49[1]	59	43[3]	65
ML2, Residence at 3233 East Miraloma Avenue	50	60	45	67
ML3, Residence at 3030 Coronado Avenue	50	58	49	62
ML4, Residence at 2997 La Jolla Avenue	41	51	40	55

Source: CofA 2007a, AFC §6.12.1.2.2; Tables 6.12-2, 6.12-3
1. Staff calculation of average of the nighttime hours (see NOISE APPENDIX A)
2. Staff calculation of average of the daytime hours (see NOISE APPENDIX A)
3. Staff calculations of average of four quietest consecutive hours of the nighttime (see NOISE APPENDIX A)

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities and normal long-term operation of the project.

Construction Impacts and Mitigation

Construction noise is usually a temporary phenomenon. Construction of the CPP project is expected to be typical of similar projects in terms of schedule, equipment used, and other types of activities (CofA 2007a, AFC §3.7).

Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances.

The applicant has predicted construction noise levels to range between approximately 37 to 48 dBA at the above residential receptors. They are summarized here in **NOISE Table 3**.

NOISE Table 3: Predicted Construction Noise Levels

Receptor/Distance	Highest Construction Noise Level (dBA) [1]	Measured Existing Ambient, Average Daytime L_{eq} (dBA) [2]	Cumulative, Using Highest Noise Level of 48 dBA	Change
ML1/1,200 feet	37-48	65	65	0
ML2/2,130 feet	37-48	67	67	0
ML3/1,725 feet	37-48	62	62	0
ML4/1,850 feet	37-48	55	56	+1

Sources: [1] CofA 2007a, AFC §6.12.2.1.1
[2] NOISE Table 2, above

The applicable local noise LORS do not limit the loudness of construction noise, but staff compares the projected noise levels with ambient levels (please see the following discussion under **CEQA Impacts**).

The applicant commits to performing noisy construction work during the times specified in the City of Anaheim Municipal Code and the City of Placentia Municipal Code (CofA 2007a, AFC §6.12.2.1.1). To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

Therefore, the noise impacts of the CPP project construction activities would comply with the noise LORS.

CEQA Impacts

Since construction noise typically varies with time, it is most appropriately measured by, and compared with, the L_{eq} (energy average) metric. As seen in **NOISE Table 3** above, last column, construction noise would not affect the existing ambient noise levels at ML1, ML2, and ML3, and would increase the existing ambient noise level at ML4 by only 1 dBA, an unnoticeable increase. Therefore, the noise effects of plant construction are considered to be insignificant at the above receptors.

To ensure the project construction would create less than significant adverse impacts at the most noise-sensitive receptors, in addition to Condition of Certification **NOISE-6**, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process to resolve any complaints regarding construction noise.

In light of the following proposed conditions of certification, the noise impacts of the CPP project construction activities would be less than significant.

Linear Facilities

New offsite linear facilities would include approximately 3,240 feet of natural gas pipeline, approximately 2,185 feet of recycled water pipeline, one 3000-foot long and one 4000-foot long electric transmission line, and the Orange County groundwater replenishment system's (GWRS) water pump station proposed to be located near monitoring location ML2 (CofA 2007a, AFC §§1.2, 2.1, 3.1, Figures 3-1, 6.12-1).

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, construction activities would be limited to daytime hours. To ensure that these hours are, in fact, adhered to, in compliance with the LORS, staff proposes Condition of Certification **NOISE-6**.

Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving. The applicant anticipates that pile driving would not be required for construction of the CPP project (CofA 2007a, AFC §3.5). Therefore no vibration impacts are expected.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized applicable LORS that would protect construction workers (CofA 2007a, AFC Table 6.12-8; §6.12.2.1.4). 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 CPP project include engine generators and their exhaust stacks, combustion air inlets, cooling towers, electric transformers, and various pumps and fans. Staff compares the projected project noise with applicable LORS, in this case the City of Anaheim LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

Proposed noise mitigation measures include the following (EEC 2006a, AFC §6.12.1.5, Table 6.12-6, Figure 6.12-2):

- a 20-foot-high sound wall around the project site;
- a 14-foot-high sound wall on the south and west sides of the fuel gas compressor;
- cooling tower super low noise fans;
- stack silencing;
- generator exhaust silencing;
- inlet air silencing;

- turbine enclosure;
- auxiliary skid enclosure; and
- water injection skid enclosure.

In addition, the project would avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design (CofA 2007a, AFC §6.12.2).

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (CofA 2007a, AFC §6.12.1.2.2, Tables 6.12-2, 6.12-3, 6.12-4). The applicant has predicted operational noise levels; they are summarized in **NOISE Table 4** below.

As explained above, the City of Anaheim Municipal Code, Chapter 6.70, limits noise levels at the property line of noise producing stationary noise sources to 60 dBA. Also as explained above, for the CPP, the City of Anaheim has defined the noise level limit at the project's property line to be 65 dBA. A letter from the City of Anaheim granting this variance is included in the AFC (CofA 2007a, AFC §6.12.1.4.2, Appendix G). Therefore, staff uses this 65 dBA limit as the applicable operational noise level limit at the CPP project site boundaries.

The applicant predicts the project's operational noise levels at the project's property lines to range between 47 dBA and 64 dBA, less than the 65 dBA limit (CofA 2007a, AFC Figure 6.12-2). In order to comply with this requirement, the applicant proposes to build a 20-foot-high sound wall around the project site and a 14-foot-high sound wall on the south and west sides of the fuel gas compressor, among other mitigation measures, as described above (CofA 2007a, AFC §6.12.1.5, Table 6.12-6, Figure 6.12-2). Staff believes these measures can mitigate the project's noise impacts to a level of compliance.

To ensure compliance, staff proposes Condition of Certification **NOISE-4**. This condition states that if the project's noise levels alone exceed 65 dBA at the project's property lines, mitigation measures shall be implemented to bring the noise levels into compliance with this limit. Also to ensure compliance, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process requiring the applicant to resolve any problems caused by operational noise.

With implementation of the following conditions of certification, noise due to the operation of the CPP project would be in compliance with the applicable LORS.

CEQA Impacts

Power plant noise is unique. A power plant operates as, essentially, a steady, continuous, broadband noise source, unlike the intermittent sounds that make up most of the noise environment. Power plant noise therefore contributes to, and becomes a part of, background noise levels, or the sound heard when most intermittent noises stop. Where power plant noise is audible, it tends to define the background noise level. For this reason, staff typically compares projected power plant noise to existing ambient background (L_{90}) noise levels at affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be applied to the project to either reduce or remove that impact.

In most cases, a power plant operates around the clock for much of the year. Nighttime operation of a peaking power plant like the CPP project, though rare, could occasionally occur, which could annoy nearby residences[4]. For residential receptors, staff evaluates project noise emissions by comparing them with nighttime ambient background levels; this evaluation assumes that the potential for public annoyance from 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 levels to arrive at a reasonable baseline for comparison with the project's predicted noise level.

Adverse impacts on residential receptors can be identified by comparing predicted power plant noise levels with the nighttime ambient background noise levels at the nearest sensitive residential receptors.

The applicant has predicted operational noise levels; they are summarized here in **NOISE Table 4**.

NOISE Table 4: Predicted Operational Noise Levels at all Identified Sensitive Residential Receptors

Receptor/Distance	Project Alone Operational Noise Level (dBA) [1]	Measured Existing Ambient, Nighttime L_{90} (dBA) [2]	Cumulative L_{90} (dBA) [2]	Increase in Existing Ambient (dBA)
ML1/1,200 feet	46	43	48	+5
ML2/2,130 feet	48	45	50	+5
ML3/1,725 feet	52	49	54	+5
ML4/1,850 feet	43	40	45	+5

Sources: [1] CofA 2007a, AFC Table 6.12-4
[2] NOISE Table 2, above

[4] The applicant intends to operate the CPP, with all four turbine generators operating, for 16 hours per day, 5 days per week, for a total of up to 4,006 hours per year (CofA 2007a, AFC §3.8.1).

Combining the ambient noise level of 43 dBA L_{90} (**NOISE Table 4**, above) with the project noise level of 46 dBA at ML1 would result in 48 dBA L_{90}, 5 dBA above the ambient. 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. Therefore, staff considers the above noise impact at ML1 to be less than significant.

Combining the ambient noise level of 45 dBA L_{90} (**NOISE Table 4**) with the project noise level of 48 dBA at ML2 would result in 50 dBA L_{90}, 5 dBA above the ambient. Staff considers this impact to be less than significant.

Combining the ambient noise level of 49 dBA L_{90} (**NOISE Table 4**) with the project noise level of 52 dBA at ML3 would result in 54 dBA L_{90}, 5 dBA above the ambient. Staff considers this impact to be less than significant.

Combining the ambient noise level of 40 dBA L_{90} (**NOISE Table 4**) with the project noise level of 43 dBA at ML4 would result in 45 dBA L_{90}, 5 dBA above the ambient. Staff considers this impact to be less than significant.

Staff proposes Condition of Certification **NOISE-4** to ensure that the noise levels due to project operation would not exceed the above levels (in **NOISE Table 4**, second column).

Tonal Noises

One possible source of annoyance could be strong tonal noises. Tonal noises are individual sounds (such as pure tones) which, while not louder than permissible levels, stand out in sound quality. The applicant plans to address overall noise in project design, and to take appropriate measures, as needed, to eliminate tonal noises as possible sources of annoyance (CofA 2007a, AFC §6.12.2). To ensure that tonal noises do not cause public annoyance, staff proposes Condition of Certification **NOISE-4**, which would require mitigation measures, if necessary, to ensure the project would not create tonal noises.

Linear Facilities

All water pipes, gas pipes, and the GWRS water pump station would be underground and therefore silent during plant operation. Noise effects from electrical interconnection lines typically do not extend beyond the lines' right-of-way easements and would be inaudible to receptors.

Vibration

Vibration from an operating power plant could be transmitted through two primary means: ground (ground-borne vibration), and 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 GE LM6000 machine have not resulted in ground-borne or airborne vibration impacts. Energy Commission staff agrees with the applicant that ground-borne vibration from the CPP project will be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves, and can rattle the walls of lightweight structures. The CPP's chief source of airborne vibration would be the gas turbines' exhaust. In a power plant such as the CPP, however, the exhaust must pass through the selective catalytic reduction (SCR) 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 CPP would cause perceptible airborne vibration effects.

Worker Effects

The applicant acknowledges the need to protect plant operating and maintenance workers from noise hazards and commits to compliance with all applicable LORS (CofA 2007a, AFC §6.12.2.1.4). 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 and provided. To ensure that plant operation and maintenance workers are adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**. For further discussion of proposed worker safety conditions of certification, please see **Worker Safety and Fire Protection** section of this document.

Minority Population

In the **Socioeconomics** section of this document, staff presents census information that shows that there are minority populations within one mile and six miles of the project site. Since staff has proposed conditions of certification that would reduce the risks associated with noise and vibration to less than significant levels, staff concludes that there will be no significant impacts from construction and operation of the project on the minority populations. Therefore, there are no environmental justice issues for **Noise and Vibration**.

CUMULATIVE IMPACTS AND MITIGATION

Section 15130 of the CEQA guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, compound or increase other environmental impacts. CEQA guidelines require that this discussion reflect the severity of the impacts and the likelihood of their occurrence, but do not need to provide as much detail as the discussion of impacts solely attributable to the project.

Staff is not aware of any other projects which, when combined with the CPP project, would create direct cumulative noise impact in the project area. Therefore, the project's cumulative noise impact is considered to be insignificant.

FACILITY CLOSURE

All operational noise from the project would cease when the CPP project closes, and no further adverse noise impact from its operation would be possible. The remaining potential temporary noise source would be the dismantling of the project structures and equipment, as well as any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it could be similarly treated - that is, noisy work could be performed during daytime hours with machinery and equipment that are properly equipped with mufflers. Any noise LORS in existence at that time would apply. Unless modified, applicable conditions of certification included in the Energy Commission decision would also apply.

RESPONSES TO AGENCY AND PUBLIC COMMENTS

No agency or public comments in the area of **Noise and Vibration** have been received.

RESPONSES TO APPLICANT'S COMMENTS

The following PSA comments from the applicant have been received in the area of **Noise and Vibration**.

1. Staff asserts that because ML4 is located in the City of Placentia, the City of Placentia's Noise Ordinance is applicable to this receptor. This is inaccurate, because caselaw holds that the applicable LORS are determined by the jurisdiction where the noise source is located (see Great Western vs. County of Los Angeles, 27 Cal. 4^{th} 853 [2002]). So while the CPP complies with the City of Placentia's Noise Ordinance, it is not required to.

   Staff's Response: Staff agrees with this and has made appropriate revisions throughout this **Noise and Vibration** analysis to reflect this comment. Note that Condition of Certification **NOISE-4** still requires the project to comply with the same noise threshold at ML4 as specified in the PSA.

2. The sound wall around the south and west sides of the fuel gas compressor referred to as 12 feet high in the PSA will be 14 feet high.

   Staff's Response: Staff has revised this **Noise and Vibration** analysis to reflect this comment.

3. Condition of Certification **NOISE-6** refers to the City of Placentia's noise restrictions for construction activities. Because the City of Placentia's Noise Ordinance only applies to a small portion of the gas pipeline that is within the City of Placentia, the applicant requests this condition of certification be modified to reflect this,

   Staff's Response: Staff agrees with this comment and has revised Condition of Certification **NOISE-6** to reflect this comment.

CONCLUSIONS

Staff concludes that the CPP project, if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration LORS and would produce no significant direct or cumulative adverse noise impacts on people within the project area, including the minority populations, directly, indirectly, or cumulatively.

PROPOSED CONDITIONS OF CERTIFICATION

PUBLIC NOTIFICATION PROCESS

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one-half mile of the project site and the linear facilities, by mail or by 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 a 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 where it is 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. This communication shall also verify that the telephone number has been established and posted at the site, and shall provide that telephone number.

NOISE COMPLAINT PROCESS

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

- use the Noise Complaint Resolution Form (below), or 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 in the complaint;
- if the noise is project related, take all feasible measures to reduce the source of the noise; and

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

Verification: Within five days of receiving a noise complaint, the project owner shall file a Noise Complaint Resolution Form, shown below, with both the local jurisdiction and the CPM, that documents the resolution of the complaint. If mitigation is required to resolve the 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 performed and complete.

EMPLOYEE NOISE CONTROL PROGRAM

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 (above permissible) noise levels during construction in accordance to the applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit the noise control program to the CPM. 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 the operation of the project will not cause the noise levels due to plant operation alone, during the four quietest consecutive hours of the nighttime, to exceed an average of 46 dBA L_{90} measured at or near monitoring location ML1 (2983 East Miraloma Avenue), an average of 48 dBA L_{90} measured at or near monitoring location ML2 (3233 East Miraloma Avenue), an average of 52 dBA L_{90} measured at or near monitoring location ML3 (3030 Coronado Avenue), and an average of 43 dBA L_{90} measured at or near monitoring location ML4 (2997 La Jolla Avenue).

The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that the operation of the project will not cause the noise levels due to plant operation alone to exceed 65 dBA at the CPP project site property lines.

No new pure-tone components shall 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.

A. When the project first achieves a sustained output of 85% or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at monitoring location ML1, or at a closer location acceptable to the

CPM. This survey during the power plant's full-load 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.

During the period of this survey, the project owner shall conduct a short-term survey of noise at each of the monitoring locations ML2, ML3, and ML4, or at closer locations acceptable to the CPM. The short-term noise measurements at these locations shall be conducted during the nighttime hours of 10:00 p.m. to 7:00 a.m.

Also during the period of this survey, the project owner shall conduct a short-term survey of noise at the project site property lines, or at closer locations acceptable to the CPM, to determine the power plant's operational noise levels at these property lines.

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.

B. If the results from the noise survey indicate that the power plant noise at the affected receptor sites exceeds the above values during the four quietest consecutive hours of the nighttime, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.

C. If the results from the noise survey indicate that the power plant noise at the project site property lines exceeds 65 dBA, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

D. 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 85 % 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 will 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 the new noise survey, performed as described above and showing compliance with this condition.

OCCUPATIONAL NOISE SURVEY

NOISE-5 Following the project's attainment of a sustained output of 85 % or greater of its rated capacity, the project owner shall conduct an occupational noise survey to identify any 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 to be employed in order 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 RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times delineated below, unless a special permit has been issued by the City of Anaheim or the City of Placentia:

Mondays through Sundays: 7 a.m. to 7 p.m.

For the portion of the natural gas pipeline constructed within the City of Placentia only:

Mondays through Fridays: 7 a.m. to 7 p.m.

Saturdays: 9 a.m. to 6 p.m.

Sundays and federal holidays: No Pipeline Construction within the City of Placentia Allowed

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Canyon Power Project
(07-AFC-9)

NOISE COMPLAINT LOG NUMBER ________________________

Complainant's name and address:

Phone number: ________________________

Date complaint received: ________________________
Time complaint received: ________________________

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: ________________________

Initial noise levels at 3 feet from noise source _________ dBA Date: _____________

Initial noise levels at complainant's property: __________ dBA Date: ____________

Final noise levels at 3 feet from noise source: ________ dBA Date: _____________

Final noise levels at complainant's property: __________ dBA Date: ____________

Description of corrective measures taken:

Complainant's signature: ________________________ Date: ____________

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

This information is certified to be correct:

Plant Manager's Signature: ________________________

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

REFERENCES

CofA 2004a – City of Anaheim General Plan, Chapter 9, Noise Element, Dated May 2004.

CofA 2004b – City of Anaheim Municipal Code, Chapter 6.70, Sound Pressure Levels, Dated October 26, 2004.

CofA 2007a – City of Anaheim/S. Sciortino (tn: 43903). City of Anaheim's Canyon Power Plant Application for Certification Volume I & II. Submitted to CEC/Docket Unit on December 28, 2007.

CofP 1974 – City of Placentia General Plan, Noise Element, Dated August 6, 1974.

CofP 2007 – City of Placentia Municipal Code, Chapter 23.76, Noise Control, Dated June 19, 2007.

NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **NOISE Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (Effects of Noise on People, U.S. Environmental Protection Agency, December 31, 1971).

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

NOISE Table A1
Definition of Some Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location (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 defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

NOISE Table A2
Typical Environmental and Industry Sound Levels

Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980			

Subjective Response to Noise

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

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

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

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

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

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

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

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

4. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, 1970).

Combination of Sound Levels

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

NOISE Table A3
Addition of Decibel Values

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

Source: Architectural Acoustics, M. David Egan, 1988

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by six dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

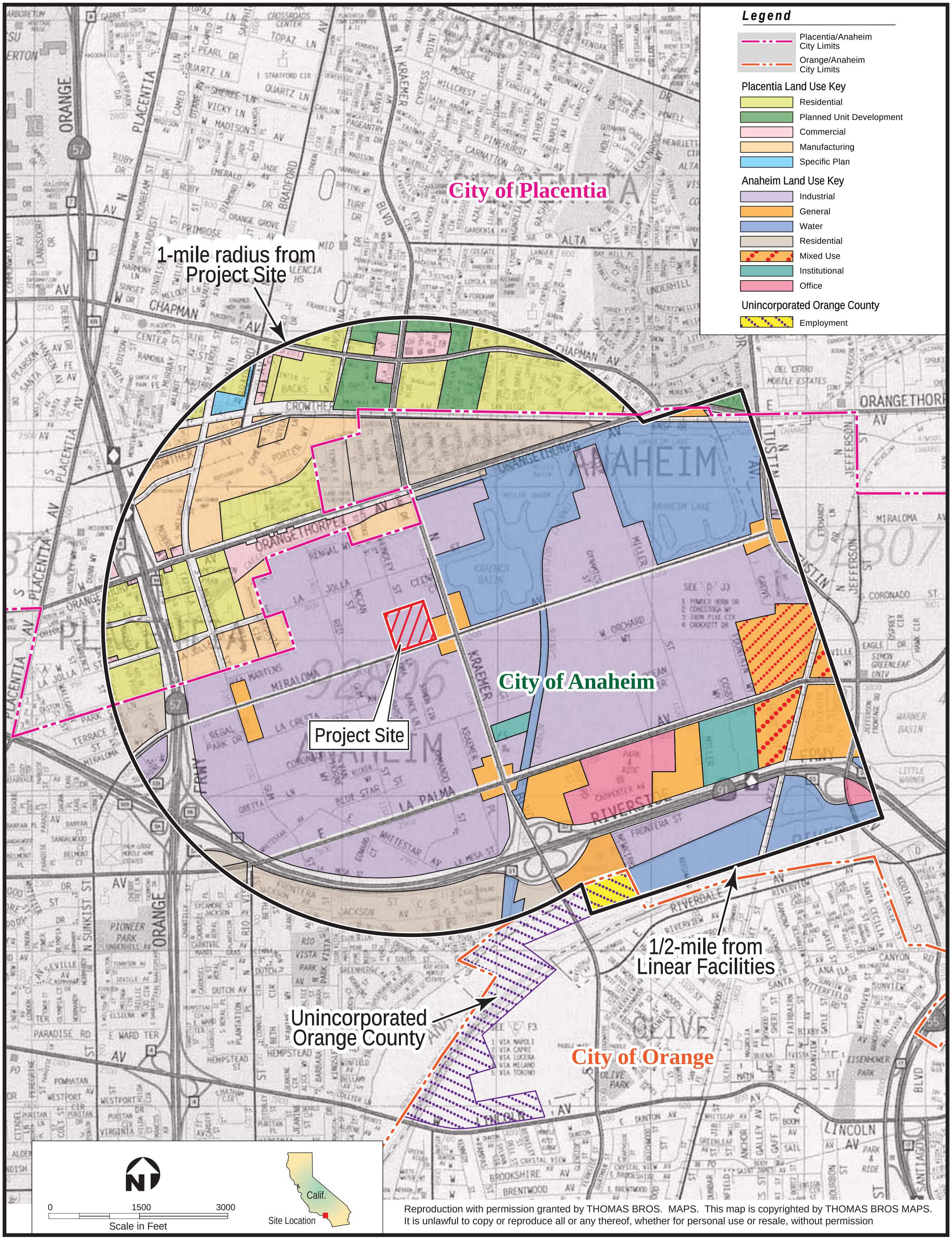
OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

NOISE Table A4
OSHA Worker Noise Exposure Standards

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

Source: 29 C.F.R. § 1910.

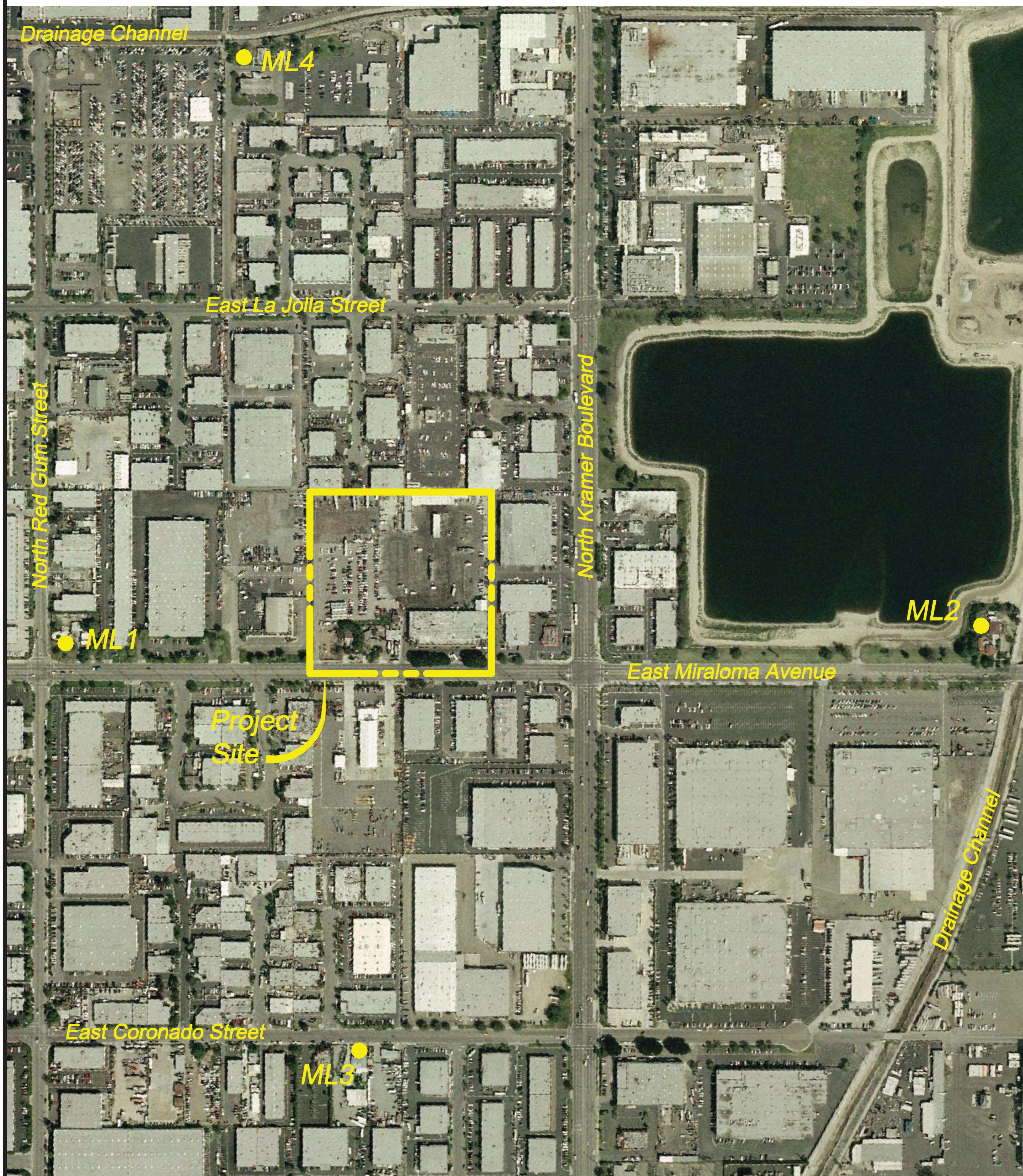
Canyon Power Project - General Plan Land Use Designations Within Project Study Area



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL DIVISION, SEPTEMBER 2009

SOURCE: AFC Figure 6.9-3

NOISE AND VIBRATION - FIGURE 2
Canyon Power Project - Sound Level Measurement Locations



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL DIVISION, SEPTEMBER 2009
SOURCE: AFC Figure 6.12-1

PUBLIC HEALTH

Testimony of Alvin Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the Canyon Power Plant (CPP) project and does not expect any significant adverse cancer or short- or long-term noncancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed CPP uses a conservative health protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the CPP would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

INTRODUCTION

The purpose of this Final Staff Assessment (FSA) is to determine if emissions of toxic air contaminants (TACs) from the proposed CPP would have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

California Energy Commission (Energy Commission) staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section of this FSA, and impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section. Health effects from electromagnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams to the public sewer system are discussed in the **Soil and Water Resources** section. Plant releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Public Health Table 1 Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (Title 42, U.S. Code section 7412)	This act requires new sources that emit more than 10 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.
State	
California Health and Safety Code section 25249.5 et seq. (Proposition 65)	These sections establish thresholds of exposure to carcinogenic substances above which Prop 65 exposure warnings are required.
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 recirculating water to minimize the growth of Legionella and other micro-organisms.
California Public Resource Code section 25523(a); Title 20 California Code of Regulations (CCR) section 1752.5, 2300–2309 and Division 2 Chapter 5, Article 1, Appendix B, Part (1); California Clean Air Act, Health and Safety Code section 39650, et seq.	These regulations require a quantitative health risk assessment for new or modified sources, including power plants that emit one or more toxic air contaminants (TACs).
Local	
South Coast Air Quality Management District (SCAQMD) Rule 1401	This rule requires the preparation of an HRA to predict health risks and the use of T-BACT for major sources of emissions.
SCAQMD Rule 1309.1	This rule requires stricter HRA significance thresholds

	before a facility may have access to the SCAQMD Priority Reserve emission credit bank.
SCAQMD Rule 301	This rule requires annual fees for TACs or ozone depleting compounds.
SCAQMD Rule 212	This rule requires the preparation of an HRA and issuing public notices if necessary before a permit to operate is issued.

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Characteristics of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn, affect public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

The project site is located about 3.25 miles northeast of downtown Anaheim. Land in the vicinity of the proposed project is designated for industrial, commercial, and residential uses, with industrial uses representing the majority (CofA 2007a, Section 6.9.1.1). The natural gas pipeline proposed for construction for this project would be approximately 0.6 miles long, running east from the proposed site on Miraloma Avenue then north on Kraemer Boulevard to East Orangethrope Avenue where it would connect with an existing Southern California Gas Company line (CofA 2007a, Section 3.4.6). Sensitive receptors and residences in the project vicinity are listed in **Appendix I-1** and shown in **Figure 6.16-1** (CofA 2007a). The nearest sensitive receptor is a residence located at 2983 East Miraloma Avenue, approximately 887 feet west of the site boundary. This residence is planned to be redeveloped for commercial use, but a caretaker unit would still exist at this location (CofA 2007a, Section 6.16.1).

The CPP would have four stacks, one for each combustion turbine generator. The stack heights would be 26.21 meters (86 feet) (CofA 2007a, Section 6.2.2.3.6). The location of elevated terrain (above the stack height) is important in assessing potential exposure, as an emission plume may impact high elevations before impacting lower elevations. The site's elevation is about 218 feet above mean sea level, and the topography of the immediate vicinity is generally flat. The Los Angeles Basin in which the proposed site is located is bordered by mountain ranges to the north, east, and south, with the Palos Verde Peninsula and coastline to the west (CofA 2007a, Sections 3.3.1 and 3.3.2). The area within 5 miles of the project site has a gradual east-west slope, with the terrain rising sharply to the north and east approximately 6 miles from the site where the Chino Hills and Santa Ana Mountains begin (CofA 2007a Section 6.16.1).

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 climate at the project site can be characterized as Mediterranean and is dominated by the influence of the Pacific Ocean and the Pacific high-pressure system, a semi-permanent, subtropical high-pressure system located off the west coast of the United States. The size and strength of the Pacific high is at a maximum during the summer, when it is at its northernmost position, and results in strong northwesterly airflow and negligible precipitation. During this period, inversions become strong, winds are light, and the pollution potential is high. The Pacific high's influence weakens during the fall and winter when it moves southwestward, which allows storms from the Gulf of Alaska to reach northern California. During the winter, inversions are weak, winds often moderate, and the potential for air pollution is low. Between May and September wind-flow patterns are generally from the ocean during the day and towards the ocean during the night. Occasionally during the fall and winter a warm dry east wind known as the Santa Ana wind can blow through the region at speeds up to 60 miles per hour (CofA 2007a Section 6.2.1.1).

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents more detailed meteorological data.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the South Coast Air Quality Management District (SCAQMD). By examining average toxic concentration levels from representative air monitoring sites 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 in the United States is about 1 in 3, or 333,000 in 1 million.

The fixed air monitoring site closest to the project is the Anaheim station, located approximately 4 miles away. The total background cancer risk calculated by the SCAQMD using the data collected at this monitoring station is 1,330 per million, and the average cancer risk in the South Coast Air Basin based on data from eight monitoring stations is 1,414 per million (CofA 2007a, Table 6.16-1).

EXISTING PUBLIC HEALTH CONCERNS

When evaluating a new project, staff conducts a detailed study and analysis of existing public health issues in the project vicinity. This analysis is prepared in order to identify the current status of respiratory diseases (including asthma), cancer, and childhood mortality rates in the population located near the proposed project. Assessing existing health concerns in the project area will provide staff with a basis on which to evaluate the significance of any additional health impacts from the proposed CPP project and evaluate any proposed mitigation. Health concerns identified within a 6-mile radius include a concern about elevated cancer risk due to locomotive rail yards in Southern California (one of the 19 rail yards identified is the Anaheim rail yard) and a general concern about health risk due to air quality in the South Coast Air Basin. To address the first concern the SCAQMD is conducting studies to assess the cancer risk from rail yards in southern California. To address the second, an extensive monitoring and modeling program (Multiple Air Toxics Exposure Study II) was implemented by the SCAQMD to measure toxic air contaminants and calculate their associated cancer risks (CofA 2007a, Section 6.16.1).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The **PUBLIC HEALTH** section of this staff assessment discusses toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no ambient air quality standards have been established are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a health risk assessment is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The risk assessment consists of the following steps:

- identify the types and amounts of hazardous substances that CPP could emit to the environment;
- estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
- estimate amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact; and
- characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Staff relies upon the expertise of the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) to identify contaminants that are known to the state to cause cancer or other noncancer toxicological endpoints and to calculate the toxicity and cancer potency factors of these contaminants. Staff also relies upon the expertise of the California Air Resources Board and the local air districts to conduct ambient air monitoring of toxic air contaminants and the state Department of Public Health to conduct epidemiological investigations into the impacts of pollutants on communities. It is not within the purview or the expertise of the Energy Commission staff to duplicate the expertise and statutory responsibility of these agencies.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case, risks and then using those conditions in the study. Such conditions include:

- using the highest levels of pollutants that could be emitted from the plant;
- assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- using the type of air quality computer model which predicts the greatest plausible impacts;
- calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
- assuming that an individual's exposure to cancer-causing agents occurs continuously for 70 years; and
- using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses).

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 that could present a health hazard from noninhalation pathways of exposure (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA 2003, p. 5-3).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer effects, and cancer risk (also long-term). *Acute health effects* result from short-term (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 arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from 12 percent to 100 percent of a lifetime, or from 8 to 70 years (OEHHA 2003, p. 6-5). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called *Reference Exposure Levels*, or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (OEHHA 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The Reference Exposure Levels are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformity with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in chances per million and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called *potency factors* and established by OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks.

Significance Criteria

Energy Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above.

As described earlier, noncriteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as cancer (long-term) health effects. The significance of project health impacts is determined separately for each of the three categories.

Acute and Chronic Noncancer Health Effects

Staff assesses the significance of noncancer health effects by calculating a hazard index. A *hazard index* is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than 1.0 signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a Total Hazard Index. The Total Hazard Index is calculated separately for acute and chronic effects. A Total Hazard Index of less than 1.0 indicates that cumulative worst-case exposures are less than the reference exposure levels. Under these conditions, health protection from the project is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant noncancer project-related public health impacts.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, (Health & Safety Code, §§25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations section 12703(b) states that "the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure." This level of risk is equivalent to a cancer risk of 10 in 1 million, which is also written as 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that applied by Proposition 65. The significant risk level of 10 in 1 million is consistent with the level of significance adopted by many air districts. In general, these air districts would not approve a project with a cancer risk exceeding 10 in 1 million. The SCAQMD also uses 10 in 1 million as the level of "Significant Health Risk" (CofA 2007a, Section 6.16.2.6).

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. Staff's analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants, and any minority or low-income populations that are likely to be disproportionately affected by impacts. To accomplish this goal, staff uses the most current acceptable public health exposure levels (both acute and chronic) set to protect the public from the effects of airborne toxics. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. Based on refined assumptions, if risk posed by the facility exceeds the significance level of 10 in 1 million, staff would require appropriate measures to reduce the risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than 10 in 1 million, staff would deem such risk to be significant and would not recommend project approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

CONSTRUCTION IMPACTS AND MITIGATION

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis.

Site disturbances occur during facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off site through soil erosion, and uncovering buried hazardous substances. The Phase I Environmental Site Assessment conducted for this site found potential contamination at the site and recommended further sampling. The Phase II ESA performed in 2007 recommended that certain underground structures be removed prior to site development, a soil management plan be prepared to address the remediation of contaminated soil, and a post-excavation sampling plan be prepared and implemented to assure that all contaminated soil was properly removed (CofA 2007a, Section 6.14.1.1). To address the possibility that soil contamination would be encountered during construction of the CPP, 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.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by the California Air Resources Board (ARB) as toxic air contaminants.

Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased coughing, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel on Toxic Air Contaminants recommended a chronic reference exposure level (see discussion of reference exposure levels in Method of Analysis section above) for diesel exhaust particulate matter of 5 micrograms of diesel particulate matter per cubic meter of air ($\mu g/m^3$) and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6).[1] The Scientific Review Panel did not recommend a value for an acute Reference Exposure Level since available data in support of a value was deemed insufficient. On August 27, 1998, ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved the panel's recommendations regarding health effect levels.

Appendix B-2 and Tables 6.2-10 through 6.2-13 of the AFC (CofA 2007a) presents diesel exhaust emission factors and maximum daily and annual emissions from construction equipment, fugitive dust, and offsite construction traffic. The applicant estimated worst-case emissions of 124 pounds per day (11.8 tons per year) of particulate matter 10 (PM10) and 26 pounds per day (2.3 tons per year) of PM2.5 during construction. Construction of the proposed CPP is anticipated to take place over a period of 12 months (CofA 2007a, Section 6.16.2.2). As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from 8 to 70 years. Therefore the applicant has stated that due to the short duration of construction for this project, health risks from construction emissions were not modeled (CCP 2007a, Section 6.16.2.2).

Mitigation measures are proposed by Energy Commission staff to reduce the maximum calculated PM10 emissions. These include the use of extensive fugitive dust control measures. The fugitive dust control measures are assumed to result in 90 percent reductions of emissions. In order to further mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, Energy Commission staff recommends the use of ultra-low sulfur diesel fuel and Tier 2 or Tier 1 California Emission Standards for Off-Road Compression-Ignition Engines or the installation of an oxidation catalyst and soot filters on diesel equipment. The catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is comparable for both mitigation measures in the range of approximately 85–92 percent. Such filters will reduce diesel emissions during construction and reduce any potential for significant health impacts.

OPERATION IMPACTS AND MITIGATION

Emissions Sources

The emissions sources at the proposed CPP include four combustion turbine generators, one cooling tower, and one blackstart internal combustion diesel generator. As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility.

Data Response AIR-1 (CPP 2008x) lists toxic air contaminants expected to be emitted from the CPP turbines, cooling tower, and blackstart diesel generator as combustion byproducts, along with their anticipated amounts (emission factors). Toxic Air Contaminant emission factors were obtained from the Environmental Protection Agency (EPA) AP-42 database of emission factors. Table 6.16-2 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include Reference Exposure Levels, which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the OEHHA Guidelines (OEHHA 2003). **Public Health Table 2** lists the toxic emissions potentially emitted by the CPP and shows how each contributes to the health risk analysis.

Public Health Table 2 Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Acetaldehyde			✔	✔	
Acrolein				✔	✔
Ammonia				✔	✔
Antimony				✔	
Arsenic	✔	✔	✔	✔	✔
Benzene			✔	✔	✔
Beryllium			✔	✔	✔
Benzo(a)anthracene			✔		
Benzo(a)pyrene			✔		
Benzo(b)fluoranthene			✔		
Benzo(k)fluoranthene			✔		
1,3-Butadiene			✔	✔	
Cadmium		✔	✔	✔	
Chromium VI		✔	✔	✔	
Chrysene			✔		
Chlorine				✔	✔
Copper				✔	✔
Cyanide					✔
Dibenz(a,h)anthracene			✔		
Diesel Exhaust			✔	✔	
Ethylbenzene				✔	
Fluoride					✔
Formaldehyde			✔	✔	✔
Indenol(1,2,3-cd)anthracene			✔		
Lead	✔		✔		
Manganese				✔	
Mercury		✔		✔	✔
Napthalene		✔	✔	✔	
Nickel		✔	✔	✔	✔
Propylene oxide			✔	✔	✔
Selenium				✔	✔
Silica				✔	
Sulfate				✔	✔
Toluene				✔	✔
Xylene				✔	✔
Zinc				✔	

Source: OEHHA 2003, Appendix L and CofA 2007a, Table 6.16-2)

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a worst case analysis. Maximum hourly emissions are required to calculate acute (one-hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The applicant's screening analysis was performed using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP). Ambient concentrations were used in conjunction with Reference Exposure Levels and cancer unit risk factors to estimate health effects that might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

The above method of assessing health effects is consistent with OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA, 2003) referred to earlier and results in the following health risk estimates.

Impacts

The applicant's screening health risk assessment for the project including emissions from all sources resulted in a maximum acute Hazard Index (HI) of 0.01645 and a maximum chronic HI of 0.0081 (GB 2008d Data Response AIR-1, Page 7/9). As **Public Health Table 3** shows, both acute and chronic hazard indices are less than 1.0, indicating that no short- or long-term adverse health effects are expected.

As shown in **Public Health Table 3**, total worst-case individual cancer risk was calculated by the applicant to be 4.081 in 1 million at the location of maximum impact.

Public Health Table 3 Operation Hazard/Risk at Point of Maximum Impact: Applicant Assessment

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.01645	1.0	No
Chronic Noncancer	0.0081	1.0	No
Individual Cancer	4.081 in a million	10.0 in a million	No

Source: GB 2008d Data Response AIR-1 (Revised HRA Results, Page 7/9)

Staff conducted a quantitative evaluation of the risk assessment results presented in the Canyon Power Plant Revised Appendix E ("Project Stack Parameters and Emission Rates Used in Criteria Pollutant and Health Risk Modeling and Model Results Tables," December 2008). Emitting units include four natural gas-fired combustion turbines, a four-cell cooling tower and a diesel fuel-fired emergency engine, for a total of nine emitting sources at the proposed facility.

Staff's quantitative analysis of facility operations included the following:

- Stack parameters, building parameters and locations of sources were obtained from modeling files provided by the applicant. Emission rates were obtained from Revised Appendix E.
- Emissions from the four combustion turbine generator stacks, the 4-cell cooling tower and the emergency diesel generator were included in the analysis.
- Used a coarse receptor grid of -5000 to 5000 m east and -5000 to 5000 m north, at 100 m increments.
- Exposure pathways assessed include inhalation, dermal absorption, soil ingestion and mother's milk.

Atmospheric dispersion modeling was conducted using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a. Terrain heights were set to "flat" in the HARP model as the applicant's modeling CD did not include local demographic files. Local meteorological data was provided by the applicant.

The emission factors used in staff's analysis of cancer risk and hazard were obtained from the revised Appendix E and are listed in **Public Health Table 4**. For cancer risk calculations using the HARP model, staff used the "Derived(Adjusted)Method" and for chronic noncancer hazard staff used the "Derived(OEHHA)Method". The following receptor locations were quantitatively evaluated in staff's analysis:

- Point of maximum impact specified in revised Appendix E (PMI; 70 year residential scenario):
  - PMI for cancer (located at the northern property boundary near the eastern edge of the site)
  - PMI for chronic noncancer hazard (also located at the northern property boundary)
  - PMI for acute noncancer hazard (located approximately 3 km southeast of the site)
- Maximally impacted sensitive receptor specified in revised Appendix E (70 year residential scenario):
  - For cancer, this receptor is located at a residence approximately 700 m southwest of the fenceline
  - For chronic noncancer hazard, this receptor is located at a residence approximately 500 m east of the fenceline
  - For acute noncancer hazard, this receptor is located at Placentia Veterinary Clinic, approximately 3.3 km north of the facility

Results of staff's analysis are summarized in **Public Health Table 5** and are compared to the results presented in the revised Appendix E. Substance-specific risks are presented in **Public Health Table 6** for the Point of Maximum Impact and in **Public Health Table** 7 for the maximally impacted residence.

Public Health Table 4 Emission Rates Used in the Cancer Risk and Hazard Analyses

Substance	Annual Average Emissions (lbs/year)	Maximum 1-Hour Emissions (lbs/hour)
EMISSION RATES FROM OPERATION OF EACH COMBUSTION TURBINE		
Ammonia	4.59E+03	3.64E+00
1,3-Butadiene	2.60E-01	2.07E-04
Acetaldehyde	2.42E+01	1.92E-02
Acrolein	2.19E+00	1.74E-03
Benzene	1.97E+00	1.57E-03
Ethylbenzene	1.94E+01	1.54E-02
Formaldehyde	2.18E+02	1.73E-01
Propylene Oxide	1.76E+01	1.39E-02
Toluene	7.87E+01	6.25E-02
Xylenes	3.88E+01	3.08E-02
B(a)Anthracene	1.35E-02	1.07E-05
B(a)Pyrene	1.32E-01	6.60E-06
B(b)Fluoranthene	6.76E-03	5.37E-06
B(k)Fluoranthene	6.58E-03	5.22E-06
Chrysene	1.51E-02	1.20E-05
Dibenz(ah)Anthracene	1.41E-02	1.12E-05
Indeno(123-cd)Pyrene	1.41E-02	1.12E-05
Naphthalene	9.93E-01	7.88E-04
EMISSION RATES FROM OPERATION OF THE CHILLER COOLING TOWER		
Antimony	1.17E-03	2.33E-07
Arsenic	9.37E-03	1.86E-06
Beryllium	1.95E-04	3.88E-08
Cadmium	1.95E-04	3.88E-08
Chlorine	1.82E+01	3.60E-03
Chromium	2.15E-03	4.26E-07
Cobalt	4.30E-03	8.53E-07
Copper	5.47E-02	1.09E-05
Cyanide	8.98E-02	1.78E-05
Fluoride	5.86E-02	1.16E-05
Lead	3.12E-03	6.20E-07
Manganese	1.80E-02	3.57E-06
Mercury	9.77E-05	1.94E-08
Nickel	1.95E-04	3.88E-08
Selenium	3.12E-02	6.20E-06
Silica	1.89E+00	3.76E-04
Sulfate	4.98E+00	9.88E-04
EMISSION RATES FROM OPERATION OF THE DIESEL BLACK START ENGINE		
Diesel PM	9.91E+00	4.96E-02

Public Health Table 5 Results of Staff's Analysis and the Applicant's Analysis for Cancer Risk and Chronic Hazard

	Staff's Analysis			Applicant's Analysis		
	Cancer Risk (per million)	Chronic HI	Acute HI	Cancer Risk (per million)	Chronic HI	Acute HI
PMI	0.82	0.017	0.0047	0.63	0.0074	0.017
Nearest residence	0.089	0.0017	0.0048	0.10	0.0014	0.016

Public Health Table 6 Results of Staff's Analysis: Contribution to Total Cancer Risk by Individual Substances at the Point of Maximum Impact (PMI)

CANCER RISK DUE TO COMBUSTION TURBINE EMISSIONS

Substance	CTG1	CTG2	CTG3	CTG4	ALL CTGs
Acetaldehyde	1.89E-12	1.72E-12	9.07E-13	1.18E-14	4.53E-12
Benzene	1.54E-12	1.40E-12	7.39E-13	9.57E-15	3.69E-12
1,3-Butadiene	1.22E-12	1.11E-12	5.85E-13	7.58E-15	2.92E-12
Ethyl Benzene	1.32E-12	1.20E-12	6.33E-13	8.20E-15	3.16E-12
Formaldehyde	3.57E-11	3.25E-11	1.72E-11	2.22E-13	8.56E-11
Propylene oxide	1.78E-12	1.62E-12	8.58E-13	1.11E-14	4.27E-12
Benzo[a]anthracene	1.45E-12	1.32E-12	6.95E-13	9.00E-15	3.47E-12
Benzo[a]pyrene	1.41E-10	1.29E-10	6.79E-11	8.80E-13	3.39E-10
Benzo[b]fluoranthene	7.24E-13	6.59E-13	3.48E-13	4.51E-15	1.74E-12
Benzo[k]fluoranthene	7.05E-13	6.41E-13	3.39E-13	4.39E-15	1.69E-12
Dibenz[a,h]anthracene	5.43E-12	4.94E-12	2.61E-12	3.38E-14	1.30E-11
Indeno[1,2,3-cd]pyrene	1.51E-12	1.37E-12	7.26E-13	9.40E-15	3.62E-12
Chrysene	1.62E-13	1.47E-13	7.77E-14	1.01E-15	3.88E-13
Naphthalene	9.29E-13	8.46E-13	4.47E-13	5.79E-15	2.23E-12
SUM	1.96E-10	1.78E-10	9.41E-11	1.22E-12	4.69E-10

CANCER RISK DUE TO COOLING TOWER EMISSIONS

Substance	CELL1	CELL2	CELL3	CELL4	ALL CELLs
Arsenic	8.66E-09	5.77E-14	6.95E-09	9.05E-09	2.47E-08
Beryllium	1.29E-11	8.61E-17	1.04E-11	1.35E-11	3.68E-11
Cadmium	2.31E-11	1.54E-16	1.85E-11	2.41E-11	6.57E-11
Lead	8.30E-12	5.53E-17	6.67E-12	8.67E-12	2.36E-11
Nickel	1.40E-12	9.32E-18	1.12E-12	1.46E-12	3.98E-12
SUM	8.71E-09	5.80E-14	6.99E-09	9.10E-09	2.48E-08

CANCER RISK DUE TO EMERGENCY GENERATOR

Substance	
Diesel Particulate Matter	7.98E-07

TOTAL CANCER RISK = 4.69E-10 + 2.48E-08 + 7.98E-07 = 8.2E-07 or 0.82 in one million

Public Health Table 7 Results of Staff's Analysis: Contribution to Total Cancer Risk by Individual Substances at Maximally Impacted Residence

CANCER RISK DUE TO COMBUSTION TURBINE EMISSIONS

Substance	CTG1	CTG2	CTG3	CTG4	ALL CTGs
Acetaldehyde	1.29E-11	1.40E-11	1.49E-11	1.58E-11	5.76E-11
Benzene	1.05E-11	1.14E-11	1.22E-11	1.28E-11	4.69E-11
1,3-Butadiene	8.30E-12	9.00E-12	9.64E-12	1.02E-11	3.71E-11
Ethyl Benzene	8.98E-12	9.74E-12	1.04E-11	1.10E-11	4.01E-11
Formaldehyde	2.43E-10	2.64E-10	2.83E-10	2.98E-10	1.09E-09
Propylene oxide	1.22E-11	1.32E-11	1.41E-11	1.49E-11	5.44E-11
Benzo[a]anthracene	9.86E-12	1.07E-11	1.14E-11	1.21E-11	4.41E-11
Benzo[a]pyrene	9.64E-10	1.05E-09	1.12E-09	1.18E-09	4.31E-09
Benzo[b]fluoranthene	4.94E-12	5.36E-12	5.73E-12	6.04E-12	2.21E-11
Benzo[k]fluoranthene	4.80E-12	5.21E-12	5.58E-12	5.88E-12	2.15E-11
Dibenz[a,h]anthracene	3.70E-11	4.02E-11	4.30E-11	4.53E-11	1.66E-10
Indeno[1,2,3-cd]pyrene	1.03E-11	1.12E-11	1.20E-11	1.26E-11	4.61E-11
Chrysene	1.10E-12	1.20E-12	1.28E-12	1.35E-12	4.93E-12
Naphthalene	6.34E-12	6.88E-12	7.36E-12	7.76E-12	2.83E-11
SUM	1.33E-09	1.45E-09	1.55E-09	1.63E-09	5.96E-09

CANCER RISK DUE TO COOLING TOWER EMISSIONS

Substance	CELL1	CELL2	CELL3	CELL4	ALL CELLs
Arsenic	8.23E-10	8.19E-10	8.16E-10	8.20E-10	3.28E-09
Beryllium	1.23E-12	1.22E-12	1.22E-12	1.22E-12	4.89E-12
Cadmium	2.19E-12	2.18E-12	2.17E-12	2.18E-12	8.72E-12
Lead	7.88E-13	7.85E-13	7.83E-13	7.86E-13	3.14E-12
Nickel	1.33E-13	1.32E-13	1.32E-13	1.32E-13	5.29E-13
SUM	8.27E-10	8.23E-10	8.21E-10	8.24E-10	3.30E-09

CANCER RISK DUE TO EMERGENCY GENERATOR

Substance	
Diesel Particulate Matter	7.95E-08

TOTAL CANCER RISK = 5.96E-09 + 3.30E-09 + 7.95E-08 = 8.9E-08 or 0.089 in one million

The South Coast Air Quality Management District (SCAQMD) also conducted a review of the applicant's initial and revised HRAs in its Final Determination of Compliance (FDOC) issued June 24, 2009. The SCAQMD determined that "the health risk assessments are acceptable". The SCAQMD additionally prepared its own HRA and determined that the risk to the Maximally Exposed Residential Receptor would be 0.1 in one million, a chronic Hazard Index of 0.0014, and an acute Hazard Index of 0.016. All these values are consistent with that found by the applicant and by staff.

Cooling Tower

In addition to being a source of potential toxic air contaminants, the possibility exists for bacterial growth to occur in the cooling tower, including Legionella. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' Disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

As noted in the LORS section above, the State of California regulates recycled water for use in cooling towers in Title 22, Section 60303, California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation applies to the CPP project since it intends to use recycled water provided by the Orange County Groundwater Replenishment System (GWRS) for cooling (CofA 2007a, Section 3.4.7.1). The GWRS water is processed using reverse osmosis and would not be treated further at the CPP (see Table 3.4-5 of the AFC for a water quality analysis of GWRS water).

The U.S. EPA published an extensive review of Legionella in a human health criteria document (EPA 1999). The U.S. EPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

In February of 2000 the Cooling Technology Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60 percent of industrial cooling towers tested was found to contain Legionella. More recently, staff has received a 2005 report of testing in cooling towers in Australia that found the rate of Legionella presence in cooling tower waters to be extremely low, approximately three to six percent. The cooling towers all had implemented aggressive water treatment and biocide application programs similar to that required by proposed condition of certification **Public Health-1**.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling and not to control Legionella.

The efficacy of any biocide in ensuring that bacterial and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures and effective monitoring.

In order to ensure that Legionella growth is kept to a minimum, thereby protecting both nearby workers as well as members of the public, staff has proposed Condition of Certification **Public Health-1**. The condition would require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. Staff believes that with the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growing and dispersing would be reduced to insignificance.

CUMULATIVE IMPACTS

Cumulative impacts of the proposed project and other projects within a 6-mile radius were not evaluated in the AFC. The applicant stated that the assessment of cumulative impacts would be completed once the appropriate information (emissions and stack parameters) for nearby facilities is received from the SCAQMD (GB 2008d Data Response 4-AIR). The applicant and the air district did not find nearby facilities or permits necessitating additional cumulative review and therefore the applicant did not conduct additional cumulative modeling.

Regarding potential cumulative impacts, staff has examined the incremental impact of emissions from this facility and has estimated the maximum cancer risk for emissions at 0.82 in one million at the point of maximum impact while the risk at the nearest residence was estimated to be 0.089 in one million. Staff would not expect any significant change in lifetime risk to any person and the increase does not represent any real contribution to the average lifetime cancer incidence rate due to all causes (environmental as well as life-style and genetic). Project-related risks at residential locations which are more distant were found to be even lower and actual risks are expected to be much lower since worst-case estimates are based on conservative health-protective assumptions that tend to overstate the true magnitude of the risk expected.

Air districts have in the past examined the issue of cumulative impacts from facilities affecting the same neighborhood. For example, one air district concluded that elevated concentrations of toxic air contaminants from stationary sources tend to be quite localized and that cumulative risks are likely to occur only when multiple facilities with substantially low-elevation emissions are immediately adjacent to, or very close to, one another. Also, staff in 2006 assessed a situation in San Francisco where a proposed power plant would be located less than ½-mile from an existing power plant. Staff conducted a detailed public health cumulative risk assessment of emissions of toxic air contaminants from the power plants and other facilities located in the vicinity of the proposed power plant. Twenty (20) facilities were included in the analysis: three power plants, one water treatment control plant, three dry cleaners, ten gasoline dispensing service stations, a steel drum facility, a printing facility and SF Petroleum. A total of 50 sources were evaluated and the results showed that the emissions from the proposed power plant did not add to a significant cumulative cancer or noncancer impact. Based upon that assessment, staff would expect that if the same quantitative assessment was conducted for the CPP, the results would be the same and that no significant cumulative impact on public health would exist.

As described above, the contribution of the CPP project to both cancer risk and chronic and acute noncancer disease are comparatively very small. Even if there were a contribution from nearby sources, the estimates for cancer risk from the CPP project would be less than significant. In addition, CPP's contribution to chronic and acute noncancer disease would be less than significant in a cumulative context.

COMPLIANCE WITH LORS

Staff has considered the minority population as identified in **Socioeconomics Figure 1** in its impact analysis and has found no potential significant adverse impacts for any receptors, including environmental justice populations. In arriving at this conclusion, staff notes that its analysis complies with all directives and guidelines from the Cal/EPA Office of Environmental Health Hazard Assessment and the California Air Resources Board. Staff's assessment is biased toward the protection of public health and takes into account the most sensitive individuals in the population. Using extremely conservative (health-protective) exposure and toxicity assumptions, staff's analysis demonstrates that members of the public potentially exposed to toxic air contaminant emissions of this project—including sensitive receptors such as the elderly, infants, and people with pre-existing medical conditions—will not experience any acute or chronic significant health risk or any significant cancer risk as a result of that exposure. Staff believes that it incorporated every conservative assumption called for by state and federal agencies responsible for establishing methods for analyzing public health impacts. The results of that analysis indicate that there would be no direct or cumulative significant public health impact to any population in the area. Therefore, given the absence of any significant health impacts, there are no disparate health impacts and there are no environmental justice issues associated with **PUBLIC HEALTH**.

Staff concludes that construction and operation of the CPP will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of **PUBLIC HEALTH**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Several comments have been received regarding emissions and potential public health impacts.

Elected officials and the City Manager's Office in Yorba Linda have expressed concern that prevailing winds from the plant will carry the exhaust plume across the adjacent communities of Placentia and Yorba Linda and thus across numerous schools, hospitals and regions of low-income housing. They are concerned that any public health or other risk posed by the plant will most likely be borne by the residents of Placentia and Yorba. They requested that an independent evaluation of the risks the plant poses to Yorba Linda residents be conducted. The City of Placentia also made similar comments.

Response:

Staff has conducted an independent quantitative human health risk assessment that addresses the potential risks and hazards posed to residents and workers in the area of the proposed power plant, including Anaheim, Placentia, and Yorba Linda. As such, the evaluations requested by the Cities of Yorba Linda and Placentia have already been conducted by staff. Air dispersion modeling and the health risk assessment were conducted according to Cal EPA and U.S. EPA protocols and addressed all people, including sensitive individuals such as children the elderly, and those with pre-existing health conditions. Both cancer and non-cancer health impacts were evaluated. As described above, staff found that the risk and hazards at the point of maximum impact were extremely low and were well below the Energy Commission's and the SCAQMD's level of significance. Since the impacts were found to be less than significant at the point of maximum impact, impacts at any other location would be less than this level; indeed, impacts at more distant receptors in the cites of Yorba Linda and Placentia would be 10 to 1000 times less. Staff's conclusion is also supported by the risk assessments conducted by the applicant and by the SCAQMD.

CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the CPP and does not expect any significant adverse cancer, short-term, or long-term health effects to any members of the public, including low income and minority populations, from project toxic emissions. Staff also concludes that its analysis of potential health impacts from the proposed CPP uses a conservative health-protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the CPP would not contribute significantly or cumulatively to morbidity or mortality in any age or ethnic group residing in the project area.

PROPOSED CONDITIONS OF CERTIFICATION

Public Health-1 The project owner shall develop and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in cooling water is kept to a minimum. The Plan shall be consistent with either staff's "Cooling Water Management Program Guidelines" or with the Cooling Technology Institute's "Best Practices for Control of Legionella" guidelines but in either case, the Plan must include sampling and testing for the presence of Legionella bacteria at least every six months. After two years of power plant operations, the project owner may ask the CPM to re-evaluate and revise the Legionella bacteria testing requirement.

Verification: At least 60 days prior to the commencement of cooling tower operations, the Cooling Water Management Plan shall be provided to the CPM for review and approval.

REFERENCES

American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) 1998. Legionellosis: Position Paper. June 25.

California Air Resources Board. 2002. California Air Quality Data, <http://www.arb.ca.gov/aqd/aqd.htm>.

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

CofA 2007a - City of Anaheim/S. Sciortino (tn 43903). Application for Certification Volume I & II, dated 12/27/07. Submitted to CEC/Docket Unit on 12/28/07.

Cooling Technology Institute (CTI). 2000. Guidelines: Best Practices for Control of Legionella.

GB 2008d - Galati & Blek LLP/M. Cosens (tn 46614). Data Responses to Data Requests 1-55, dated 6/5/08. Submitted to CEC/Docket Unit on 6/5/08.

Environmental Protection Agency (EPA) November 1999. (EPA-822-R-99-001) "Legionella: Human Health Criteria Document."

OEHHA (Office of Environmental Health Hazard Assessment). 2003. *Air Toxics Hot Spots Program Risk Assessment Guidelines*. The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. August.

SRP (Scientific Review Panel on Toxic Air Contaminants). 1998. Findings of the Scientific Review Panel on The Report on Diesel Exhaust as adopted at the Panel's April 22, 1998, meeting.

URS 2009a – URS/J. Mitchell (tn 49919). Changes to Annual Emission and Dispersion Modeling, dated 1/28/09. Submitted to CEC/Docket Unit on 1/28/09.

SOCIOECONOMICS

Testimony of Scott Debauche

SUMMARY OF CONCLUSIONS

Energy Commission staff concludes that the nominal 200-megawatt (MW) simple-cycle electric generating plant, referred to as the Canyon Power Plant (CPP or proposed project), would not result in significant adverse direct or indirect socioeconomics impacts. In addition, the CPP would not contribute to a cumulative socioeconomic impact on the area's population, employment, housing, police, schools, or hospitals because the construction and operation workforce required for the CPP currently resides in the regional or local labor market area. The construction and operation of the proposed CPP would not result in any disproportionate adverse socioeconomic impacts to any low-income or minority population. Gross public benefits from the proposed CPP include capital costs and sales taxes.

INTRODUCTION

The California Energy Commission (Energy Commission) staff socioeconomics impact analysis evaluates project-related changes on existing population and employment patterns, community services, and provides demographic information related to Environmental Justice (EJ). A discussion of the estimated beneficial economic impacts of the construction and operation of the proposed CPP and other related economic impacts are provided. Information provided herein was independently reviewed and included from the CPP Application for Certification (AFC) Section 6.10 (Socioeconomics).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

SOCIOECONOMICS Table 1 contains socioeconomics laws, ordinances, regulations, and standards (LORS) applicable to the proposed CPP.

SOCIOECONOMICS Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
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	Except for a fee, charge, dedication, or other requirement authorized under Section 17620 of the Education **Code**, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

SETTING

PROJECT STUDY AREA

The proposed project includes the construction and operation of a generating facility located at 3071 East Miraloma Avenue in the city of Anaheim within Orange County. The project site is within one mile of both State Route (SR) 91, which lies to the south, and SR 57 which is located to the west. Research shows that workers may commute as much as two hours each direction from their communities rather than relocate (EPRI 1982). Therefore, for purposes of this analysis, the socioeconomics study area is the Counties of Orange, Los Angeles, Riverside, and San Bernardino. The project area pertaining to regional workforce for the proposed project consists of Orange, Los Angeles, Riverside, and San Bernardino counties.

POPULATION CHARACTERISTICS

In order to characterize the population profile of the study area, current and forecasted population trends for the study area are summarized in **SOCIOECONOMICS Table 2**. As shown in **Table 2**, between the period of 2000 and 2030, Riverside County is expected to experience the highest total population increase, while Los Angeles County is expected to experience the lowest population increase within the CPP study area.

SOCIOECONOMICS Table 2
Population Profile of the Study Area, Year 2000–2030

	Year			
Area	**2000 Population**	**2010 Projected Population**	**2020 Projected Population**	**Projected 30-Year Population Growth**
City of Anaheim	330,100	365,495	377,118	110,712 (41.6%)
Orange County	2,846,289	3,291,628	3,433,609	1,023,053 (42.4%)
Los Angeles County	9,519,338	10,718,007	11,501,884	2,638,720 (29.8%)
Riverside County	1,545,387	2,085,432	2,644,278	1,473,865 (126.0%)
San Bernardino County	1,709,434	2,133,377	2,456,089	2,762,307 (41.8%)

Source: CofA 2007.

DEMOGRAPHIC SCREENING

Staff's demographic screening is designed to determine the existence of a minority or below-poverty-level population or both within a six-mile area of the proposed project site. The demographic screening process is conducted based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality, 1997) and *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses (*National Council on Environmental Quality, 1998). The screening process relies on Year 2000 U.S. Census data to determine levels of minority and below-poverty-level populations.

Minority Populations

According to *Environmental Justice: Guidance Under the National Environmental Policy Act*, minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

A minority population, for the purposes of environmental justice, is identified when the minority population of the potentially affected area is (1) greater than 50%; (2) meaningfully greater than the percentage of the minority population in the general population of the county or other appropriate unit of geographical analysis; or (3) when one or more U.S. Census blocks in the potentially affected area have a minority population of greater than 50%.

For the CPP, the total population within a six-mile radius of the proposed site is 601,605 persons, and the total minority population is 320,454 persons or 50.26% of the total population (see **SOCIOECONOMICS Figure 1**). The demographic screening area as a whole just exceeds 50.0% and contains a number of individual census blocks with minority populations greater than 50%. Therefore, staff in several technical areas identified in the Executive Summary has considered environmental justice in their environmental impact analyses.

Below-Poverty-Level Populations

Staff has also identified the current below-poverty-level population based on Year 2000 U.S. Census block group data within a six-mile radius of the project site. The below-poverty-level population within a six-mile radius of the CPP consists of 69,725 people or 11.70% of the total population in that area.

EMPLOYMENT CHARACTERISTICS

The four-county study area includes both Orange and Los Angeles Counties individually, and the combined Riverside-San Bernardino County Metropolitan Statistical Area (MSA) as defined by the U.S. Census Bureau. **SOCIOECONOMICS Table 3** presents Year 2004 labor force characteristics (latest data available by industry) for the four-county study area. As shown in **Table 3**, the study area is diverse in industry employment, with Los Angeles County having the largest employment sector. Among all industries within the study area, the trade, transportation, and utilities industry has the largest employment numbers.

SOCIOECONOMICS Table 3
Study Area 2004 Labor Force Characteristics

Industry	Orange County 2004 Labor Force Characteristics	Los Angeles County 2004 Labor Force Characteristics	Riverside-San Bernardino MSA 2004 Labor Force Characteristics
Total Farm	6,700	7,600	18,700
Construction	92,200	140,200	111,800
Education and Health Services	131,000	467,000	118,400
Financial Activities	132,300	241,600	45,700
Government	153,400	587,100	212,500
Information	33,800	211,900	14,000
Leisure and Hospitality	162,900	372,800	116,700
Manufacturing	183,500	483,600	120,100
Natural Resources and Mining	600	3,800	1,200
Professional and Business Services	254,900	562,400	125,500
Trade, Transportation, and Utilities	264,900	781,600	254,900
Other Services	47,400	144,700	39,300
Total Employed	*1,463,400*	*4,004,100*	*1,178,100*
Unemployment Rate[1]	3.8%	5.3%	5.3%

[1] Unemployment rate shown reflects Year 2005
Source: CofA 2007.

HOUSING

Year 2007 housing conditions within the study area are shown in **SOCIOECONOMICS Table 4.** As shown in **Table 4**, there were 5,939,264 total housing units in the study area in 2007, with 360,970 of these units being vacant, creating an average vacancy rate of 6.1% for the study area.

SOCIOECONOMICS Table 4
Housing Units in the Study Area, Year 2007

	Total Units	Single-Family	Multi-Family	Mobile Homes	Percent Vacant
City of Anaheim	101,510	52,727	44,398	4,385	2,842 (2.8%)
Orange County	1,024,692	646,176	346,419	32,097	35,864 (3.5%)
Los Angeles County	3,382,356	1,882,499	1,443,156	56,701	142,058 (4.2%)
Riverside County	753,797	544,653	123,117	86,027	101,008 (13.4%)
San Bernardino County, CA	676,909	504,896	127,784	44,229	79,198 (11.7%)
Total	5,939,264	3,630,951	2,084,874	223,439	360,970 (6.1%)

Source: CofA 2007.

FISCAL REVENUE

The existing CPP site occupies city of Anaheim parcel numbers 344-221-03, 344-221-04, and 344-221-09, which are located in the Orange County Tax Rate Area (TRA) 01-076. In 2007, the CPP site parcels were purchased by the city of Anaheim (URS 2008). Article 13 of the California Constitution states: “property owned by a local government (except those that are outside of its boundaries) are exempt from property taxes" (State of California 2008). Therefore, CPP site parcels 344-221-03, 344-221-04, and 344-221-09 are exempt from property taxation.

PUBLIC SERVICES

Physical impacts to public services and facilities are usually associated with population in-migration and growth in an area, which increase the demand for a particular service, leading to the need for expanded or new facilities. Service providers serving the CPP site are located within the city of Anaheim and/or Orange County. Therefore, the study area for the public services analysis is limited to the city of Anaheim and Orange County.

Police Protection

The proposed CPP site is located within the jurisdiction of the city of Anaheim Police Department (CofA 2007). The Department is currently authorized for 395 sworn officers who are assigned to all locations within the Anaheim Police Department. The ratio of sworn police officers is approximately 13 officers per 1,000 people. The CPP site is located in the Department's East District, which is served by the East District Headquarters located 8.5 miles from the project site, at 8201 E. Santa Ana Canyon Road. Police services provided include patrol, investigations, traffic enforcement, traffic control, vice and narcotics enforcement, airborne patrol, crime suppression, community policing, tourist-oriented policing, and detention facilities. Furthermore, crime prevention recommendations are provided for all major residential, commercial, and industrial construction projects. According to AFC Section 6.10 (Socioeconomics), the capacity and level of service provided by the city of Anaheim Police Department is maintained to keep pace with the rate of development and growth in its service area.

Schools

The proposed CPP site is located within the Placentia-Yorba Linda Unified School District. In addition to the Placentia-Yorba Linda Unified School District, school capacities for the adjacent Anaheim City and Anaheim Union High School Districts are also identified in **SOCIOECONOMICS Table 5**. According to AFC Section 6.10 (Socioeconomics), school districts serving Orange County may assign students to specific schools having adequate capacity in order to avoid overloading other schools. As shown in **Table 5**, the Placentia-Yorba Linda Unified School District has a low student enrollment when compared to the Anaheim City School District enrollment numbers. In addition, both the Anaheim City and Union High School Districts are over their total operational capacity.

SOCIOECONOMICS Table 5
Enrollment Figures for the Placentia-Yorba Linda and Anaheim City School Districts, Year 2006–2007

	Number of Schools	Total Enrollment	Total School Capacity
Placentia-Yorba Linda Unified School District (K through 12th Grade)	4	5,351	N/A
Anaheim City School District (K through 8th Grade)	23	19,958	17,454
Anaheim Union High School District (9th through 12th Grade)	12	23,066	20,844

N/S: Information not available
Source: CofA 2007.

Parks and Recreation

The nearest park facility to the CPP site is city of Anaheim McFadden Park, located approximately 1,200 feet west of the CPP site on East La Jolla Street (CofA 2007). The city of Anaheim Parks Division of the Community Services Department is responsible for the maintenance and upkeep of the more than 600 acres that make up the 44 parks within Anaheim (CofA 2008).

Hospitals

The closest hospital with an emergency room to the proposed CPP site is the Placentia Linda Hospital (1303 North Rose Drive, Placentia), located less than four miles from the CPP site. The next nearest hospital is the Anaheim Memorial Center (1111 West La Palma Avenue), located less than six miles from the CPP site, and also provides emergency, acute care, surgery, inpatient/outpatient, and other care services at its 224-bed hospital facility. Additionally, the Western Medical Center (1025 South Anaheim Boulevard, Anaheim) is approximately six miles from the project site, and is a 188-bed full care hospital facility. Services include a 24-hour emergency room, acute care, and cardiology capabilities (CofA 2007).

Emergency Medical Services

The Orange County Emergency Medical Services (EMS) Agency provides oversight to all providers of emergency medical services, including fire departments, medical transportation providers, base hospitals, emergency departments, trauma centers, and to the emergency medical technician and paramedic training programs within the county (CofA 2007). Orange County EMS coordinates with a number of private regional ambulance service providers, including air ambulance services, with paramedic receiving centers and hospitals (CofA 2007).

In addition to the Orange County EMS, the city of Anaheim Fire Department (AFD) provides emergency services to the project area (CofA 2007). The AFD currently operates 11 fire stations and employs a total of 231 sworn personnel and 60 administrators (CofA 2007). The department staffs 12 engine companies, 10 of which are designated paramedic companies, six truck companies; one contract paramedic company; one dual-role hazardous-materials unit; one dual-role technical rescue unit; and two battalions (CofA 2007). The CPP site would be served by AFD Kraemer Station

5, located at 1154 North Kraemer Boulevard less than 0.5 mile from the project site. Station 5 houses Paramedic Engine 5. Response times for the AFD require first engine response within 5 minutes to 90% of all incidents and 8 minutes to the remaining 10% (CofA 2007). The AFD requires a maximum of 10 minutes for truck company response to 100% of all incidents (CofA 2007).

ASSESSMENT OF IMPACTS

Staff reviewed the socioeconomics section of the CPP AFC and the socioeconomic data provided and referenced from various governmental agencies and trade associations, and conducted its own independent analysis to form the following socioeconomics analysis and conclusions.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

According to Appendix G (Environmental Checklist Form) 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 recreation, hospitals, and emergency medical services.

A socioeconomics 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 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 respond to project needs.

The analysis of subject areas such as capacities of fire service providers, utilities, water use, and wastewater disposal are identified in the **Worker Safety and Fire Protection**, **Soil and Water Resources**, and **Waste Management** sections, respectively, of the Staff Assessment.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Population and Employment

Construction

As stated in AFC Section 3.0 (Project Description), it is anticipated that construction of the proposed CPP would last for 12-months. Required construction personnel would consist of craftspeople and supervisory, support, and construction management workers on-site during construction. There will be an average of approximately 145 daily construction workers, with a peak daily workforce of 225, depending on the month and the work required. According to AFC Section 6.10 (Socioeconomics), the peak construction labor force would be a total of 225 construction workers daily during the fifth month of construction. This peak employment number is used to analyze worst-case construction population and employment impacts.

The Impact Analysis for Planning (IMPLAN) model (an input-output model), used by the applicant to estimate employment and income impacts from the proposed CPP 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). Social Accounting Matrix (SAM)[3] multipliers were used for the applicant's economic impact analysis. SAM multipliers are similar to Type II[4] multipliers because they both include the indirect and induced effects (secondary impacts). IMPLAN multipliers were used to calculate direct, indirect, and induced jobs and expenditures in the regional economy.

The IMPLAN output completed for the CPP estimates approximately $11.9 million (in 2007 dollars) in direct construction payroll at an approximate annual salary of $82,000, including benefits. The estimated indirect and induced employment from Orange, Los Angeles, Riverside, and San Bernardino counties during construction of the CPP are 12 and 94 jobs, respectively. These additional jobs result from the $2.2 million in local construction expenditures, as well as approximately $11.9 million in payroll. The CPP's indirect and induced outputs for dollars generated by other industries supplying construction of power facilities were estimated at $1,884,900 and $12,798,600, respectively.

Staff finds the IMPLAN output completed for the CPP (economic impact analysis) reasonably consistent with the economic literature cited by many economists (Moss et al. 1994 and Mulkey et al. 2000) and therefore finds these projected beneficial economic impacts close enough to the benchmarks to be considered reasonable.

It is anticipated that construction workers would commute as much as two hours each direction from their communities rather than relocate (EPRI 1982). Staff reviewed the socioeconomics data for counties within the two-hour commute range, which is within the study area and includes Orange, Los Angeles, Riverside, and San Bernardino

[3] Type SAM multipliers capture inter-institutional transfers and account for social security and income tax leakages, institutional savings, and commuting and Type II multiplier effects (direct, indirect, and induced).

[4] A Type I multiplier is the ratio of the direct plus indirect change to the direct change resulting from a unit increase in final demand for any given sector. A Type II multiplier is the ratio of the direct, indirect, and induced change to the direct change resulting from a unit increase in final demand. The Type II multiplier takes into account the HBRP repercussionary effects of secondary rounds of consumer spending in addition to the direct and indirect inter-industry effects (Richardson 1972). Both multipliers can be of an income or employment type. 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.

Counties. **SOCIOECONOMICS Table 3** indicates that a total of 344,200 construction workers are available within the study area. An assumed maximum need of 225 construction workers represents 0.07% of the total construction workforce within the study area. Because the number of construction workers required represents such a small portion of the local available labor force, it is assumed that no population in-migration would occur as a result of project-related construction activities. Therefore, no significant impacts would occur to existing population levels or employment distribution within the study area from construction of the proposed CPP.

Operation

According to AFC Section 6.10 (Socioeconomics), the proposed CPP is expected to require a total of nine permanent full-time employees for operations, of which seven would be existing workers (five generation technicians, one generation manager, and one office specialist) from the Anaheim Peaking Plant and two would be new hires (one operations and maintenance supervisor and one generation technician) (G&B 2008a). Research shows that operational workers would commute as much as one hour to a power plant site from their homes rather than relocate (EPRI 1982). This one-hour commute range includes portions of all counties located within the four-county study area (Orange, Los Angeles, Riverside, and San Bernardino Counties). As shown in **SOCIOECONOMICS Table 3**, due to the large labor force located within the study area, it is assumed that the two new employees required for the CPP would be found locally. In addition, a total of two new workers would account for a negligible amount of the total study area labor force and would not change existing employment patterns of the study area. As all workers are expected to reside within the study area, no impacts to existing population levels would occur. Because the number of operational workers required represents such a small portion of the local available labor force, no significant impacts to the study area population or employment base would result from proposed project operation.

For CPP operations, IMPLAN estimates the average salary per employee is expected to be approximately $80,000 per year, including benefits. Combined, the annual operation payroll will be approximately $723,000 for the facility. The combined annual salary for the two new employees is expected to be $189,000, including benefits. The resulting indirect and induced effects of the CPP operation occurring in Orange, Los Angeles, Riverside, and San Bernardino counties would be one and four jobs, respectively. These additional jobs result from the $700,000 in operations and maintenance, as well as $722,762 in payroll. The CPP's indirect and induced outputs for dollars generated by other industries supplying power generation were estimated at $217,990 and $510,675, respectively.

Housing

The proposed CPP site is on land zoned for industrial use and contains no existing housing. As such, no housing would be displaced. As presented in **Socioeconomics Table 4**, there were 5,939,264 total housing units within the study area, with 360,970 vacant units, resulting in a 6.1% vacancy rate. As discussed above in the population and employment analysis, during project construction all workers would reside within commuting distance of the proposed CPP site, and therefore would not need to move into the area. In addition, as discussed above in the population and employment analysis, CPP operation would only require two new employees that are expected to come from within the study area. In the unlikely event that any workers come from outside the study area, ample vacant housing is available. Therefore, no construction or operation-related impacts are expected on the local housing supply availability or demand.

Fiscal and Economic Effects

Property Taxes

The CPP site is currently owned by the city of Anaheim, and would continue to be under city of Anaheim ownership during proposed project operation. Article 13 of the California Constitution exempts local government from property taxation (State of California 2008). Therefore, because the proposed project site is owned by the city of Anaheim, the CPP would not generate property tax revenue to the county of Orange. Therefore, there would be no impacts to the property tax base of Orange County as a result of the CPP.

Sales Tax

According to AFC Section 6.10 (Socioeconomics), during construction, local commodities expenditures are expected to be approximately $733,000 for each county within the study area (Orange, Los Angeles, Riverside, and San Bernardino) for an estimated total of $2.9 million in construction commodity expenditures. Sales tax and allocations resulting from local expenditures paid to the four-county study area during construction is estimated to be $230,987 in 2007 dollars. During project operation, local commodities expenditures are expected to be approximately $700,000, with an estimated $175,000 spent in each of the four counties in the study area. Sales tax and allocations resulting from local expenditures paid to the four-county study area during CPP operation is estimated to be $55,127 annually in 2007 dollars. The additional sales tax revenues generated by the proposed CPP would have a beneficial impact to the four-county study area local economies.

Public Services

Physical impacts to public services and facilities are usually associated with population in-migration and growth in an area, which increase the demand for a particular service and lead to the need for expanded or new facilities. An increase in population in any given area may result in the need to develop new or alter existing public services and associated facilities to accommodate increased demand. The **Socioeconomics** analysis focuses on the proposed project impacts to public services such as law enforcement, schools, and hospitals. The analysis of proposed project impacts to fire protection service levels is discussed within the **Worker Safety and Fire Protection** section of the Staff Assessment.

Law Enforcement

The required construction and operational labor force would reside within the four-county study area. Therefore, no population increase would occur as a result of the CPP, thereby eliminating the need for an increase in law enforcement services or facilities in the study area. In addition, according to AFC Section 6.10 (Socioeconomics), the city of Anaheim Police Department, which has primary responsibility for policing the proposed project site, stated to have sufficient capacity to provide law enforcement services to the CPP during both construction and operational phases. Therefore, construction and operation activities at the proposed CPP would not significantly impact the existing service levels or response times of the city of Anaheim Police Department serving the CPP site or surrounding area.

Schools

As discussed earlier in the population and employment analysis, the proposed CPP is expected to employ a total of nine full-time employees, seven of which would be existing employees from the Anaheim Peaking Plant and currently residing with the study area and two new employees who are expected to come from within the study area labor force. Because all construction and operational employees are expected to already reside within the study area, the proposed CPP would not result in any direct population growth to the area that could generate a need for expanded school facilities. No impacts to schools would occur.

Typically, most developments are required to pay a development fee, or school impact fee to offset the potential impacts of the development on the school district(s) serving the site. These impact fees collected by the affected school district typically go toward school construction projects to accommodate growth. According to AFC Section 6.10 (Socioeconomics), the Placentia-Yorba Linda Unified School District, which serves the CPP project area indicates that the proposed project would be exempt from paying school impact fees, because the property is owned by a local jurisdiction (i.e., the city of Anaheim). In addition, the CPP would not contribute any direct population growth to the area that could generate a need for expanded school facilities. Therefore, the CPP would not result in any impacts to the Placentia-Yorba Linda Unified School District.

Parks and Recreation

The demand for new or expanded park and recreational facilities is generally associated with an increase in housing or population. As discussed above within the Population and Employment analysis, no population in-migration would occur as a result of project-related construction or employment activities. Therefore, both construction and operation of the CPP would not have a significant adverse socioeconomic impact on parks and recreational facilities.

Hospitals

The proposed CPP would not directly or indirectly induce substantial population growth in the area. The proposed CPP site is served by several hospitals equipped to provide 24-hour emergency room, acute care, and cardiology capabilities (CofA 2007). As all construction and operational employees are expected to already reside within the study area, no additional constraints or physical impacts would occur to the healthcare services or facilities provided by the hospitals serving the CPP site. Therefore, construction and operation of the proposed CPP would have no impacts to hospital facilities.

Emergency Medical Services

As discussed above under direct/indirect population impacts, the proposed CPP would not directly or indirectly induce substantial population growth in the area. The proposed CPP site is served by the Orange County EMS to provide 24-hour contact with a number of private regional ambulance service providers, including air ambulance services, with paramedic receiving centers and hospitals (CofA 2007). All ambulance service would come from privately owned providers from within the Orange County study area in the event ambulance service is required during construction or operation. Because all employees are expected to already reside within the study area, no additional constraints or physical impacts would occur to the emergency service providers or facilities serving the Orange County EMS and the CPP site. In addition, based on consultation with the AFD, no significant impacts are expected from the proposed CPP on AFD Kraemer Station 5 services (CofA 2007). Therefore, construction and operation of the proposed CPP would have no impacts to emergency medical services.

CUMULATIVE IMPACTS

A project may result in significant adverse cumulative impacts when 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, or the effects of probable future projects (Title 14, California Code of Regulations, section 15130). Cumulative socioeconomics impacts could occur when more than one project has an overlapping construction schedule that creates a demand for workers that cannot be met by the local labor force, resulting in an influx of non-local workers and their dependents.

A total of 58 projects located within a one-mile radius of the proposed CPP site that could have an adverse cumulative socioeconomic effect (G&B 2008d). These projects include a large number of residential projects (including the Canyon Crest 165 single-family home development and the Olen Development 260 apartment development), large commercial development projects (including the Anaheim Resort, Platinum Triangle, and Boeing redevelopment project), institutional projects (including the Orange County Anaheim Medical Center, La Jolla groundwater basin project, and the Placentia-Yorba Linda Unified School District new Gualberto Valadez Middle School), as well as various mixed-use and expansion projects. All of the identified 58 projects would require a labor supply for construction.

As discussed above, an assumed maximum need of 225 construction workers (expected peak labor force) represents 0.07% of the total construction workforce within the four-county study area. Operation of the proposed CPP would require only nine full-time, permanent employees, of which only two would be new employees. The generation of two permanent new full-time positions associated with operation of the proposed CPP represents a negligible portion of the local labor force. Therefore, because the proposed CPP requires such a small amount of the local labor force for both construction and operation, its cumulative contribution to socioeconomic impacts resulting from an influx of non-local workers and their dependents would not be cumulatively considerable and, therefore would be less than significant.

While continued development of the area would likely result in an increase in population and require the need for new housing and expanded public service facilities, the proposed CPP would have no cumulative contribution to these impacts. Despite the potential for construction schedule overlaps with known projects within the proposed CPP site area, no adverse cumulative socioeconomic effects are anticipated from either the construction or operation of the proposed CPP. In addition, both the short-term construction-related and long-term operation-related spending activities of the CPP are expected to have cumulative economic benefits to four-county study area. The cumulative benefits would increase when revenues accrued as a result of the proposed CPP are combined with spending and any local revenues accrued (taxation and fees) as a result of current and future reasonably foreseeable cumulative development projects.

RESPONSE TO COMMENTS

Comments were received both verbally and in writing on the contents of the Preliminary Staff Assessment (PSA) from agencies, organizations and members of the public. During the PSA comment period, no comments related to issues presented in the **Socioeconomics** section of the PSA were provided to staff.

NOTEWORTHY PUBLIC BENEFITS

Important public benefits discussed earlier under the fiscal and economic effects section, include both the short-term construction related and long-term operational related increase in local expenditures and payrolls, as well as sales tax revenues.

CONCLUSIONS

No significant adverse socioeconomics impacts would occur as result of the construction or operation of the proposed CPP. Staff believes the proposed CPP would not cause a significant adverse direct, indirect, or cumulative impact on population, employment, housing, public finance, local economies, or public services. In addition, because there would be no adverse project-related socioeconomic impacts, minority and low-income populations would not be disproportionately impacted. The proposed CPP would benefit the four-county study area (Orange, Los Angeles, Riverside, and San Bernardino Counties) in terms of an increase in local expenditures and payrolls during construction and operation of the facility. These activities would have a positive effect on the local and regional economy.

Estimated gross public benefits from the CPP include increases in sales taxes and employment payrolls for the CPP area. **SOCIOECONOMICS Table 6** provides a summary of economic benefits of the CPP.

SOCIOECONOMICS Table 6
Project Financials (2007 dollars)

Estimated Project Capital Cost	$174 million
Estimated Annual Property Taxes	$0
Estimated School Impact Fees	$0
Estimated Direct Payroll	
Construction	$11.9 million (estimated)
Operation	$723,000 annually (estimated)
Estimated Total Sales Taxes (Total: Combined State, County and local)	
Construction	$230,987
Operation	$55,127

PROPOSED CONDITION OF CERTIFICATION

No conditions of certification are required for socioeconomic resources because no significant adverse socioeconomics impacts would occur as a result of the proposed CPP.

REFERENCES

CofA 2008 – City of Anaheim. City of Anaheim Parks Division of the Community Services Department information website. http://www.anaheim.net/article.asp?id=235.

CofA 2007 - City of Anaheim/S. Sciortino (tn 43903). Application for Certification Volume I & II, dated 12/27/07. Submitted to CEC/Docket Unit on 12/28/07.

EPRI 1982. Electric Power Research Institute. *Socioeconomics of Power Plants*, 1982.

G&B 2008a – GB/D. Wiseman (tn: 45606). Data Adequacy Responses. Submitted to CEC/Docket Unit on 03/07/2008.

G&B 2008d – GB/M. Cosens (tn: 46614). Data Responses to Data Requests 1-55. Submitted to CEC/Docket Unit on 06/05/2008.

Lewis, Eugene, Russell Youmans, George Goldman, Garnet Premer. 1979. *Economic Multipliers: Can a rural community use them?* Western Rural Development Center 24.

Mulkey, David and Alan W. Hodges. 2000. Using Implan to Assess Economic Impacts. University of Florida IFAC Extension FE 168.

State of California 2008. California State Constitution Article XIII. http://www.leginfo.ca.gov/.const/.article_13

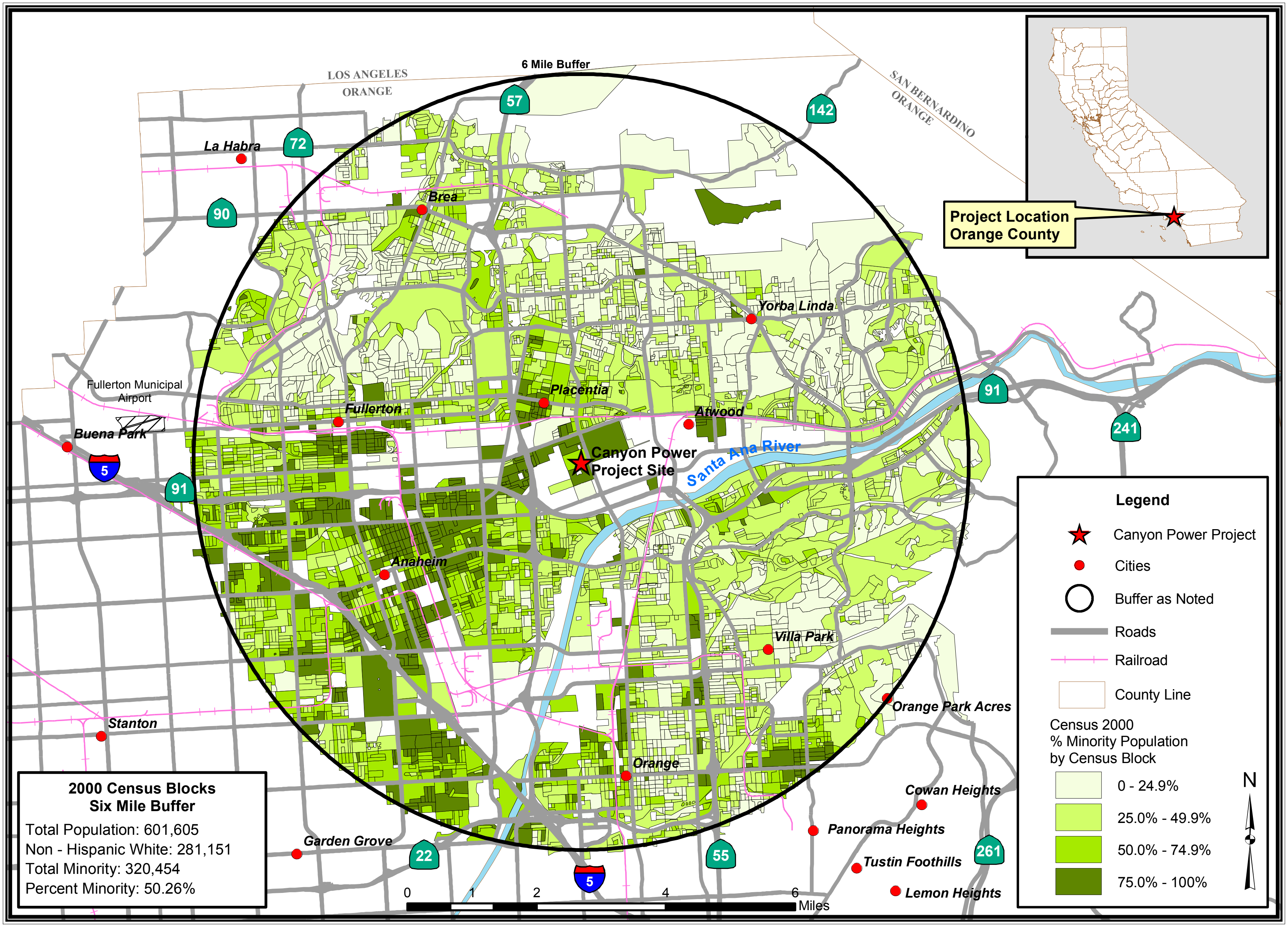
URS 2008. Email communication between Cindy Poire of URS Corporation and Che McFarlin California Energy Commission Siting Project Manager for the Canyon Power Plant. July 8, 2008.

US Census 2000. U.S. Census Bureau. Poverty Thresholds 2000. http://www.census.gov/hhes/www/poverty/threshld.html

US EPA 1998. U.S. Environmental Protection Agency. Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses. April 1998.

SOCIOECONOMICS - FIGURE 1

Canyon Power Project - Census 2000 Minority Population by Census Block - Six Mile Buffer



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: California Energy Commission Statewide Power Plant Maps 2009 - Census 2000 PL 94-171 Data - Matrix PL2

SOIL AND WATER RESOURCES

Testimony of Paul Marshall, P.G., C.H.G.

SUMMARY OF CONCLUSIONS

Staff has not identified any immitigable significant impacts to soil and water resources from construction or operation of the proposed Canyon Power Plant (CPP) if all recommended conditions of certification are fulfilled. Through compliance with various City of Anaheim (COA) and Orange County (OC) codes and ordinances as well as the preparation and implementation of construction and operating plans, all potential impacts would be mitigated to a less than significant level.

INTRODUCTION

Southern California Public Power Authority (SCPPA) proposes to construct a nominal 200-megawatt (MW) simple-cycle power plant and associated infrastructure within the COA. This section of the Final Staff Assessment (FSA) presents an analysis of the potential impacts to soil and water resources from the construction and operation of the proposed CPP. This assessment incorporates information provided to the Energy Commission staff as of July 29, 2009 and focuses on the potential for the CPP to:

- cause accelerated wind or water erosion and sedimentation;
- exacerbate flood conditions in the vicinity of the project;
- adversely affect surface water or groundwater supplies;
- degrade surface water or groundwater quality; and
- comply with all applicable laws, ordinances, regulations, and standards (LORS).

Where the potential for impacts is identified, staff proposes mitigation measures to reduce the significance of the impact and, as appropriate, recommends conditions of certification to ensure that any impacts are less than significant and the project complies with all applicable LORS. The soil remediation process and removal of contaminated soil are addressed in the **WASTE MANAGEMENT** section of this FSA.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

SOIL AND WATER Table 1
Laws, Ordinances, Regulations, and Standards

Federal LORS	
Clean Water Act (33 USC, §§ 1251 et seq.)	Requires states to set standards to protect water quality, which includes regulation of storm water discharges during construction and operation of power plant facilities.
section 401 Permit	Requires that any activity that may result in a discharge into a water body must be certified by the Regional Water Quality Control Board.
section 404 Permit	Authorizes the US Army Corps of Engineers to regulate the discharge of dredged or fill material to the waters of the US.
Resource Conservation and Recovery Act	The Resource Conservation and Recovery Act (RCRA) of 1976 (40 CFR Part 260 et seq.) 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 LORS	
California Constitution, Article X, section 2	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.
California Water Code, section 13523	Requires the Santa Ana Regional Water Quality Control Board (SARWQCB) to prescribe water reuse requirements for water that is to be used as recycled water after consulting with the Department of Public Health (DPH).
Title 17, California Code of Regulations	Requires prevention measures for backflow and cross connections of potable and non-potable water lines.
Title 22, California Code of Regulations	Requires DPH to review and approve new or modified recycled water projects to ensure they meet all recycled water criteria for the protection of public health.
Public Resources Code, sections 25300 through 25302	Requires the Energy Commission to conduct assessments and forecasts of all aspects of energy production and use to develop energy policy that conserve resources, protect the environment, ensure energy reliability, enhance the state’s economy, and protect public health and safety.
Local LORS	
City of Anaheim Municipal Code, Title 10, Ch. 10.09	Requires new development and redevelopment projects to prepare a Water Quality Management Plan to manage urban storm water runoff.
Orange County Sanitation District Ord. No. OCSD-31	Specifies discharge limitations for industrial wastewater discharges to the sewer system.
State Policies and Guidance	
Integrated Energy Policy Report (Pub. Resources Code, Div. 15, § 25300 et seq.)	Requires the Energy Commission to allow the use of fresh water for cooling purposes by power plants only where alternative water supply sources and alternative cooling technologies are shown to be “environmentally undesirable” or “economically unsound.”

SETTING

The proposed CPP site is located within the Los Angeles Basin on a broad alluvial plain that gradually slopes to the southwest. The site is underlain by stratified alluvial deposits consisting of medium dense to very dense silty sand and poorly graded sand. The Los Angeles Basin is bounded by the Santa Monica Mountains to the north, Puente Hills to the east, Santa Ana Mountains to the south, and the Palos Verde Peninsula to the west (CofA 2007a, section 6.3.1.1).

PROJECT, SITE, AND VICINITY DESCRIPTION

The CPP site would be located within the COA in northern OC. The project site is bordered by the City of Placentia to the north and the Santa Ana River corridor, the City of Orange, and a small-unincorporated area within OC to the south. Directly east of the proposed site are several groundwater recharge facilities (Kraemer Basin) operated and maintained by the Orange County Water District (OCWD) (CofA 2007a section 3.2).

The proposed CPP and associated construction laydown areas would be located on a previously developed site located at 3071 East Miraloma Avenue in a COA designated industrial zone. The existing 10-acre site is currently paved with concrete and asphalt (approximately 90 percent) and is partially occupied by existing buildings. The site elevation is approximately 210 feet above mean sea level (msl) and is essentially flat with a slight grade to East Miraloma Avenue on the south (CofA 2007a, sections 6.4.1 & 6.5.1.1).

The proposed CPP would consist of four natural gas-fired General Electric LM 6000PC Sprint combustion turbines (CTs) and associated infrastructure. The project proposal includes the demolition of all structures and associated pavement currently on-site, as well as offsite installation of power cables, natural gas lines, communication cables, electrical interconnection line, and process water lines. A more complete description of the project that includes site layout and regional maps is contained in the **PROJECT DESCRIPTION** section of this FSA.

SOILS

Regional soil consists of Quaternary Age alluvial deposits. These deposits consist of loose to moderately dense, unconsolidated sand, sandy silt, and silt from the Santa Ana River and are considered floodplain deposits. A geotechnical investigation was performed and found that the CPP site is underlain by approximately 2,000 feet of unconsolidated, stratified silt, sand, and gravel deposits. Shallow soil at the CPP site consists of fill within the upper three to five feet and is composed of silty sand (URS 2007a, section 2.2).

Beneath the fill, native soils are of the Metz Series and consist of medium dense to very dense silty sand and poorly graded sand with some isolated layers of sandy silt. This soil series is formed in mixed alluvium and consists of somewhat excessively drained soils. The Metz Series soil found at the CPP site and linears is designated as Metz loamy sand (CofA 2007a, section 6.4.1.1.1).

GROUNDWATER

The CPP site is located within the lower Santa Ana River watershed and Orange County Groundwater Basin (basin). The basin underlies the north half of OC and covers an area of approximately 350 square miles. The basin is over 2,000 feet deep and forms a complex series of interconnected sand and gravel deposits. The total capacity of the basin is 38,000,000 acre-feet (AF). As of 1998, storage of fresh water within the basin was estimated to be 37,700,000 AF. The basin is managed by OCWD for the benefit of municipal, agricultural, and private groundwater users (CofA 2007a, section 6.5.1.6.6, CofA 2005).

During the Phase I environmental investigation conducted by AMEC Earth and Environmental, Inc. (AMEC), groundwater beneath the CPP site was found at depths from 83.40 to 87.10 feet below ground surface (bgs). Groundwater flows in a west-southwest direction as the topography slopes down towards the Pacific Ocean (URS 2007a, section 2.2).

SOIL AND GROUNDWATER CONTAMINATION

Soil contamination was found on site during the Phase II Environmental Site Assessment conducted by AMEC. AMEC found petroleum hydrocarbons indicative of diesel fuel, tetrachloroethylene and other volatile organic compounds (VOCs), and concentrations of heavy metals (arsenic and lead) in the soil samples. Petroleum hydrocarbons identified as diesel oil were found in the groundwater samples (URS 2007a, section 2.3).

The identification and removal of contaminated soil is discussed in the **WASTE MANAGEMENT** section of this FSA. Given the depth to groundwater (83 to 87 feet bgs), no contact with the groundwater table would occur during construction or operation of the proposed CPP.

SURFACE HYDROLOGY

The COA is located within portions of four watersheds. The Santa Ana River watershed is the largest watershed and covers 153.2-square miles. The Santa Ana River begins 75-miles from the Pacific Ocean in the San Bernardino Mountains. The Santa Ana River flows through the eastern portion of the COA and is approximately 1.5-miles south of the CPP site. The Santa Ana River has been improved to provide flood control and groundwater recharge. Flows within the Santa Ana River near the CPP site consist of natural runoff, recycled water, and imported water (GB 2008d, Data Response 50).

Carbon Creek is just north of the CPP site downstream from the Carbon Canyon Diversion Channel. Carbon Creek encompasses a watershed of 21.4-square miles in west OC. The watershed area is highly urbanized with residential, commercial, and industrial development. There are currently no impaired water bodies within the Carbon Creek watershed; however, Carbon Creek is tributary to the San Gabriel River, which is an impaired water body under the Los Angeles Regional Water Quality Control Board's 1998 303(d) list (GB 2008d, Data Response 50 and LARWQCB 1998).

The Carbon Canyon Diversion Channel is located approximately 2,500-feet east of the CPP site and provides flood control. The Carbon Canyon Diversion Channel is a partially rock-lined flood control channel that drains into the Kraemer Basin facility and is hydrologically connected to the Santa Ana River. The CPP site is adjacent to the Kraemer Basin facility, which is part of OCWD's Groundwater Replenishment System (GWRS) (CofA 2007a section 6.6.1.3).

Project Water Supply

Water would be used during construction and operation of the proposed CPP. Potable water and raw or untreated groundwater would be provided by the COA (GB2009h). The COA serves a population of more than 345,500 and relies on water pumped from the basin. The COA pumps groundwater from 19 wells with a total capacity of 82,000,000 gallons per day (gpd). The COA's groundwater supply is supplemented by imported fresh water purchased from the Metropolitan Water District of Southern California (MWD) (CofA 2007a, section 6.5.2.3).

As proposed in SCPPA's Final Comments on the Preliminary Staff Assessment dated June 9, 2009 (GB 2009g, pg 9), water for CPP operation would be recycled water supplied to the CPP from the OCWD's GWRS via a new 2,185-foot-long pipeline. SCPPA proposes to construct an underground offsite pump station. The primary uses of the GWRS recycled water would be for chiller cooling system makeup water and emissions control. Within SCPPA's Final Comments on the Preliminary Staff Assessment (GB 2009g, pgs 6 & 7), SCPPA expects the peak recycled water consumption rate to be approximately 414,720-gpd with a maximum consumption of approximately 100-acre-feet per year (AFY). SCPPA estimates the average CPP recycled water consumption rate would be approximately 384,000-gpd.

Although SCPPA states that the maximum recycled water consumption of 100-AFY would be based on the allowable operating hours contained in the Preliminary Determination of Compliance (PDOC) (GB 2009g, pgs 6), SCPPA did not provide the number of allowable operating hours or whether the number of operating hours differs from the maximum annual operating hours permitted in the PDOC (5,040-hrs/y). The Final Determination of Compliance (FDOC) has been submitted and allows the CPP to operate for a maximum of 5,040-hrs/yr (SCAQMD 2009c, Tables 24 & 25). For this assessment, 5,040-hrs/yr of plant operation will be used to determine the maximum potential annual recycled water consumption by the CPP.

In SCPPA's Final Comments on the Preliminary Staff Assessment (GB 2009g, pg 9), SCPPA proposed new verification text be included in Condition of Certification **SOIL&WATER-6** stating that the OCWD can deliver recycled water at a maximum rate up to 700 gallons per minute (gpm). Based on this delivery rate, the hourly rate of recycled water consumption would be 42,000 gallons per hour. If the CPP were to operate for its permitted maximum hours of operation (5,040-hrs/y), the plant would consume approximately 650-AF of recycled water per year.

Process and Sanitary Wastewater

The wastewater discharge from the proposed CPP would consist primarily of process wastewater as well as a minor amount of sanitary wastewater. The process wastewater is comprised of reverse osmosis (RO) wastewater and cooling tower blowdown from the chilled water system cooling tower. Blowdown would be required to prevent mineral scale formation on heat transfer surfaces. Because the process wastewater would consist primarily of concentrated GWRS recycled water, SCPPA anticipates that it would not need to be treated prior to discharge to the OCSD sewer system (CofA 2007a, section 6.5.3.11).

Storm Water

The existing CPP site is predominantly paved with a slight downward grade to the south. Storm water runoff from the site currently drains as sheet flow to the south into existing storm water drains on East Miraloma Avenue. Land disturbance activities are expected to occur on all 10-acres of the site, and existing drainage patterns would be significantly altered. The site would be graded and sloped to allow sheet flow to the south or to catch basins with underground piping to a proposed collection vault (CofA 2007a, Appendix N and GB 2008d, Data Response 50).

The soils underlying the CPP site are suitable for infiltration of storm water. SCPPA proposes to pre-treat the storm water for sediment and oil removal before draining to the proposed on-site underground vault for infiltration. During CPP operation, the infiltration vault would prevent discharges of storm water runoff from the industrial areas of the site. The infiltration vault would include an overflow outlet to allow for storm water discharge in excess of the design capacity to flow to the existing COA storm drains on East Miraloma Avenue (CofA 2007a, section 6.5.3.14).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The CPP was evaluated to determine whether the construction or operation of the project would contribute to erosion, sedimentation, flooding, and degradation of water quality and water supply. Compliance with the comprehensive regulatory procedures that have been adopted, absent unusual circumstances, will ensure that impacts will not occur. The regulatory procedures typically offer a suite of options for addressing the potential impacts and include performance standards so that impact avoidance or minimization is ensured.

The federal and state LORS and state and local policies presented in **SOIL AND WATER Table 1** were used to determine LORS compliance and are of particular relevance when determining the significance of potential impacts associated with the project.

- The Clean Water Act requires states to set standards to protect water quality through the regulation of point source and certain non-point source discharges to surface water.
- California Constitution, Article X, section 2 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.
- California Water Code, section 13523 requires the SARWQCB to prescribe water reuse requirements for water that is to be used as recycled water after consultation with the DPH to ensure such actions are protective of the public.
- California Code of Regulations, Title 17 specifies requirements for backflow prevention and cross connections of potable and non-potable water lines.

- California Code of Regulations, Title 22 requires the California Department of Public Health (DPH) to review and approve the use and disposal of recycled water to ensure public health and safety.
- City of Anaheim Municipal Code, Title 10, Chapter 10.09 requires new development and redevelopment projects to prepare a Water Quality Management Plan to manage urban storm water runoff quality.
- Orange County Sanitation District, Ord. No. OCSD-31 specifies discharge limitations for industrial wastewater discharges to the sewer system.
- *Integrated Energy Policy Report* requires the Energy Commission to allow 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.

For impacts that either exceed published standards or do not conform to established practices, mitigation will be proposed by staff to reduce or eliminate the impact.

DIRECT/INDIRECT IMPACTS AND MITIGATION

A discussion of direct and indirect impacts and mitigation, presented below, is divided into separate sections relating to construction and operation of the CPP. For each potential impact discussed, both the applicant's proposed mitigation and staff's determination of the adequacy of that proposed mitigation are discussed. If necessary, staff will propose additional mitigation measures and refer to specific conditions of certification relating to a potential impact and its required mitigation measures. Construction and operation impacts for erosion and storm water runoff must be addressed to avoid potential adverse impacts to water quality and soil resources.

Construction Impacts and Mitigation

Construction of the CPP would involve the removal of existing buildings and pavement, soil excavation, grading, building construction, and installation of utility connections. Potential impacts to soils can be caused by either increased erosion or release of hazardous materials during construction. Accelerated wind- and water-induced erosion may result from earth-moving activities associated with construction of the project. Alteration of the soil structure leaves soil particles vulnerable to detachment and removal by wind or water.

Potential storm water impacts could result if increased runoff flow rates and volume discharge from the site contribute to larger flows to the Santa Ana River. Water quality could be impacted by the discharge of eroded sediments from the site, the release of hazardous materials during construction, or the migration of existing hazardous materials present in the subsurface soil. Potential construction-related impacts to soil, stormwater, and water quality, including the applicant's proposed mitigation measures and staff's proposed mitigation measures are discussed below.

Soil Erosion Potential

Construction activities can lead to adverse impacts to soil resources including increased soil erosion, soil compaction, loss of soil productivity, and the disturbance of saturated soils. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Soil erosion can result in the loss of topsoil and increased sedimentation of surface waters, or in increased sediment loading to the COA's storm drain system.

The magnitude, extent, and duration of those impacts would depend on several factors, including the proximity of the CPP site to surface water, the soils affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation or high intensity and short duration rain events, coupled with soil-disturbing activities, can result in on-site erosion. In addition, high winds during grading and excavation activities can result in wind-borne erosion, which can lead to increased particulate emissions, which in turn can adversely affect air quality. The implementation of appropriate erosion control measures would help conserve soil resources, maintain water quality, prevent accelerated soil loss, and protect air quality.

Water and Wind Erosion

Soil disturbing activities related to CPP construction would be conducted on all 10-acres of the project site. Site preparation would involve the removal of existing buildings and pavement. Site grading would be minimal, as the final grade at the site would be similar to the existing grade. The native soils underlying the CPP site are primarily sandy soils and are generally stable. The upper layers of native soil are considered loose sandy material and would need to be excavated, removed, re-compacted, and then reused as engineered fill. Construction of the CPP is estimated to be conducted over a 12-month period. Material suitable for backfill would be stockpiled on-site (CofA 2007a, section 6.4.1.1.1).

The primary soil types for the CPP (Metz Series) are medium dense to very dense silty sand and poorly graded sand with some isolated layers of sandy silt. The risk of erosion for those soils is slight. The proposed site is also located in a highly developed area that would limit local ground-level winds thus further reducing the potential for wind erosion.

CPP Site Construction

SCPPA proposes to demolish all existing structures on the CPP site as well as remove the concrete and asphalt pavement. Construction of the proposed CPP would include the erection and/or installation of the power generating facilities, natural gas and recycled water pipelines, and a multi-chamber storm treatment vault and infiltration basin.

SCPPA believes that the relatively flat topography surrounding developed areas and the use of construction best management practices (BMPs) would reduce the potential for soil loss and erosion to a negligible level. The draft Storm Water Pollution Prevention Plan (SWPPP) and Water Quality Management Plan (WQMP) submitted by SCPPA provides erosion control BMPs for addressing soil erosion and treatment control BMPs for trapping eroded sediments during construction. The CPP would be designed to comply with the WQMP requirements for new development and significant redevelopment as specified in the Orange County Drainage Area Management Plan (DAMP) and the COA Local Implementation Plan.

The fundamental requirements specified in the WQMP include site design BMPs that would minimize changes to the existing hydrology, structural source control BMPs to minimize or eliminate the exposure of pollutant sources to precipitation or runoff, and treatment control BMPs to reduce or remove pollutants that have become entrained in storm water runoff. The COA's storm water compliance program is governed by the requirements of the Orange County National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (Orange County MS4) permit and the DAMP. The Orange County MS4 permit (Order No. R8-2009-0030, NPDES No. CAS618030) requires preparation of a construction SWPPP for municipal construction projects. The construction SWPPP must comply with the State's General NPDES Permit (Order No. 99-08-DWQ) (CofA 2007a, Appendix N and SARWQCB 2009).

As a condition of the DAMP, the COA must notify the SARWQCB of the proposed construction activity with an informal Notice of Construction Activity. The construction SWPPP must be prepared before the start of any construction activities. During construction, the COA is required to inspect and enforce contract documents (the construction SWPPP and Monitoring Program) and notify the SARWQCB of any non-compliance with the General Permit (CofA 2004).

SCPPA proposes to meet the requirements of the Orange County MS4 permit and the DAMP for municipal storm water and urban run-off discharges within OC. With the implementation of appropriate BMPs, which is required by the construction SWPPP and the MS4 permit, SCCPA expects to keep soil loss due to water and wind erosion to a negligible amount that would not be considered a significant impact (GB 2008d, Data Response 41).

Staff agrees that the proper selection and implementation of BMPs can reduce the impact of water and wind erosion to soil resources to a level that is less than significant. Adherence to the procedures in an approved construction SWPPP and WQMP would limit both erosion and the migration of contaminants (that may be disturbed by construction) from entering the COA's storm water system. Staff has reviewed both the draft SWPPP and the preliminary WQMP. These plans require the applicant to test and monitor soil and run-off from the CPP site. Because adequate steps would be taken as part of the design and implementation of the construction SWPPP and WQMP as required in Condition of Certification **SOIL&WATER-1**, staff believes that soil loss and erosion from construction of the CPP project would not create a significant impact.

However, given the existing on-site soil contamination from petroleum hydrocarbons, VOCs, and heavy metals, the potential impacts relating to wind borne soil loss could be exacerbated and the offsite transport of eroded sediments could lead to significant water quality impacts. SCPPA proposes to ensure the site is adequately characterized and remediated for known soil contaminants. Condition of Certification **WASTE-1** has been proposed in the **WASTE MANAGEMENT** section of this FSA. Condition of Certification **WASTE-1** requires that any remedial work must be conducted under the oversight of the Orange County Health Care Agency Environmental Health Division (OCHCA). Through proper site characterization and remediation, combined with erosion control measures, the offsite transport of soil contaminants would be minimized. The project owner would not be allowed to start soil disturbing activities in areas requiring characterization and remediation until OCHCA had determined that all necessary remediation had been accomplished.

CPP Linears Construction

For operation of the proposed CPP, water, sewer, and natural gas pipelines as well as underground transmission and communications cables would be required. Potential construction pollutants associated with these linears are sediment from areas of soil disturbance, concrete and cement-related mortars, spilled oil, fuel, and fluids from vehicles and heavy equipment. With the exception of a portion of the natural gas pipeline, all other pipelines or underground cables would be constructed exclusively within COA streets, and potential impacts to soil and water resources would be mitigated through the preparation and implementation of the construction SWPPP and WQMP (CofA 2007a, Appendix N).

The natural gas pipeline would cross under Carbon Creek at the intersection of East Orangethorpe Avenue and Kraemer Boulevard. SCPPA proposes a jack and bore construction operation to drill under Carbon Creek to install the natural gas pipeline below and across Carbon Creek. Because of the drilling process would employ the jack and bore process, unexpected and temporary impacts can occur as a result of drilling mud flowing through soil fractures to the surface and into Carbon Creek. To mitigate the potential of such an occurrence, staff recommends the preparation of a Frac-Out Plan prior to the commencement of the jack and bore operation. This plan would specify emergency and remedial actions to protect Carbon Creek in the event drilling mud is released to the creek or creek bed. The requirement for a Frac-Out Plan is included in Condition of Certification **SOIL&WATER-2**.

Construction activities associated with the proposed jack and bore operation may have the potential for adverse impacts to water quality from surface or sub-surface pollutants. To minimize impacts to Carbon Creek from pit excavation and drilling, staff recommends consultation with the U.S. Army Corps of Engineers and the SARWQCB regarding Clean Water Act, section 404 and 401 permits and with the Department of Fish and Game for a Streambed Alteration Agreement. To be protective of water resources, staff has included the requirement that the project owner provide the Compliance Project Manager (CPM) with copies of the section 401 water quality certification, section 404 permit, and streambed alteration agreement in Condition of Certification **SOIL&WATER-2**.

Construction Water Supply

SCPPA estimates the average daily water demand for demolition and construction to be 13,000-gpd with an average annual consumption of 3.5 million gallons (approximately 11 AF). The volume of construction water would be used for dust control, soil compaction, concrete curing, and hydrostatic testing (CofA 2007a, section 6.5.3.5). In SCPPA's Well 28 Information and Revised Text Re: Soil and Water 3 Condition for the CPP, letter dated July 29, 2009 (GB 2009j), SCPPA proposes to use raw groundwater from the COA Well 28 for dust suppression and soil compaction activities during CPP construction.

Well No. 28 is located at 3413 E. Miraloma Avenue approximately 1-mile from the CCP site. SCPPA proposes to install a quick connect coupler to the well's discharge line so tanker trucks could be filled using a fire hose. An air gap would be provided between the fire hose discharge and the construction tanker truck to ensure that construction water from the tanker truck could not be drawn back into the well or the raw water transmission main in the event of a sudden well pump motor shutdown (CofA 2009i).

Staff commends SCPPA for proposing to use raw groundwater for construction activities instead of potable water. The use of a raw untreated groundwater complies with the California Constitution, Article 10, Section 2 by conserving potable water so that it can be used for its highest beneficial purpose as drinking water.

As of 2005, the COA had 23 active wells that pumped approximately 43,642 AF from the groundwater basin. By 2010, COA expects to pump up to 57,850 AF from the basin and may extract additional groundwater with OCWD approval. The total capacity of the basin is 38,000,000 AF with fresh water estimated to be 37,700,000 AF in 1998. (CofA 2005, sections 1 & 2 and Tables 2.2-5 & -6 and CofA 2007a, section 6.5.1.7.2). SCPPA's proposed use of 11 AFY of groundwater from COA's Well 28 represents less than 0.02 percent of COA's projected groundwater pumping by 2010. Given the temporary nature of the project's proposed construction groundwater use, and the very small percentage of the expected COA groundwater pumping volume it represents, no significant adverse impact to the local groundwater supply is anticipated from project construction groundwater use.

Based on the water quality data provided by the COA (CofA 2009i and GB 2009j), Well 28 produces high quality groundwater that can be used for all CPP construction activities that do not require potable water such as hydrostatic testing of potable water pipelines. Staff is fully supportive of SCPPA's proposal to use groundwater for dust suppression and soil compaction activities during CPP construction but recommends that the project owner use Well 28 groundwater for all construction activities that do not require potable water. Staff has revised Condition of Certification **SOIL&WATER-3** to specify the use of Well 28 groundwater for CPP construction activities that do not require potable water use. The condition would also require the project owner to submit a Groundwater Use Plan prior to site mobilization.

The use of approximately 11 AF of groundwater for CPP construction activities would comply with state law for the use and conservation of potable water. This volume of groundwater consumption would not impact groundwater supply or surface water quality.

Operation Impacts and Mitigation

Operation of the CPP project could lead to potential impacts to soil, water supply, and surface or groundwater quality. Soils may be impacted through erosion or the accidental release of hazardous materials used during operation of the project. Storm water runoff from the site could result in increased runoff flow rates and discharge volumes to existing storm drain systems. Water quality could be impacted by non-storm water discharges containing pollutants released during operation, or the migration of existing hazardous materials present in the subsurface soil. The water supply for plant operation and landscape irrigation could lead to potential impacts to the existing recycled water supply and the use of recycled water for other purposes.

Wastewater discharge to the OCSD's sewer system could lead to potential impacts if the CPP discharges wastewater with constituent concentrations beyond OCSD's permitted influent limits. Potential impacts to soil, storm water, water quality, water supply, and wastewater related to the operation of the proposed CPP, including the applicant's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Soil

During operation of the CPP, the entire site would be covered with impervious material, gravel, or landscaping that will minimize the exposure of on-site soil to wind or water erosion. Staff agrees with SCPPA that the CPP does not require coverage under the NPDES General Permit for Discharges of Storm Water Associated with Industrial Activities (Industrial General Permit Order No. 97-03-DWQ). In order to be protective of soil and water resources during operation of the CPP, SCPPA proposes to implement a site-specific WQMP as required by the Orange County MS4 permit (CofA 2007a, Appendix N).

The WQMP would contain appropriate details for structural storm water treatment and detention. Final design for the structural BMPs would be incorporated into the CPP design. SCPPA proposes post-construction structural and treatment BMPs for CPP operation in its preliminary WQMP, which includes the on-site drainage system that would provide storm water discharge to the underground percolation chamber. Permanent soil stabilization will be achieved through the placement of concrete, gravel and landscaped vegetative cover (CofA 2007a, Appendix N).

Through the preparation and implementation of a post-construction WQMP, soil impacts and the potential for soil erosion would not be significant. A WQMP for plant operation would be developed to set performance and monitoring standards that are required by the SARWQCB and the Orange County MS4 permit. Condition of Certification **SOIL&WATER-4** requires the submittal and implementation of a post-construction WQMP per the provisions of the Orange County MS4 permit. With implementation of the site-specific WQMP, no significant impacts to soil resources from plant operation are expected.

Surface and Groundwater

Operation activities at the proposed CPP would have minimal potential to adversely affect surface or groundwater resources in the vicinity of the CPP site. The Orange County MS4 permit requires post-construction structural or treatment BMPs be designed for the volume of runoff produced from a 24-hour 85_{th} percentile rainfall event. SCPPA proposes to design the post-construction percolation chamber and infiltration basin to capture 85 percent of the total annual storm water runoff from the completed CPP site. SCPPA expects runoff from the proposed CPP to occur only as a result of extreme precipitation events where storm water flows in excess of the infiltration basin design capacity would be directed to the COA's storm water drains.

With the preparation and implementation of a site-specific WQMP as required in Condition of Certification **SOIL&WATER-4**, the potential for increased sediment or contaminants to be conveyed offsite would be minimized. Adverse effects to surface and groundwater from storm water runoff during CPP operation would be less than significant.

Storm Water

During its operation, the proposed CPP would be essentially flat with paved, graveled, or landscaped surfaces. SCPPA proposes to design the storm water collection system and infiltration basin based on a 24-hour, 100-year rainfall event and to submit and implement a WQMP per the requirements of the Orange County MS4 permit.

SCPPA proposes to route storm water from those portions of the CPP site containing industrial pollutants to catch basins. From the catch basins, the contact storm water would flow to an underground vault-type multi-chamber pre-treatment system that would remove sediment, coarse materials, and oil from the runoff. Following pretreatment for sediment and oil removal, the storm water would flow to an on-site underground vault to allow for infiltration. This chamber would be filled with rock and would be unlined to allow for infiltration. The infiltration vault would prevent discharges of potentially polluted runoff from the industrial areas of the CPP site. The underground vault would include an overflow outlet to allow for emergency discharge to the COA's storm drain system (CofA 2007a, Appendix N).

With the submittal and implementation of the site-specific WQMP per Condition of Certification **SOIL&WATER-4**, the impacts of storm water runoff during CPP operation would be less than significant.

Flooding Potential

The proposed CPP site is located approximately one mile north of the Santa Ana River at an approximate elevation of 210-feet above msl. At this elevation, the proposed site is above the 100-year floodplain but has been categorized as being within a 500-year flood zone. The potential for the proposed CPP site to be affected by flooding from a rain event is minimal and no adverse impacts to soil or water resources from flooding are expected during the operational lifetime of the proposed CPP (CofA 2007a section 6.3.1.6.3).

Water Supply

SCPPA proposes to use potable water from the COA and recycled water from the OCWD. SCPPA originally proposed to use recycled water provided to the COA from OCWD's GWRS. In SCPPA's Final Comments on the Preliminary Staff Assessment (GB 2009g, pg 7), SCPPA proposes to purchase recycled water directly from the OCWD. The CPP would be OCWD's first industrial recycled water customer.

Potable Water Supply

SCPPA proposes to use potable water for sanitary purposes, fire suppression, and as a backup supply for the GWRS. The COA's water system serves a population of more than 345,500 and relies on water pumped from the basin by 19 city-owned wells with the capability to pump up to 82,000,000-gpd. The COA can store almost 950 million gallons in 13 local reservoirs (CofA 2007a, section 6.5.2.3).

The COA's water supplies include imported (treated and untreated) water from MWD and groundwater from the basin. The COA currently receives approximately 64 percent of its water supply as local groundwater from the basin and 36 percent imported water from MWD. The basin is operated as an underground reservoir by OCWD where the net amount of water stored is increased in wet years to allow for managed overdrafts in dry years. During the 2003/2004 water year, total basin production was approximately 284,621-AF. Groundwater supply can be adjusted as needed based on the basin's hydrologic conditions. OCWD is responsible for the protection of water rights in the Santa Ana River in OC as well as the management and replenishment of the basin (CofA 2005, section 2).

OCWD allocates groundwater based on a Basin Pumping Percentage (BPP). Based on the long-term BPP of 70 percent, COA's water supply is expected to increase from 69,277-AF in 2005 to 90,710-AF in 2030. In the AFC, the proposed potable water consumption for CPP operation is expected to be approximately 1.5-AFY, which under normal operating conditions would be the volume of potable water consumed annually for domestic and sanitary purposes.

In SCPPA's Final Comments on the Preliminary Staff Assessment (GB 2009g, pg 9), SCPPA proposes to add the following language to the verification text of Condition of Certification **SOIL&WATER-5** stating that the project owner shall submit to the CPM two copies of the:

> **. . . complete water meter application to the COA and proof that the COA can deliver potable water to the CPP in the event of a recycled water interruption at a rate up to 700-gpm**.

Based on a recycled water interruption lasting for 48 hours (32 hours of plant operation), the additional potable water demand at 700-gpm would be approximately 4-AFY.

As noted above, the COA's long-term potable water supply comes primarily from established groundwater allocations. Estimated increases in supply due to basin pumping percentages would be more than adequate to meet the low volume (approximately 5.5-AFY) potable and emergency process water demands for CPP operation. If multiple or extended recycle water interruptions occur, the COA has access to additional groundwater from the OCWD to meet the industrial water supply needs of the CPP. Therefore, if the project owner were to operate the CPP at the maximum potable water delivery rate of 700-gpm, the additional demand for potable water as an emergency backup supply should not cause a significant impact to the COA's potable water supply.

Staff has modified Condition of Certification **SOIL&WATER-5** to include the verification language that:

> **…the project owner shall submit to the CPM two copies of the COA's water meter application for the long-term supply of potable water and a letter from the COA stating it can deliver potable water to the CPP in the event of a recycled water interruption at a rate up to 700-gpm.**

Staff has also modified the condition requiring the project owner to provide the CPM with two copies of a complete water meter application for the supply of potable water and deleting the requirement that the project owner submit two copies of an executed and final potable water supply agreement.

Recycled Water Supply

Recycled water would be used for the production of demineralized water for injection into the CTs for emissions reductions and for cooling tower makeup. Recycled water from the GWRS meets or exceeds State of California Title 22 disinfected tertiary recycled water quality standards. OCWD has provided the COA a "will serve" letter indicating OCWD's willingness to provide GWRS recycled water to the proposed CPP for its projected operational life. Staff expects that the volume of disinfected tertiary recycled water that OCWD committed to the COA will be available to SCPPA for use at the CPP.

In SCPPA's Final Comments on the Preliminary Staff Assessment (GB 2009g, pg 9), SCPPA proposes to add language to the verification text of Condition of Certification **SOIL&WATER-6** stating that within the recycled water supply agreement OCWD:

> **. . . specify that (they) can deliver recycled water at a maximum rate up to 700-gpm.**

At 700-gpm, the CPP has the potential to consume 672,000-gpd of recycled water (based on 16 hours per day of plant operation). This consumption rate is more than 1½ times the maximum consumption rate (414,720-gpd) proposed by SCPPA on page 6 of their PSA comments. If the CPP were to consume 700-gpm for its maximum permitted hours of operation (5,040-hrs/y), the plant would consume approximately 650-AF of recycled water per year (SCAQMD 2009c, Tables 24 & 25).

The GWRS is currently producing 70 million gallons per day (72,000-AFY) of recycled water (OCWD 2008 and CofA 2007a, Appendix O). This recycled water supply is currently being used for groundwater protection and enhancement, and the CPP would be OCWD's first industrial customer to use recycled water from the GWRS. Because the GWRS is currently producing 72,000-AFY of recycled water, it has the capability to supply the CPP 650-AFY if requested by the project owner. Although SCPPA does not propose to consume recycled water at a rate of 700-gpm for continuous operation of the CPP, the project owner would have the contractual right to receive recycled water at this delivery rate, which could result in the potential consumption of 650-AFY of GWRS recycled water. If the OCWD agrees to provide the CPP with up to 650-AFY, the GWRS has the capability to supply this volume of recycled water.

The OCWD was established to manage and protect the Orange County Groundwater Basin. In its role as the groundwater basin manager, OCWD implements projects such as the GWRS to increase groundwater supply and quality (OCWD 2009). As the groundwater basin manager, OCWD has the duty to protect the basin and would be responsible for determining whether there is sufficient GWRS recycled water to supply the CPP. As stated in OCWD's "Will Serve Letter," delivery of GWRS recycled water to the CPP is dependent on an agreement that establishes the terms and conditions for its delivery.

Staff believes that since an agreement between the project owner and OCWD is required for the delivery of GWRS recycled water to the CPP, and the agreement must be protective of the groundwater basin, the use of GWRS recycled water for CPP operation would not cause a significant impact to the GWRS recycled water supply or cause an adverse effect to the groundwater basin. Therefore, staff will add SCPPA's proposed verification text to Condition of Certification **SOIL&WATER-6** that OCWD specify that they can deliver recycled water at a maximum rate up to 700-gpm.

Within Condition of Certification **SOIL&WATER-6**, staff requires the project owner to execute a long-term (30 – 35 years) recycled water supply agreement with the OCWD that stipulates a minimum delivery of 370-AFY to ensure that a long-term recycled water supply is available for CPP operation. The minimum delivery of 370-AFY provides the volume of recycled water needed to operate the CPP for 5,040-hrs/y at a consumption rate of 414,720-gpd (GB 2009g, pgs 6&7) but does not preclude OCWD from providing additional recycled water to the CPP. The use of recycled water for process water and landscape irrigation is fully compliant with state law as evinced in the California Constitution, Article X, section 2, and its use by CCP is fully supported by staff.

Public Resources Code, sections 25300 through 25302, requires the Energy Commission to collect data on all aspects of energy production in order to develop energy policy for the conservation of resources, the protection of the environment, and to protect public health and safety. In order to collect power plant water consumption data, staff recommends Condition of Certification **SOIL&WATER-7** that requires the project owner to install metering devices prior to the use of recycled or potable water for CPP operation. This information would be used for comparative purposes and to document power plant water consumption in order to develop and recommend water use policy.

Process and Sanitary Wastewater

The wastewater discharge from proposed CPP operation would consist of sanitary and process wastewater. The process wastewater would be comprised of RO reject water and cooling tower blowdown. The quality of GWRS recycled water will allow for direct use as makeup water for the cooling tower. The cooling tower would require the use of chemical additives to maintain the required chemistry in the cooling water for proper equipment operation. It is expected that the cooling tower will operate with up to 10 cycles of concentration in order to prevent mineral scale formation on the heat transfer surfaces. (CofA 2007a section 6.5.3.6)

SCPPA proposes to discharge the cooling tower blowdown, sanitary wastewater, and water separated from the oil-water separator to OCSD's sewer system. For wastewater streams containing solvents, SCPPA proposes to install underground tanks for the storage and disposal of this wastewater stream, which will not be discharged to the sewer system. This liquid waste stream could be classified as hazardous waste and would be disposed of in accordance with the requirements discussed in the Waste Management section of this document. Condition of Certification **WASTE – 9** would require the applicant to develop an operation waste management plan. In this plan the applicant would identify and characterize all potential waste streams, and discuss disposal methods that will be consistent with LORS. SCPPA proposes to comply with all OCSD's discharge requirements (GB 2008d, Data Response 49).

Through compliance with OCSD's discharge Ordinance No. OCSD-31, potential water- or soil-related impacts from operational wastewater would be reduced to less than significant. Staff has included Condition of Certification **SOIL&WATER-8** that requires the project owner to comply with the permitting requirements of the OCSD Ordinance No. OCSD-31 prior to project operation.

CUMULATIVE IMPACTS AND MITIGATION

There are multiple projects within a five-mile radius of the CPP that may cause a cumulative effect. Some of the projects proposed are the Orange County Anaheim Medical Center, a mixed-use residential project and industrial park, two commercial industrial buildings, and a middle school (CofA 2007a, §6.18). The CPP project would neither cause nor contribute to cumulative impacts to soil and water resources. Sound engineering practices and BMPs would be used in both the project's design and operation. Storm water discharge practices would strictly adhere to state and local agency water quality standards. The CPP would comply with the Orange County MS4 permit and the SARWQCB NPDES permit for water quality standards, further ensuring that cumulative impacts on local waterways would be avoided.

Drainage volumes and peak-flow rates from the site would be managed in compliance with state and local storm water discharge permits and structural BMPs designed in compliance with the WQMP. No significant impacts to either surface water or groundwater quality are expected during construction or operation of the CPP.

Soils

Construction activities relating to the CPP may cause a temporary increase in cumulative wind and water erosion due to soil-disturbing activities until the exposed soil is either stabilized or covered with pavement. SCPPA has provided a draft Construction SWPPP and a preliminary WQMP for construction activities. Implementation of the pre- and post construction BMPs as required by the WQMP and the Construction SWPPP would minimize soil erosion to a less than significant level. Because the COA requires WQMPs from all new development and significant redevelopment projects, the impacts to soil erosion from the CPP and other projects would not be cumulatively considerable.

Surface Water

Disturbed soil could increase the sediment and pollution loading to surface water bodies in the vicinity of the proposed CPP. However, no significant impacts are expected if effective BMPs are employed in accordance with the WQMP and the Construction SWPPP. Additionally, storm water and non-storm water discharges are required to be monitored to meet regulatory discharge standards.

Development of the CPP site would redirect surface drainage to both an infiltration basin and to the COA's storm water drains. Implementation of the pre- and post construction BMPs as required by the WQMP and the Construction SWPPP along with full compliance with state and local LORS would prevent or minimize the release of sediment or other pollutants to surface water bodies. Discharges from other projects in the area would also be required to implement appropriate WQMPs and BMPs, as applicable for compliance with water quality LORS. Because pollutant loading to surface water bodies from CPP as well as other projects in the vicinity of the proposed CPP would be monitored and controlled through implementation of WQMPs, BMPs and compliance with water quality LORS, the impacts to surface water bodies would not be cumulatively considerable.

Water Supply

Staff has not identified any cumulative development activities that would diminish the supply of potable or recycled water.

Groundwater

As noted previously, SCPPA's use of raw groundwater during CPP construction would represent less than 0.02 percent of the projected COA pumped groundwater volume. Management of the groundwater resource by OCWD and COA generally includes development of pumping projections and allowances that take into account any new water demands from potential development projects in the area. Consequently, the impact of the CPP's very small percentage of the COA groundwater supply, combined with the water demands from other developments in the area, is not expected to result in a cumulatively significant impact on local groundwater supplies.

In addition, the WQMPs, BMPs, and water quality LORS applicable to the CPP and other projects in the area would help to prevent any cumulatively significant impacts to groundwater quality. The CPP site, as well as any other similar project sites, would be required to be covered with impervious materials, gravel, or landscaping following construction. Chemical storage areas would have to have secondary containment and surface flows from project areas would have to be discharged to infiltration basins or to the COA's storm water drains. Therefore, no cumulatively significant impacts to groundwater quality are anticipated from construction and operation of the proposed CPP.

Wastewater

The wastewater streams from the CPP would include plant drainage and process and sanitary wastewater. SCPPA proposes to comply with the OCSD requirements for discharge to its sewer system and to install storage tanks for wastewater streams that are considered hazardous. The wastewater discharge streams to OCSD's sewer system would be monitored to ensure that it complies with the OCSD's discharge requirements. These measures would ensure that the project would not contribute to significant adverse cumulative impacts.

COMPLIANCE WITH LORS

CLEAN WATER ACT

Staff has determined that the CPP would satisfy the requirements of the NPDES permits with the adoption of Conditions of Certification **SOIL&WATER-1 & 4** that require the development and implementation of a construction SWPPP and WQMPs that includes pre- and post-construction BMPs.

CALIFORNIA CONSTITUTION, ARTICLE X, SECTION 2

The California Constitution, Article X, Section 2 requires 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. Through compliance with Conditions of Certification **SOIL&WATER-3 & 6**, the use of potable water for any construction or operation activity (except as a back-up supply to the GWRS recycled water supply) that is suitable for non-potable water use would be disallowed.

CALIFORNIA WATER CODE, SECTION 13523

Through compliance with Condition of Certification **SOIL&WATER- 6,** recycled water use will be permitted by DPH, and water reuse requirements for GWRS recycled water will be prescribed by the SARWQCB.

CALIFORNIA ENERGY COMMISSION INTEGRATED ENERGY POLICY REPORT: WATER USE AND WASTEWATER DISCHARGE POLICY

Under legislative mandate, the Energy Commission will allow 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. Through the use of recycled water for power plant cooling, the CPP would comply with this policy.

PUBLIC RESOURCES CODE, SECTIONS 25300 THROUGH 25302

Through compliance with Conditions of Certification **SOIL&WATER-7**, the project owner would provide potable and industrial water consumption data that allows staff to conduct assessments and forecasts of the various types and the quality of water used and consumed by power plants.

RESPONSE TO COMMENTS

Staff only received comments from SCPPA.

SCPPA-1: Instead of COA potable water, SCPPA now proposes to use raw groundwater from the COA's Well 28 (GB2009j). With the proposed use of groundwater, SCPPA suggests the following changes to Condition of Certification **SOIL&WATER-3**. (SCPPA's suggested text is shown in **<u>bold-underline</u>** and deleted text shown in ~~**bold-strikeout**~~.)

SOIL&WATER-3: The project owner shall provide the CPM two copies of ~~an executed Construction Water Supply Agreement (agreement) with the Orange County Water District (OCWD)~~ **a complete water meter application to the City of Anaheim (COA)** for the procurement and use of **COA Anaheim Well 28 (raw groundwater)**. ~~**tertiary treated recycled water from the Kraemer Basin groundwater recharge facilities. Tertiary treated recycled water**~~ **The Well 28 water** will be used for ~~**all approved**~~ construction **related** ~~**activities**~~ dust suppression **and** soil compaction **activities** ~~**concrete curing, etc.), that for health and safety reasons, do not require the use of potable water.**~~ **The Well 28 water will not be used for construction activities such as concrete curing, concrete mixing, pipeline flushing or pipeline hydrostatic activities where the use of such water may pose a health and safety risk to construction of plant personnel.**

Verification: Prior to site mobilization, the project owner shall submit two copies of the executed agreement for the supply and on-site use of ~~**recycled water**~~ **Well 28 water** for the construction of the CPP and all linears. ~~**The agreement shall include a method of metering and payment for the recycled water and meet all Department of Public Health requirements for the delivery and use of tertiary treated recycled water. The project owner shall submit a copy of the Master Reclamation Permit issued to OCWD by the SARWQCB per the requirements of section 13523 of the California Water Code.**~~

Response: Staff agrees with SCPPA proposal to use Well 28 groundwater for dust suppression and soil compaction activities but also requires that Well 28 groundwater be used for all construction activities that do not requires potable water. Staff has revised Condition of Certification **SOIL&WATER-3** to reflect SCPPA proposed Well 28 groundwater use and also added the provision that the project owner submit a Groundwater Use Plan to the CPM prior to site mobilization.

SCPPA-2: The City of Anaheim does not enter into long-term water supply agreements. The City requires the applicants to complete a water meter application, which will allow the City to deliver potable water to the CCP. SCPPA proposes the following change to Condition of Certification **SOIL&WATER-5**. (SCPPA's proposed text is shown in **bold-underline** and deleted text shown in ~~**bold-strikeout**~~.)

SOIL&WATER-5: Prior to connection to the City of Anaheim's (COA) 14-inch potable water main located in East Miraloma Avenue, the project owner shall provide the CPM with two copies of ~~**an executed and final Potable Water Supply Agreement (agreement)**~~ **a complete water meter application to the COA** for the long-term supply ~~**(30 – 35 years)**~~ of potable water. **The project owner shall provide evidence that the COA can provide water at a** ~~**agreement shall specify a minimum**~~ delivery rate ~~**of 432-gpm in order**~~ to meet CPP's **maximum** operation requirements in the event of a recycled water interruption. Potable water shall not be used for any construction or operation activity that is suitable for non-potable water use **unless the source of recycled water is unavailable**. In the event of a recycled water delivery interruption, potable water may be used as an emergency backup supply for ~~**up to 32 hours of plant operation per incident.**~~ **the period of time of the**

emergency. For the purpose of this condition, the term emergency shall mean the inability for the CPP to take or for the OCWD to deliver recycled water to the CPP in a quantity sufficient to meet CPP demand due to Acts of God, natural disaster and other circumstances beyond the control of the project owner and it is necessary for the CPP to continue to operate to serve the COA's peaking load or to satisfy the COA's regulatory mandated reserve margin.

Verification: No later than 30 days prior to the connection to the 14-inch potable water main, the project owner shall submit to the CPM two copies of the **complete water meter application to the COA** ~~**executed and final agreement**~~ **and proof that the COA can deliver potable water to the CPP in the event of a recycled water interruption at a rate up to 700-gpm.** The project owner shall submit to the CPM any water quality monitoring reports required by the COA in the annual compliance report. ~~**The project owner shall notify the CPM of any violations of the agreement terms and conditions, the actions taken or planned to bring the project back into compliance with the agreement, and the date compliance was reestablished.**~~

Response: The submittal of a complete water meter application in lieu of a long-term potable water supply agreement is appropriate based on the COA's municipal procedures. Staff will make all proposed changes relating to the submittal of a water meter application and will delete the reference to a specified delivery rate (432-gpm). Staff does not agree with the proposed text that:

> In the event of a recycled water delivery interruption, potable water may be used as an emergency backup supply for **the period of time of the emergency.**

This phrase will not be added to **SOIL&WATER-5**, and new language has been added to the verification that includes the specified duration (32 hours of plant operation) and a method for extended use of potable water that requires CPM approval. This additional text is provided below in the verification paragraph of this response. Additionally, staff considers the term Acts of God to be synonymous with natural disaster and/or other circumstances beyond the control of the project owner and has not included it in the revised condition of certification.

For the proposed verification, staff will make all proposed changes relating to the submittal of a water meter application and the reference to a specified delivery rate of 700-gpm. Staff will add to the verification that:

> **The project owner shall submit to the CPM a letter from the COA stating it can deliver potable water to the CPP in the event of a recycled water interruption at a rate up to 700-gpm.**
>
> **The project owner shall notify the CPM when potable water will be used for more than 32 hours of plant operation. Within the notification, the project owner shall provide justification for the extended use of potable water as an emergency backup supply and the expected duration of its use. The project owner shall not use potable water as an emergency backup supply for more than 32 hours of plant operation without CPM approval.**

Staff believes that this verification language protects against the inappropriate use of potable water for industrial purposes and provides an approval process for its use for a period of time equal to the length of the emergency. Condition of Certification **SOIL&WATER-5** will be revised per staff's response.

SCPPA-3: SCPPA proposes that any specific numerical delivery rate be removed from the condition to the verification in Condition of Certification **SOIL&WATER-6** in order to avoid a formal amendment if the number is modified during final design. (SCPPA's proposed text is shown in **bold-underline** and deleted text shown in **~~bold-strikeout~~**.)

SOIL&WATER-6: The project owner shall provide the CPM two copies of the executed Recycled Water Purchase Agreement (agreement) with the **~~City of Anaheim (COA)~~** **Orange County Water District (OCWD)** for the long-term supply **~~(30 – 35 years)~~** of **~~tertiary treated~~** recycled water to the CPP. The agreement shall specify a **~~minimum~~** delivery rate **to meet CPP's maximum operation requirements** **~~of 432-gpm~~**, and all terms and costs for the delivery and use of recycled water at the CPP. The CPP shall not connect to the COA's new **~~14-inch~~** recycled water pipeline without the final agreement in place and submitted to the CPM. The project owner shall comply with the requirements of Title 22 and Title 17 of the California Code of Regulations and section 13523 of the California Water Code.

Verification: No later than 60 days prior to the connection to the COA's **~~14-inch~~** recycled water pipeline, the project owner shall submit two copies of the executed agreement for the supply and on-site use of recycled water at the CPP **that specifies that OCWD can deliver recycled water at a maximum rate up to 700-gpm.** The project owner shall submit to the CPM a copy of the Engineering Report and Cross Connection inspection and approval report from the California Department of Public Health prior to the delivery of recycled water from the **OCWD** **~~COA's~~**.

Response: Staff agrees with SCPPA's proposal to move the numerical delivery rate from the condition to the verification and the deletion of the diameter size of the recycled water pipeline (14-inches). The duration of the agreement (30-35 years) must remain in the condition because it provides for a long-term recycled water supply, which is required for CPP certification.

Title 22, California Code of Regulations, section 60306(a) requires the use of disinfected tertiary recycled water for industrial cooling that involves the use of a cooling tower. Therefore, staff cannot remove this language from the condition but will change **tertiary treated** to **disinfected tertiary** as required by section 60306(a).

In the AFC, SCPPA (customer) proposed to use recycled water provided by the COA (retail water supplier). As a modification to Condition of Certification **SOIL&WATER-6**, SCPPA proposes to bypass the COA as the retail water supplier and purchase recycled water directly from the OCWD (recycled water producer). California Water Code, section 13580.5(b) does not allow a customer to obtain recycled water from a recycled water producer without the retailer's approval (agreement).

In order to replace COA with OCWD, an agreement from COA will be required. Staff will include language in Condition of Certification **SOIL&WATER-6** that requires a written agreement from the COA for the long-term supply of tertiary treated recycled water from OCWD (recycled water producer). The project owner must have an agreement with the COA for the purchase of tertiary treated recycled water from the OCWD. Condition of Certification **SOIL&WATER-5** will be revised per staff's response.

CONCLUSIONS

Staff has not identified any immitigable significant impacts to soil and water resources provided all proposed conditions of certification are met. Potentially significant impacts would be mitigated through the preparation and implementation of various construction and operating plans, which, if not implemented, could result in soil erosion, contamination to surface and groundwater, or non-compliance with wastewater treatment and discharge requirements. Proposed conditions of certification for remediation of the site are provided in the **WASTE MANAGEMENT** section of this FSA.

Existing soil contamination at the CPP site represents the most significant potential threat to soil and water resources from construction of the proposed CPP. With the development and implementation of the WQMP and the construction SWPPP, migration of existing soil contaminants offsite through wind or water transport would be minimized. Conditions of Certification **SOIL&WATER-1 & 4** would serve to mitigate potentially significant impacts to soil and water resources.

During construction and operation of the CPP, Conditions of Certification **SOIL&WATER- 5, 6, & 8** will ensure that recycled water use and wastewater discharge are in compliance with federal, state and local LORS. Conditions of Certification **SOIL&WATER- 3, 5, & 6** have been modified in accordance with staff's responses in the Response to Comments section of this assessment.

In the **Socioeconomics** section of this FSA, staff presents census information that shows that there are minority populations within one mile and six miles of the project. Staff has recommended conditions of certification that are protective of soil and water resources by reducing the risk of soil and water pollution from the construction and operation of the proposed CPP. Additionally, through the use of recycled water for plant operation and landscape irrigation the cumulative impacts to the regional potable and raw water supplies will be insignificant. Therefore, staff concludes that there will be no significant impact from construction or operation of the CPP on minority populations.

PROPOSED CONDITIONS OF CERTIFICATION

SOIL&WATER-1: The project owner shall comply with the requirements of the Orange County Municipal Separate Storm Sewer System (MS4) Permit (NPDES No. CAS618030), the Orange County Drainage Area Management Plan (DAMP) and the City of Anaheim's (COA) Local Implementation Plan. The Orange County MS4 permit requires preparation of a Construction Storm Water Pollution Prevention Plan (construction SWPPP) in accordance with the State's General NPDES Permit (Order No. 99-08-DWQ). The project owner shall develop and implement a construction SWPPP for the construction of the CPP, offsite booster pump station, and all linear facilities. The construction SWPPP shall include a Water Quality Management Plan (WQMP) as required by the Santa Ana Regional Water Quality Control Board (SARWQCB) Order No. R8-2009-0030.

Verification: Prior to site mobilization, the project owner shall submit to the CPM a copy of the construction SWPPP that has been reviewed and approved by the COA and retain a copy on site. The construction SWPPP shall include a WQMP that complies with SARWQCB Order No. R8-2009-0030 and the Orange County DAMP.

The project owner shall submit copies to the CPM of all correspondence between the project owner and the SARWQCB about the construction SWPPP and the WQMP within 10 days of its receipt or submittal. This information shall include a copy of the Notice of Intent and Notice of Construction Activity for the CPP.

SOIL&WATER-2: Prior to the initiation of any Carbon Creek jack and bore activities for the natural gas pipeline, the project owner shall provide a Frac-Out Plan and a copy of the following permits to the CPM as appropriate:

A. section 401 water quality certification or a waiver of waste discharge requirements from the Santa Ana Regional Water Control Board or the State Water Resources Control Board;

B. section 404 acceptance of preconstruction notification for nationwide permit(s) from the US Army Corps of Engineers; and

C. streambed alteration agreement(s), developed in consultation with the California Department of Fish and Game.

Modifications of the construction techniques to be used or the location of the crossing as a result of permit conditions shall be reviewed and approved by the CPM. The project owner shall implement the terms and conditions contained in all permits.

Verification: No later than 30 days prior to any construction-related activities that could affect water quality in Carbon Creek, the project owner shall submit to the CPM for review and approval a Frac-Out Plan and a copy of the applicable permits or agreements. Written verification from the issuing agency that a permit is not necessary can be used to satisfy this condition.

SOIL&WATER-3: The project owner shall provide the CPM two copies of a complete and approved groundwater meter application for the procurement and use of City of Anaheim (COA) Well 28 raw groundwater for project construction, along with a Groundwater Use Plan. Potable water shall not be used for any CPP site or linear construction activity that is suitable for Well 28 groundwater use without CPM approval.

Verification: Prior to site mobilization, the project owner shall submit two copies of the completed and approved COA groundwater meter application and a Groundwater Use Plan (plan) to the CPM.

Within the plan, the project owner shall specify those construction activities that would use groundwater and those construction activities that would use potable water, the expected volume of water to be used for those activities, and the delivery method of potable or groundwater to the construction site.

The project owner shall submit copies to the CPM of all correspondence between the project owner and the COA for the delivery and use of Well 28 groundwater within 10 days of its receipt or submittal.

Within the Monthly Compliance Report, the project owner shall report the volume of potable and non-potable water used for construction activities, the activity for which it was used, and any revision to the plan for the future use of potable or groundwater for CPP construction.

SOIL&WATER-4: The project owner shall develop and implement a Water Quality Management Plan (WQMP) in compliance with the SARWQCB Order No. R8-2009-0030 and City of Anaheim (COA) Municipal Code, Title 10, Chapter 10.09.

Verification: Prior to commercial operation, the project owner shall submit to the CPM a copy of the WQMP that has been reviewed and approved by the COA and retain a copy on site. The WQMP shall comply with SARWQCB Order No. R8-2009-0030 and the COA Municipal Code, Title 10, Chapter 10.09.

The project owner shall submit copies to the CPM of all correspondence between the project owner and the COA about the WQMP within 10 days of its receipt or submittal. This information shall include a copy of the Notice of Termination of coverage under the General NPDES Permit for construction activity associated with the CPP project.

SOIL&WATER-5: Prior to connection to the City of Anaheim's (COA) 14-inch potable water main located in East Miraloma Avenue, the project owner shall provide the CPM with two complete copies of the COA's water meter application for the long-term supply of potable water. The project owner shall provide evidence that the COA can provide water at a delivery rate to meet CPP's operation requirements in the event of a recycled water interruption due to an emergency. Potable water shall not be used for any facility operation activity that is suitable for non-potable water use unless the source of recycled water is unavailable in the event of an emergency. For purposes of this condition, the term emergency shall mean the inability for the CPP to take or for the OCWD to deliver recycled water to the CPP in a quantity sufficient to meet CPP demand due to natural disaster or other circumstances beyond the control of the project owner and it is necessary for the CPP to continue to operate to serve the COA's peaking load or to satisfy the COA's regulatory mandated reserve margin.

Verification: No later than 30 days prior to the connection to the 14-inch potable water main, the project owner shall submit to the CPM two complete copies of the COA's water meter application for the long-term supply of potable water and a letter from the COA stating it can deliver potable water to the CPP in the event of a recycled water interruption at a rate up to 700-gpm.

The project owner shall notify the CPM when potable water will be used for more than 32 hours of plant operation. Within the notification, the project owner shall provide justification for the extended use of potable water as an emergency backup supply and the expected duration of its use. The project owner shall not use potable water as an emergency backup supply for more than 32 hours of plant operation without CPM approval.

SOIL&WATER-6: The project owner shall provide the CPM two copies of the executed Recycled Water Purchase Agreement (agreement) with the Orange County Water District (OCWD) for the long-term supply (30 – 35 years) of disinfected tertiary recycled water to the CPP. The agreement shall specify a delivery rate to meet CPP's maximum operation requirements and all terms and costs for the delivery and use of recycled water at the CPP. The CPP shall not connect to the OCWD's new recycled water pipeline without the final agreement in place and submitted to the CPM. The project owner shall comply with the requirements of Title 22 and Title 17 of the California Code of Regulations and section 13523 of the California Water Code.

Verification: No later than 60 days prior to the connection to the OCWD's recycled water pipeline, the project owner shall submit two copies of the executed agreement for the supply and on-site use of disinfected tertiary recycled water at the CPP. The agreement shall specify that OCWD can deliver recycled water at a maximum rate up to 700-gpm and will provide the CPP a minimum of 370-AFY.

The project owner shall submit to the CPM a signed agreement between the COA and OCWD for the long-term supply of disinfected tertiary recycled water from the OCWD to the CPP for industrial and landscape irrigation purposes.

The project owner shall submit to the CPM a copy of the Producer/User Water Recycling Requirements, the recycled water criteria, the Engineering Report, and the Cross Connection Inspection and Approval report prior to the connection to the OCWD disinfected tertiary recycled water pipeline.

SOIL&WATER-7: Prior to the use of potable or recycled water for operation of the CPP, the project owner shall install and maintain metering devices as part of the water supply and distribution system to monitor and record in gallons per day the volume of potable and recycled water supplied to the CPP. The metering devices shall be operational for the life of the project. An annual summary of daily water use by the CPP, differentiating between potable and recycled water, shall be submitted to the CPM in the annual compliance report.

Verification: At least 60 days prior to use of any water source for CPP operation, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the potable and recycled water pipelines serving the project. The project owner shall provide a report on the servicing, testing, and calibration of the metering devices in the annual compliance report.

The project owner shall submit a water use summary report to the CPM in the annual compliance report for the life of the project. The annual summary report shall be based on and shall distinguish recorded daily use of potable and recycled water. Included in the annual summary of water use, the project owner shall submit copies of meter records from the City of Anaheim documenting the volume of potable water supplied over the previous year. The report shall include calculated monthly range, monthly average, and annual use by the project in both gallons per day and acre-feet. After the first year and for subsequent years, this information shall also include the yearly range and yearly average recycled and potable water used by the project.

SOIL&WATER-8 Prior to commercial operation, the project owner shall provide the CPM and the Orange County Sanitation District (OCSD) with all information and documentation required to satisfy Ordinance No. OCSD-31 for the discharge of sanitary and plant wastewater into the OCSD sewer system. During operation, any monitoring reports provided to OCSD shall also be provided to the CPM. The CPM shall be notified of any violations of discharge limits or amounts.

Verification: At least 60 days prior to commercial operation, the project owner shall submit the information and documentation required to satisfy Ordinance No. OCSD-31 to the OCSD for review and comment, and to the CPM for review and approval.

During CPP operation, the project owner shall submit any wastewater quality monitoring reports required by OCSD to the CPM in the annual compliance report. The project owner shall submit any notice of violations from OCSD to the CPM within 10 days of receipt and fully explain the corrective actions taken in the annual compliance report.

REFERENCES

CofA 2004 – City of Anaheim. Water Quality Management Plan Template, dated 2/1/04.

CofA 2005 – City of Anaheim. 2005 Urban Water Management Plan.

CofA 2007a – City of Anaheim/S. Sciortino (tn 43903). City of Anaheim's Canyon Power Plant Application for Certification Volume I & II. Submitted to CEC/Docket Unit on 12/28/2007.

CofA 2009i – City of Anaheim/S. Wilson. E-mail with attachments to Richard Latteri on Raw Groundwater and Well 28 water quality data, dated 7/29/09.

GB 2008d - Galati & Blek LLP/M. Cosens (tn 46614). Data Responses to Data Requests 1-55, dated 6/5/08. Submitted to CEC/Docket Unit on 6/5/08.

GB 2008i - Galati & Blek/D. Wiseman (tn 47912). Major Component Design Characteristics Table, dated 9/4/08. Submitted to CEC/Docket Unit on 9/4/08.

GB 2009g - Galati & Blek/M. Mills (tn 51881). SCPPA's Final Comments on the Preliminary Staff Assessment, dated 6/9/09. Submitted to CEC/Docket Unit on 6/9/09.

GB 2009j - Galati & Blek/M. Mills. Well 28 Information and Revised Text Re: Soil and Water 3 Condition for the Canyon Power Plant Project, dated 7/29/09. Submitted to CEC/Docket Unit on 7/29/09.

LARWQCB 1998 - Los Angeles Regional Water Quality Control Board. 1998 California 303(d) List and TMDL Priority Schedule.

OCWD 2008 – Orange County Water District. News Release, *OCWD Celebrates 75 Years of Providing Reliable, High-Quality, Groundwater for Northern and Central Orange County*, dated 2/5/09.

OCWD 2009 – Orange County Water District/Michael R Markus (tn 52636). Comment Letter from Orange County Water District dated 6/8/09. Submitted to CEC/Docket Unit on 7/31/09

SARWQCB 2009 – Santa Ana Regional Water Quality Control Board. Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the Incorporated Cities of Orange County within the Santa Ana Region Area Wide Urban Storm Water Runoff, NPDES No CAS618030 --SARWQCB Order No.R8-2009-0030.

SCAQMD 2009a - South Coast Air Quality Management District /M. Nazemi (tn 50221). South Coast Preliminary Determination of Compliance, dated 2/18/09. Submitted to CEC/Docket Unit on 2/23/09.

SCAQMD 2009c - South Coast Air Quality Management District /M. Nazemi (tn 52179). South Coast Final Determination of Compliance, dated 6/24/09. Submitted to CEC/Docket Unit on 6/26/09.

URS 2007a - URS/C. Shen (tn 46325). Additional Phase II Environmental Investigation Report, dated 11/14/07. Submitted to CEC/Docket Unit on 12/27/07.

TRAFFIC AND TRANSPORTATION

Testimony of David Flores

SUMMARY OF CONCLUSIONS

The Canyon Power Plant (CPP) would be consistent with the Circulation Element in the city of Anaheim General Plan, Local Circulation Plans and Policies and all other applicable laws, ordinances, regulations, and standards. 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 the city of Anaheim and Orange County. During the operational phase, the project would not adversely affect local roads or aviation operations associated with any airport flight traffic.

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 proposed roads and routings 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 laws, ordinances, regulations, and standards (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 CPP.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Traffic and Transportation Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal:	
Title 14, Code of Federal Regulations (CFR) 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.
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 that 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:	
City of Anaheim General Plan – Transportation and Circulation Element	Requires level of service (LOS) D or better operating conditions for city intersections and roadways.
County of Orange Congestion Management Plan.	Requires LOS E (volume to capacity ratio [V/C]<0.10) or better operating conditions for highway intersections and freeway segments.

SETTING

The proposed site for the CPP project is located in the city of Anaheim, in the northern part of Orange County. To the north of the project site is the city of Placentia, to the south is the Santa Ana River corridor, the city of Orange, and a small unincorporated area within Orange County. The Santa Ana River runs east-west approximately one mile south of the project area.

The project site is served by two major freeways. Highway 57 runs north-south through the city of Anaheim, and is approximately one mile west of the project area. Highway 91 run east-west through the city of Anaheim and is also approximately one mile south of the project site. **Traffic and Transportation Figure 1, Regional Transportation System,** shows the region surrounding the project site. Transportation figures are located at the end of this analysis.

CRITICAL HIGHWAYS AND ROADS

The project is located in the northern section of the city of Anaheim near State Route (SR) 91 which is an east-west ten-lane freeway that runs south of the project site. California Department of Transportation (Caltrans) records show average daily traffic volume on SR-91 in the project area (west of Kraemer Avenue) is about 233,000 vehicles per day (Caltrans 2007). State Route 57 is a north-south freeway originating from its southerly terminus at Interstate I-15 and SR-22 freeways just south of the Anaheim city limit. SR-57 is located west of the project site and is a ten-lane freeway, including two high-occupancy vehicle lanes. There are two freeway access ramp connectors off of SR-57, located at Orangethorpe Avenue and Lincoln Avenue.

The local roadways include Kraemer Boulevard which is a north-south roadway that provides the most direct route to the proposed project site. It is a six-lane roadway with a posted speed limit of 40 mph, and connects to the regional freeway system via an interchange with the SR-91 freeway.

East Miraloma Avenue is an east-west four-lane collector that provides direct access to the CPP project site. East Miraloma Avenue intersects with Kraemer Boulevard and operates as a signalized intersection. The posted speed is 45 mph and parallels SR-57 and provides regional freeway access via SR-91 freeway interchange to the south of the project site.

La Palma Avenue is an east-west, six lane primary road to the south of the CPP project site. The posted speed is 45 mph and La Palma Avenue intersects with Kraemer Boulevard and operates as a signalized intersection.

LEVEL OF SERVICE

Level of Service (LOS) is a qualitative measure describing operational conditions within a traffic stream. The term is 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 and 3 provide existing daily and peak traffic volume and LOS in the project area. Plant construction and operation traffic would use the existing local roadways, which would include SR-91, Kraemer Boulevard, and East Miraloma Avenue. SR-91 and SR-57 are the principal highways in the area and are LOS C on a daily basis. Access to the site from the local roadways would be from Kraemer Boulevard and East Miraloma Avenue which are operating at LOS A with free flowing traffic.

[1] National Research Council, *Highway Capacity Manual, Third Edition*, 1994.

Traffic and Transportation Table 2
Freeway/Roadway Segment Level of Service
Existing Conditions

Roadway	Segment	Number and Type of Lanes	Average Daily Traffic Volume	Percent Truck	Average Daily Traffic LOS[2]
State Route 91	West of Kraemer Blvd	10-Lane Freeway	233,000	8.7[1]	C
State Route 91	East of Kraemer Blvd	10-Lane Freeway	237,000	8.7[1]	C
East Miraloma Ave	West of Kraemer Blvd	4-lane undivided	204,000	10[2]	A
North Kraemer Blvd	South of E. Miraloma Ave	6-lane undivided	223,000	5[2]	A

[2]See Tables 6.11-3
[3][1]Source: Caltrans, 2005
2City of Anaheim, October 19,2007

Traffic and Transportation Table 3
Peak Hour Intersection Level of Service
Existing Conditions

Intersection	A.M. Peak Hour Volume to Capacity Ratio (V/C)	LOS	P.M. Peak Hour Volume to Capacity Ratio (V/C)	LOS
N. Kraemer Blvd/ E. Miraloma Avenue	0.720	C	0.669	B
N. Kraemer Blvd/E. Coronado Street	0.534	A	0.535	A
N. Kraemer Blvd/E. La Palma Avenue	0.760	C	0.855	D
N. Kraemer Blvd/SR-91 Freeway WB off ramp	0.668	B	0.541	A
N. Kraemer Blvd/E. Frontera Street	0.641	B	0.624	B

[2]See Tables 6.11-34
City of Anaheim, October 19,2007

AIRPORTS

The nearest airport facility is the Fullerton Municipal Airport, located approximately 6.5 miles west of the CPP project site. John Wayne (i.e., Orange County) Airport is located approximately 16 miles south of the proposed project site.

PUBLIC TRANSPORTATION

0The transportation routes used by the workforce going to and from the project site or along the truck routes proposed for use during construction of the project will not conflict with school bus routes or stops.

The following is a list of public transit providers in the general area around the proposed CPP site:

- Orange County Transportation Authority Routes 59 and 213/213A provide north-south bus service on weekdays between the cities of Brea and Irvine via Kraemer

Boulevard and Glassell Street. Line 410 also operates during the weekdays only from Kraemer Boulevard and La Palma Avenue, then proceeds eastward towards to the Metrolink Station.

- Ominitrans Bus Route 66 (Fontana-Foothill-Montclair) traverses the study area along Foothill Boulevard to the north of the proposed project site.
- The Anaheim Canyon Metrolink Commuter Rail is located near La Palma Avenue. The Fullerton Amtrak/Metrolink Station is located near Harbor Boulevard.

RAILROADS

The Southern Pacific Transportation Company (SPTC), Burlington Northern Santa Fe (BNSF), and Atchison Topeka and Santa Fe railroads provide freight service for the County of Orange. The applicant has not indicated in their application the use of the railroad system for delivery of heavy equipment.

BICYCLE ROUTES

A top priority class II bikeway and off road bike trail is proposed on East Miraloma Avenue in the vicinity of the project site. The segment of La Palma Avenue to the south of the project site is also proposed an off road bike trail. Kraemer Boulevard has no current or planned bikeway designation. Energy Commission staff observed no bicycle or pedestrian activity in the area of the project site. Staff agrees with the applicant’s conclusion that this could be attributed to the mainly commercial and light industrial uses in this area and distance from major activity centers (AFC pg. 6.11-7, Sec. 6.11.1.1.5).

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 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 CPP and provides an explanation of the impact conclusion.

The Application for Certification (AFC) provides an analysis of projected traffic conditions with the addition of project construction traffic trips. Project construction is expected to take 12 months.

Off-Site Parking

No on-street parking is permitted on Miraloma Avenue. The applicant has identified the following possible parking lots for all plant construction workers: (see **Traffic and Transportation Figure 1**).

- 3001 Miraloma Avenue-provides approximately 150 parking spaces, and is located immediately west of the project site;
- 3150 Miraloma Avenue- provides approximately 374 parking spaces, and is located approximately 0.25-mile east of the project site; and
- 3190 Miraloma Avenue- provides approximately 224 parking spaces, and is located approximately 0.25-mile east of the project site.

Staff has determined that the parking sites are adequate for the number of construction workers involved in the project, and all three sites are within walking distance to the project site. Workers walking from the most distant two optional parking sites will increase the pedestrian activity at the intersection of Kraemer and Miraloma Avenue. Therefore, staff is recommending that the applicant provide a shuttle service to the project if the more distant off-site parking sites are used (See Condition of Certification **Trans-1**). The laydown area for materials and equipment will occur on the project site.

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 intervals (6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.). The average number of construction workers would be approximately 160 (AFC Table 6.10-9, pg. 6.10-14), while the peak workforce would consist of 225 workers (including 28 contractor staff) during a three-month period. Considering the worst case scenario, the applicant assumed 253 one-way daily trips during peak construction with no worker carpooling. Given experience with previous projects, staff believes that the estimated construction traffic trips and assumptions about peak construction activity are reasonable. Based on regional demographics and availability of skilled laborers, the construction workers would likely come from Los Angeles County. However, staff believes that some workers could come from San Bernardino, Riverside, and Orange Counties.

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 three heavy trucks and 15 light trucks on average per day during peak construction per day (CPP 2008a). In-bound and out-bound truck traffic would arrive and depart the project site using the same route as construction workers. Construction access to the project site will be primarily via SR-91 north on Kraemer Boulevard and west on Miraloma Avenue. Truck deliveries would normally be on weekdays between 7:00 a.m. to 5:00 p.m.

Total Construction Traffic

Total average construction traffic impact (workforce and trucks) would be 365 vehicle trips (160 workers one-way trips plus 45 PCE for truck and delivery trips). Total peak construction traffic impact would be 558 vehicle round trips (225 worker trips plus 54 PCE for truck and delivery trips). Staff has recommended a traffic and transportation control plan that will be prepared in coordination with the city of Anaheim, Orange County and Caltrans (see Condition of Certification **TRANS-1**). Staff is also proposing Condition of Certification **TRANS-2** to repair any damage to Kraemer Boulevard and to Miraloma Avenue (to SR-91) from construction traffic, particularly from heavy trucks.

Traffic and Transportation Table 4 provides the average daily traffic (ADT) volumes with the addition of the project's traffic volumes along the freeway and roadway segments during construction of the proposed project. The forecast is that the freeway and roadways would continue to operate at LOS C or better on the same segments as shown on **Table 2, Freeway/Roadway Segment Level of Service Existing Conditions** during the a.m. and p.m. peak hours. None of the study segment's LOS would deteriorate to a level that would cause a significant impact.

Traffic and Transportation Table 4
Freeway/Roadway Segment Level of Service Year 2009
Project Construction Conditions

Roadway/ Freeway	Segment	Cross-Section (Number of Lanes)	2009 + Project ADT	Project added ADT	LOS	Percent Increase
State Route 91	West of Kraemer Blvd[2]	10-Lane Freeway	237,980	279	C	0.12
State Route 91	East of Kraemer Blvd[2]	10-Lane Freeway	236,980	279	C	0.12
E. Miraloma Ave	West of Kraemer Blvd[2]	4-Lane undivided	15,160	558	B	3.68
N. Kraemer Blvd	South of E. Miraloma Ave[2]	6-Lane undivided	31,860	558	A	1.75

Source: AFC pg. 6.11-15, Table 6.11-8

Traffic and Transportation Table 5 reflects the peak hour intersection LOS and average vehicle delay during project construction conditions. As reflected in Table 5, all study intersections re forecast to operate at LOS C or better during construction conditions. Table 5 also reflects an improvement to P.M. peak hour traffic volumes at N. Kraemer Avenue at E. La Palma Avenue due to roadway widening improvements.

Traffic and Transportation Table 5
Peak Hour Intersection Level of Service
Project Construction Conditions

Intersection	A.M. Peak Hour Volume to Capacity Ratio (V/C)	LOS	P.M. Peak Hour Volume to Capacity Ratio (V/C)	LOS
N. Kraemer Blvd/ E. Miraloma Avenue	0.740	C	0.763	C
N. Kraemer Blvd/E. Coronado Street	0.545	A	0.553	A
N. Kraemer Blvd/E. La Palma Avenue	0.675	B	0.784	C
N. Kraemer Blvd/SR-91 Freeway WB off ramp	0.740	C	0.576	A
N. Kraemer Blvd/E. Frontera Street	0.653	B	0.635	B

AFC Tables 6.11-10, pg. 6.11-16
City of Anaheim, October 19,2007

Linear Facilities

Natural gas would be provided using a new 12-inch diameter gas line that will connect to SoCal Gas Company's existing gas transmission line (CPP 2008a, p. 6.11-11). Total length of the gas line would be approximately 3,240 feet. With the off-site portion crossing under Carbon Canyon diversion channel, the applicant has proposed the use of jack and bore construction techniques. It is more than likely that the street portion would be open cut trenched. The need for flagmen and proper signage would be addressed under Condition of Certification **TRANS-1**.

Process water for the proposed project would be supplied by recycled water from the Orange County groundwater replenishment system (GWRS) via a new 2,185-foot long, 14-inch pipeline. The water line will run east of the project site on the north side of East Miraloma Avenue for 1,850 feet to the new pumping station located north of East Miraloma Avenue, then north 210 feet and connect to the 60-inch GWRS recycled water line at an existing 36-inch stub near the Carbon Canyon Diversion Channel.

The electrical interconnection will be underground. Two 69 kV underground circuits will proceed eastward approximately 4,000 feet in East Miraloma Avenue, turn south on

Miller, then proceed approximately 3,000 feet to connect to the Dowling-Yorba 69 kV line at East La Palma Avenue. The need for flagmen, proper signage and replacement of asphalt pavement would be addressed under Condition of Certification **TRANS-1**.

The fiber optic cable for communication purposes will run in common trench with the approximately 7,000 foot 69 kV electric cables, and tie into existing fiber optic cables.

Construction Phase Transport of Hazardous Materials and Waste

Deliveries to the CPP site would include small quantities of hazardous materials to be used during project construction. The applicant has stated that the delivery/disposal of hazardous materials (CPP 2008a) to and from the site, 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 assessment for more information). The preferred transportation route for hazardous materials delivery would be via SR-91, north on Kraemer Boulevard, and west on Miraloma Avenue to the CPP project site. Staff believes this would be a reasonable route to access the site since it is the shortest and most direct route from SR-91.

Operation Impacts and Mitigation

Employee and Truck Traffic

Operation of the power plant would require a labor force of nine full-time employees that would generate 18 one-way trips per day to and from the CPP site. Other project-related trips (that is, delivery trucks, visitors, and other business-related trips) are expected to be minimal and would occur during regular business hours. Staff assumes that operational workers would follow the same routes as the construction workers. These minor trip additions to surrounding local streets and highways would not significantly affect the LOS of these roads.

Transport of Hazardous Materials and Waste

The transportation and handling of hazardous substances associated with the proposed project could increase roadway hazard potential. Impacts associated with hazardous material transport to the facility could be mitigated to less than significant level 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 (CPP 2007a, p.7.10-23).

The California Department of Motor Vehicles exclusively 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 a maximum of six delivery/service trucks per week. Operation would also require a maximum of four deliveries per month of aqueous ammonia. A licensed hazardous waste transporter would haul any hazardous waste from the project site to one of three Class 1 hazardous waste landfills in western Kern County near the communities of Buttonwillow and Kettleman City, and 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

As noted earlier, the closest major airport is Fullerton Airport, which is 6.5 miles west of the proposed site. John Wayne Airport is approximately 16 miles to the south of the project site. The existing flight pattern does not bring aircraft at low altitude over the project site. The two combustion turbine generator stacks would be 86 feet high and the four-cell chiller cooling tower would be 43.5 feet high (CPP 2008a, p.3-7). As discussed earlier in this report, all new electrical transmission cables will be installed underground, therefore the stacks and cooling tower would not penetrate navigable airspace for any airport.

The California Highway Patrol monitors traffic from the air and would probably remain directly above SR-91 and SR-51 and not fly north or east toward the proposed project site. Therefore, the CPP plumes would not affect local aircraft operations. Staff concludes that the proposed project would not cause a significant adverse impact on aircraft operations.

Ground-Level Water Vapor Plumes

Staff uses a plume frequency of 20 percent of seasonal (November through April) daylight with no rain/fog high visual contrast (that is, “clear”) hours to determine potential plume impact significance.

There is the potential for visible water vapor plumes to be produced from the project’s chiller cooling tower exhaust. However, because of the power plant’s operating limitations, and the limited operation of the chiller which would not operate during low temperatures when plumes are most likely to be formed, the potential for visual plumes would be very limited, and not occur greater than staff’s initial screening significance criteria of 20 percent of seasonal daylight clear hours.

SACTI calculations were performed for AEP and no ground hugging plumes are predicted under the range of cooling tower operations provided by the applicant (data response 44 dated 6/20/08). Therefore, based on the SACTI model there would appear to be no impacts from the plumes to ground traffic in the project area.

Emergency Services Vehicle Access

The city of Anaheim Fire Department would provide 24-hour fire protection and emergency medical services to the CPP site. The nearest fire station is in the city of Anaheim, about one-half mile south from the project site on Kraemer Boulevard. Emergency service vehicles would reach the project site via the access road off of Miraloma Avenue. For a more detailed discussion of emergency services concerning adequate ingress/egress serving the facility, see the **Worker Safety and Fire Protection** section of this assessment.

CUMULATIVE IMPACTS

A cumulative impact consists of an impact that is created as a result of the combination of the proposed project together with other projects causing related impacts. When the proposed project is viewed together with the effects of other projects in the area, cumulative impacts may be significant. A number of projects are proposed for development in the CPP site vicinity that could contribute to cumulative effects. These include a new middle school located in the city of Placentia, located approximately 1.5 miles west from the project site. It is anticipated that the middle school will be completed in the fall of 2009. Also, adjacent to the middle school, the Orange County Water District has certified the construction of the La Jolla Groundwater Recharge Basin Project. The construction has not been announced as per this writing. Kaiser's Hospital has received approval for a proposal to construct a new 360 bed hospital on La Palma Avenue in the city of Anaheim. This proposal is approximately five miles east of the project site.
It has been determined that the construction of these facilities would not result in a significant cumulative impact to traffic flow during the construction or during the operation of the CPP project, as the CPP site will implement a traffic control plan, consistent with the City's public works department requirements (see Condition of Certification **Trans-1**) therefore, cumulative traffic impacts are not considered significant.

Staff has considered the minority populations (as identified in **Socioeconomics Figure 1**) and low income populations in its impact analysis. There are 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 (CPP 2006a, section 5.11.5). Staff has concluded that the project as proposed would comply with relevant LORS. **Traffic and Transportation Table 5** presents the project's conformance with all applicable LORS.

TRAFFIC & TRANSPORTATION Table 5
Project Compliance with Adopted Traffic and Transportation LORS

Applicable LORS	Description
Federal: Title 14, Code of Federal Regulations (CFR) 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: Fullerton Airport is 6.5 miles west of the proposed site. John Wayne Airport is approximately 16 miles to the south of the project site. The existing flight pattern does not bring aircraft at low altitude over the project site and none of the project's structures would penetrate any navigable airspace.
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 that 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. 0
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.

<u>Local</u>: City of Anaheim General Plan – Transportation and Circulation Element	Requires LOS D or better operating conditions for city intersections and roadways.
	<u>Consistent:</u> As reflected in Traffic and Transportation Table 2, the LOS along these designated roadways would remain below the LOS D threshold requirement, therefore will be in compliance with the city's circulation element.
County of Orange Congestion Management Plan	Requires LOS D (V/C<1.0) or better operating conditions for city intersections and roadways.
	<u>Consistent:</u> As reflected in Traffic and Transportation Table 2, the LOS along these designated roadways would remain below the LOS D threshold requirement, therefore will be in compliance with the county's congestion management plan.

CONCLUSIONS

1. The project as proposed would comply with all applicable LORS related to traffic and transportation and would not degrade the LOS B and C on Kraemer Blvd and Miraloma Avenue.

2. Because of the project's distance from the nearest airport, no impact on the Fullerton Municipal Airport and Orange County Airport Airspace would occur, and the project would not impact aviation safety.

3. Staff is proposing Condition of Certification **TRANS-2** which would require a mitigation plan to repair Kraemer Blvd and Miraloma Avenue if they are damaged by project-related traffic.

4. There would be no significant direct or cumulative traffic and transportation impact and therefore no environmental justice issues.

PROPOSED CONDITION OF CERTIFICATION

TRANS-1 The project owner shall prepare a construction traffic control and implementation plan for the project and its associated facilities. The project owner shall consult with the affected local jurisdiction(s), Caltrans and Orange County (if applicable) and the Anaheim Public Works Department, in the preparation of the traffic control and implementation plan.

The traffic control and implementation plan shall include and describe the following minimum requirements:

A. Timing of heavy equipment and building materials deliveries and related hauling routes;

B. Redirecting construction traffic with a flag person;

C. Signing, lighting, and traffic control device placement;

D. Timing of construction work hours and arrival/departure intervals outside of peak traffic periods;

E. Ensuring safe access to the main entrance;

F. Ensuring access for emergency vehicles to the project site;

G. Closing of travel lanes on a temporary basis;

H. Ensuring access to adjacent commercial land industrial properties during the construction of all linears;

I. Devising a construction workforce ridesharing plan; and

J. Provide a shuttle service from the most distant off-street parking areas.

The project owner shall submit the proposed traffic control and implementation plan to the affected local jurisdiction, Orange County (if applicable) and Caltrans for review and comment.

Verification: At least 60 days prior to start of site mobilization, the project owner shall provide to the city of Anaheim and county of Orange, Caltrans, and the California Highway Patrol for review and comment and to the CPM for review and approval, a copy of the construction traffic control plan. The plan must document consultation with the applicable agencies.

TRANS-2 Prior to site mobilization activities, the project owner shall prepare a mitigation plan for Kraemer Boulevard and East Miraloma Avenue should they be damaged by project construction. The intent of this plan is to ensure that if these roadways are damaged by project construction, they will be repaired and reconstructed to original or as near original condition as possible. This plan shall include:

A. Documentation of the pre-construction condition of Kraemer Boulevard from SR-91 to the access road off East Miraloma Avenue into the project site. Prior to the start of site mobilization, the project owner shall provide to the CPM photographs or videotape of East Miraloma Avenue and Kraemer Street to SR-91.

B. Documentation of any portions of Kraemer Boulevard to East Miraloma Avenue that may be inadequate to accommodate oversize or large construction vehicles and identification of necessary remediation measures; and

C. Reconstruction of portions of East Miraloma Avenue and Kraemer Boulevard that are damaged by project construction due to oversize or overweight construction vehicles.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit a mitigation plan focused on restoring Kraemer Boulevard and Miraloma

Avenue (from the project site to SR-91) to its pre-project condition to the city of Anaheim Public Works and 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 city of Anaheim Planning Department and the CPM that the damaged sections of Kraemer Boulevard and East Miraloma Avenue have been restored to their pre-project condition.

REFERENCES

CofA 2007a – City of Anaheim/S. Sciortino URS2007a. City of Anaheim's Canyon Power Plant Application for Certification Volume I & II.

CofA 2008 – City of Anaheim . City of Anaheim's Canyon Power Plant Response to California Energy Commission Data Requests 1-74. 6/20/2008

CEC 2008g – CEC/M. Jones. Data Adequacy Recommendation. 01/28/2008.

City of Anaheim. 2004. General Plan Circulation Element.

County of Orange Transportation Authority (OCTA). 2007

Traffic Counts. 2007. National Data and surveying services.

THIS PAGE INTENTIONALLY LEFT BLANK

TRAFFIC AND TRANSPORTATION APPENDIX A

HIGHWAY CAPACITY MANUAL

The *Highway Capacity Manual* is prepared by the Transportation Research Board, Committee on Highway Capacity and Quality of Service. It represents a concentrated, multi-agency effort by the Transportation Research Board, the Federal Highway Administration, the American Association of Highway and Transportation Officials, and other traffic/transportation related agencies. It is the most widely used resource for traffic analysis. Several versions of the *Highway Capacity Manual* (*HCM*) have been published. The current edition was published in 2000. It contains concepts, guidelines, and procedures for computing the capacity and quality of service of various highway facilities, including freeways, signalized and unsignalized intersections, and rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems.

LEVEL OF SERVICE

The description and procedures for calculating capacity and level of service are found in the *Highway Capacity Manual 2000*. The *Highway Capacity Manual 2000* represents the latest research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with level of service A representing the best operating conditions and level of service F, the worst. Each level of service represents a range of operating conditions and the driver’s perception of these conditions. Safety is not included in the measures that establish service levels. A general description of service levels for various types of facilities is shown in **Table A**.

Table A
Level of Service Description

Facility Type	Uninterrupted Flow	Interrupted Flow
	Freeways Multi-Lane Highways Two-Lane Highways Urban Streets	Signalized Intersections Unsignalized Intersections - Two-Way Stop Control - All-Way Stop Control
Level of Service		
A	Free-flow.	Very low delay
B	Stable flow. Presence of other users noticeable.	Low delay
C	Stable flow. Comfort and convenience starts to decline.	Acceptable delay
D	High density stable flow.	Tolerable delay
E	Unstable flow.	Limit of acceptable delay
F	Forced or breakdown flow.	Unacceptable delay

Source: *Highway Capacity Manual 2000*

Interrupted Flow

One of the more important elements limiting, and often interrupting, the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals and stop and yield signs. These all operate quite differently and have differing impacts on overall flow.

Signalized Intersections

The capacity of a highway is related primarily to the geometric characteristics of the facility, as well as to the composition of the traffic stream on the facility. Geometrics are a fixed, or non-varying, characteristic of a facility.

At the signalized intersection, an additional element is introduced into the concept of capacity: time allocation. A traffic signal essentially allocates time among conflicting traffic movements seeking use of the same physical space. The way in which time is allocated has a significant impact on the operation of the intersection and on the capacity of the intersection and its approaches.

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, driver frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (that is, in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Specifically, level of service criteria for traffic signals is stated in terms of average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the ratio of green time to cycle length, and the volume to capacity ratio for the lane group.

For each intersection analyzed, the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A level of service designation is given to the control delay to better describe the level of operation. Descriptions of levels of service for signalized intersections can be found in **Table B**.

Table B
Description of Level of Service for Signalized Intersections

Level of Service	Description
A	Very low control delay, up to 10 seconds per vehicle. Movement forward (progression) is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop, causing higher levels of delay.
C	Control delay greater than 20 and up to 35 seconds per vehicle. Higher delays are caused by fair progression or longer cycle lengths or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase does not serve a waiting line of vehicles, and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Control delay greater than 55 and up to 80 seconds per vehicle, the limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation and arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.

Source: *Highway Capacity Manual 2000*

The use of control delay, often referred to as signal delay, was introduced in the 1997 update to the *Highway Capacity Manual*. It represents a departure from previous updates. In the third edition of the *Highway Capacity Manual*, published in 1985 and the 1994 update to the third edition, delay only included stop delay. Thus, the level of service criteria listed in Table B differs from earlier criteria.

Unsignalized Intersections

The current procedures on unsignalized intersections were first introduced in the 1997 update to the *Highway Capacity Manual* and represent a revision of the methodology published in the 1994 update to the 1985 Highway Capacity Manual. The revised procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, driver frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (that is, in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

Two-Way Stop Controlled Intersections

Two-way stop controlled intersections, in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At two-way stop-controlled intersections, the stop-controlled approaches are referred to as the *minor street approaches* and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the *major street approaches*.

The capacity of movements subject to delay is determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A level of service designation is given to the expected control delay for each minor movement. Level of service is not defined for the intersection as a whole. Control delay is the increased time of travel for a vehicle approaching and passing through an all-way stop-controlled intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection. A description of levels of service for two-way stop-controlled intersections is found in **Table C**.

Table C
Description of Level of Service for Two-Way Stop Controlled Intersections

Level of Service	Description
A	Very low control delay: less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay: greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay: greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay: greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of acceptable control delay: greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay: in excess of 50 seconds per vehicle for each movement subject to delay.

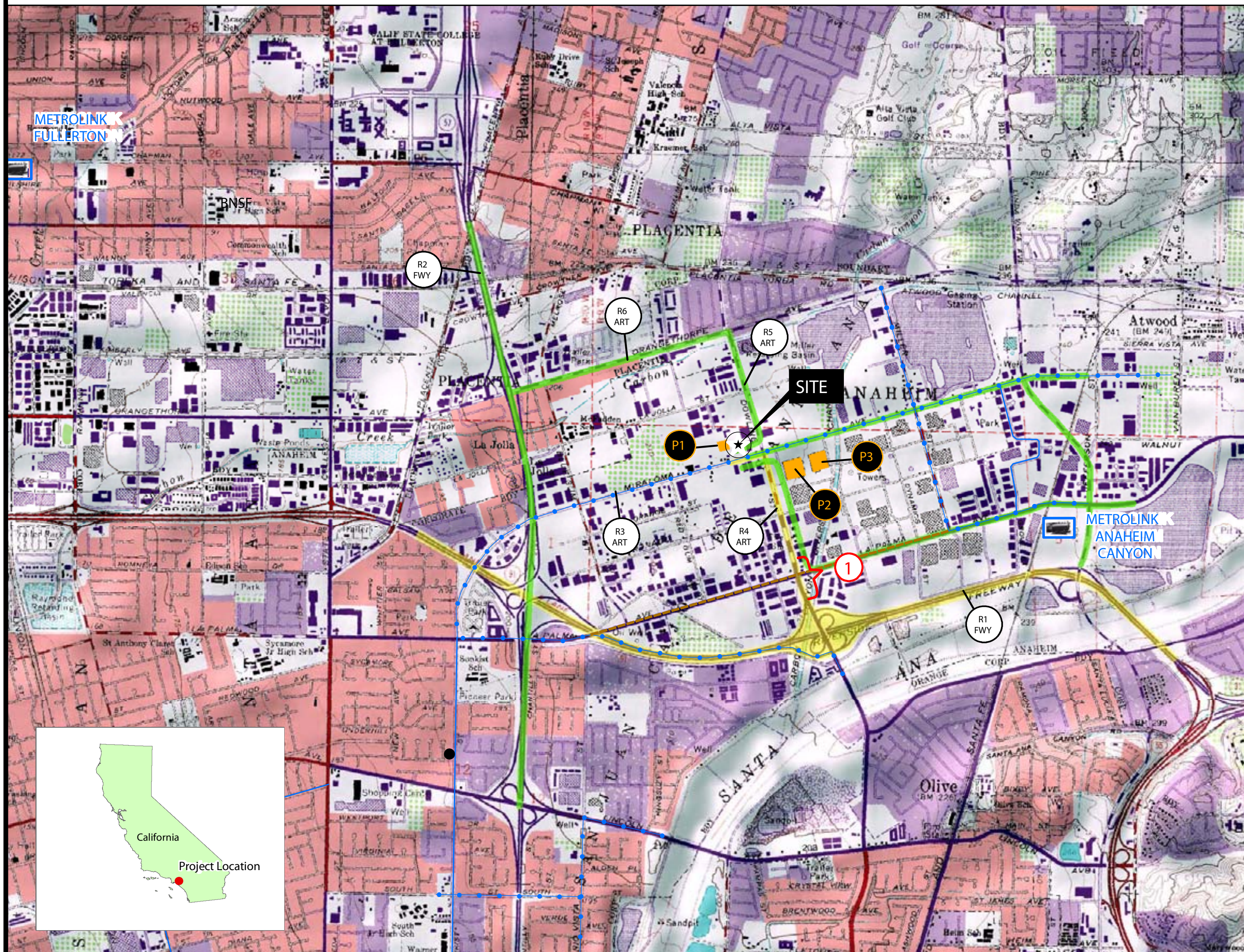
Source: *Highway Capacity Manual 2000*

REFERENCE

Transportation Research Board. *Highway Capacity Manual 2000*. Washington, D.C.

TRAFFIC & TRANSPORTATION - FIGURE 1

Canyon Power Project - Regional Transportation & Off-Site Parking Options



LEGEND

1 — Roadway widening of Kraemer Boulevard to ultimate width of three through lanes in each direction

Project construction/routes and study locations approved by City of Anaheim traffic engineers

Alternative Routes

Proposed Off Road Trail Bikeway

Existing Class II Bikeway

Proposed Top Priority Class II Bikeway

Metrolink Stations

R1 FWY — SR-91 is an east-west freeway facility located south of the project site. Existing Average Daily Traffic (ADT) is 233,000 vehicles per day. Existing LOS = C, Project Construction LOS = C, Project Operations LOS = C.

R2 FWY — SR-57 is a north-south freeway facility located west of the project site. Existing Average Daily Traffic (ADT) on the segment north of Orangethorpe Avenue is 265,000 vehicles per day. Existing LOS = C, Project Construction LOS = C, Project Operations LOS = C.

R3 ART — Miraloma Avenue is an east-west Secondary Arterial located directly south of the project site. Existing Average Daily Traffic (ADT) west of Kraemer Avenue is 14,300 vehicles per day. Existing LOS = A, Project Construction LOS = A, Project Operations LOS = A.

R4 ART — Kraemer Avenue is a north-south Primary Arterial located to the east of the project site. Existing Average Daily Traffic (ADT) between SR-91 and Miraloma Avenue is 30,700 vehicles per day. Existing LOS = A, Project Construction LOS = A, Project Operations LOS = A.

R5 ART — Kraemer Avenue is a north-south Primary Arterial located to the east of the project site. Existing Average Daily Traffic (ADT) between Orangethorpe Avenue and Miraloma Avenue is 25,050 vehicles per day. Existing LOS = A, Project Construction LOS = A, Project Operations LOS = A.

R6 ART — Orangethorpe Avenue is an east-west Major Arterial located to the north of the project site. Existing Average Daily Traffic (ADT) between SR-57 and Kraemer Avenue is 25,530 vehicles per day. Existing LOS = B, Project Construction LOS = B, Project Operations LOS = B.

P1 — Off Site Parking Option 1 (3001 Miraloma)
Parking Capacity = 275' x 290' (~150 Spaces)

P2 — Off Site Parking Option 2 (3150 Miraloma-PDS)
Parking Capacity = ~374 Spaces

P3 — Off Site Parking Option 3 (3190 Miraloma-TDK)
Parking Capacity = ~224 Spaces

N

0 2,000 4,000 Feet

Scale 1:24,000

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: Data Response June 2008 Figure 6.11-2

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The applicant, the City of Anaheim (COA) California, proposes to transmit the power from the proposed Canyon Power Plant (CPP) to the city's 69-kilovolt (kV) transmission grid through an on-site 69-kV switchyard. This grid connection would be made using two double-circuit underground lines extending from the switchyard to their respective connection points on the city's existing 69-kV Vermont-Yorba and Dowling-Yorba lines. As underground lines, the proposed line conductors would be placed closer together than their overhead counterparts and would therefore produce the magnetic fields of the lowest intensity possible without affecting line safety, efficiency and reliability. The proposed underground lines and their related riser poles (for connection to the COA's overhead grid Iine) would be designed, operated, erected, and maintained according to standards reflecting the practices of the Southern California Edison (SCE) which is the area's major service utility; these practices conform to applicable laws, ordinances, regulations and standards (LORS). With the three 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 design and operational plan for the transmission lines proposed for the Canyon Power Plant to determine whether their related field and nonfield impacts would constitute a significant environmental hazard in the area around the proposed route. All line-related health and safety LORS are currently aimed at minimizing such hazards. The proposed lines would be routed underground to their respective riser poles from which they would connect to the city's existing overhead, 69-kV power grid. Staff's analysis focuses on the following issues taking into account both the physical presence of the lines and the physical interactions of their 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 nonfield impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

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	
Local	
City of Anaheim's General Plan, Noise Element	References the City's Municipal Code for noise limits for stationary sources.
Hazardous and Nuisance Shocks	
State	
CPUC GO-128, "Rules for Underground Electric line Construction.	Governs requirements for the design and safe design, operation and maintenance of underground transmission facilities.
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.

Applicable LORS	Description
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.
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 CPP is a gated, 10-acre parcel located on 3071 East Miraloma Avenue within an industrial area of COA. The site is currently paved from past industrial activities with several related vacant buildings that would be demolished and removed to allow for the facility. There are no residential buildings in the immediate vicinity of the site, which would be enclosed by a 20-foot wall (COA 2007, pp. 1-3, 3-4 4-1, 6.9-13, and 6.9-18). The absence of nearby residences eliminates the potential for the residential field exposures of the health concern of recent years. Such lack of residential field impacts means that there would be no exposure-related environmental justice issues although the Socioeconomics staff has identified specific minority populations in some areas around the project. Furthermore, the proposed line undergrounding (which is required by City ordinance 5281 and the COA's general development standards for the project area), would produce magnetic fields that decrease more rapidly with distance than their overhead counterparts of the same current-carrying capacity. Such reduction in areas of potential impacts would further reduce the potential for residential field exposures during operations.

PROJECT DESCRIPTION

The proposed CPP lines consist of the segments listed below:

- Two double-circuit, underground 69-kV cables stretching approximately 100 feet from the project's switchyard to the south side of East Miraloma Avenue to connect to their riser poles ;
- Two other double-circuit underground 69-kV cables stretching approximately 7,000 feet from the switchyard to connect to the Dowling-Yorba 69-kV line at East La Palma Avenue south of the site;
- The project's on-site 69-kV switchyard from which the conductors would extend underground to the connection points on the COA 69-kV power grid.

The proposed underground conductors would be placed in protective concrete casings together with communication circuits for data acquisition. The two riser structures would be tubular 90-foot, steel structures that would allow placement of the cables within the interior. It is from these structures that the CPP would be connected to the existing overhead COC power grid. The proposed underground lines and related riser structures would be designed, built, maintained and operated according to SCE's standards and practices since SCE is the main area utility to which the utilized 69-kV power grid would be connected (at the Lewis 230/69-kV Substation). Since the power from CPP would flow through the existing area COC 69-kV and adjacent 12-kV lines, the maximum field and nonfield impacts of operation would best be represented by (a) the strengths of the fields from the underground lines themselves at the maximum impact location, and (b) the total field strength reflecting the fields from the existing power flow and the added power from CPP operations. The applied design and construction measures would reflect compliance with SCE guidelines that ensure line safety and efficiency together with reliability, and maintainability (COA 2007a, pp. 4-1, 4-2, and 4-8 through 4-12).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The potential magnitude of the field and nonfield impacts of concern in this staff analysis depends on compliance with the listed design-related LORS and industry standards, which were established to maintain these 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.

As noted by the applicant, (COA 2007a, p. 3-54), the nearest area airport to the project site is approximately 12.4 miles to the south and thus too far removed according to FAA specifications to constitute a collision-related aviation hazard. Furthermore, the riser poles' height of 90 feet is far below the 200 feet the FAA regards as the threshold of concern over the potential for collision. The FAA would thus, not require the applicant to file a "Notice of Proposed Construction and Alteration (Form 7040).

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 electric fields from overhead lines. Since electric fields (unlike magnetic fields) are unable to penetrate the soil and most materials, these electric field-related effects are not produced by underground lines and would not be associated with the proposed CPP lines. When such fields are produced by overhead lines, they result from 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. 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, therefore the potential for perception is minimized by reducing the line electric fields or locating the line away from inhabited areas.

Since the electric field effects would only occur around the existing overhead 69-kV and adjacent 12-kV lines, any electric field effects from CPP operation would be encountered along their existing routes. These fields and any related effects would not change with CPP operation since the line voltage would remain the same (at 69 kV) during CPP operations. These existing overhead lines were built and are maintained in keeping with standard SCE practices that minimize surface irregularities and discontinuities and are thus expected to continue operating without complaints about field effects. Moreover, the potential for such interference and corona effects is usually of concern for lines of 345-kV and above, and not the existing 69-kV lines that would be used. Since staff does not expect any residential corona-related radio-frequency interference or related complaints in the general project area, we do not recommend any related conditions of certification.

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-kV or higher. It is, therefore, not generally expected at significant levels from overhead lines of less than 345-kV as would continue to be used during CPP operation. Since the low-corona designs for the exisitng 69- kV lines are also aimed at minimizing field strengths, staff does not expect these lines to produce any noise above existing background levels during CPP operation. For analysis of 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. Since the proposed CPP lines would be located underground away from combustible materials, their use would not pose a significant fire hazard. The standard fire prevention and suppression measures that are applied to the existing 69-kV lines would continue to be applied during CPP operations. The applicant's intention to comply with the clearance-related aspects of GO-95 would prevent line-related fires in the case of the two riser poles. Staff recommends no conditions of certification with regard to fires.

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 power lines. Safety is assured within the industry from compliance with the requirements specifying the minimum national safe placement standards for all lines, whether underground or above ground. The applicant's stated intention to implement the GO-128-related measures against direct contact with the energized underground line (COA 2007a, p.4-8) 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. The existing 69-kV lines to be used were constructed according to SCE safety and reliability standards and require no CPP-related conditions of certification.

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 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 underground lines and existing 69-kV lines to be used, the project owner would be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way. Staff recommends Condition of Certification **TLSN-2** to ensure such grounding for CPP.

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 and exposure to them together is generally referred to as EMF exposure. The CPUC, other regulatory agencies, and staff have evaluated the available evidence and concluded that such fields do not 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 feasible reduction of such fields without affecting safety, efficiency, reliability and maintainability.

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

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- There are measures that can be employed for field reduction, but they 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 many high-voltage lines owned and operated by investor-owned utilities) 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 or underground 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 most new lines in California are currently required by the CPUC to be designed according to the EMF-reducing guidelines of the electric utility in the service area involved, the proposed line’s fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the proposed underground project line according to existing SCE field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management.

The CPUC has recently revisited the EMF management issue to assess the need for policy changes to reflect the available information on possible health impacts. The CPUC found that there is no need for significant changes to existing field management policies. Since there are no residences in the immediate vicinity of the proposed project line, there would not be the long-term residential 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 vicinity of the line. These types of exposures are short term and well understood as not significantly related to the health concern.

For the proposed underground lines, the inability of electric fields to penetrate the overlying soil (unlike the companion magnetic fields), means that only magnetic field exposures would be potentially significant up till the point of connection to the existing area 69-kV and 12-kV lines. Exposures around these existing lines would be reflected by the strengths of the electric fields and the magnetic fields from existing current flow and the added current from CPP.

Industry's Approach to Reducing Field Exposures

The present focus is on the magnetic field because unlike electric fields, it can penetrate the soil, buildings and other materials to produce the types of human exposures at the root of the health concern of recent years. The industry seeks to reduce exposure, not by setting specific exposure limits, but through design guidelines that minimize exposure in each given case. As one focuses on the strong magnetic fields from the more visible high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed too much stronger fields while using some common household appliances than from high-voltage lines (National Institute of Environmental Health Services and the U.S. Department of Energy, 1998). 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 SCE lines, specific field strength-reducing measures would be incorporated into the design of the proposed lines 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 to an optimal level;
2. Reducing the spacing between the conductors to an optimal level;
3. Minimizing the current in the line; and
4. Arranging current flow to maximize the cancellation effects from interacting of conductor fields.

The applicant has assessed the potential impacts of CPP operation by comparing existing fields (at the points of maximum strengths) with total fields encountered after CPP comes on line (COA 2007a, pp. 4-5 through 4-7). The magnetic field strength at the point of maximum impacts for the existing 69-kV lines was calculated at 29.7 mG for a location on East MiraLoma Avenue. Since of the CPP power would be directed into the existing Vermont-Dowling line as it also flows into the Vermont-Yorba line, the maximum magnetic fields during CPP operation would decrease to 26 mG at the same maximum impact location, showing that CPP operation would not significantly change the intensity of magnetic fields from existing area 69-kV lines. Since the same 69 kV would be applied to the utilized lines, the existing electric fields would remain the same at 0.08 kV/m, which is too low for significant field effects (COA 2007a, p. 4-5).

The magnetic field at the point of maximum intensity above the proposed underground lines was calculated as 24.4 mG, which is the lowest intensity possible from such use of underground lines in this SCE utility service area. Staff has verified the accuracy of the applicant's calculation of the intensity of fields from lines of the proposed voltage and current-carrying capacity and recommends the on-site measurement requirements in Condition of Certification **TLSN-3** to validate the applicant's assumed reduction efficiency. The measurements are recommended for the maximum impacts locations for which field the strength values were provided by the applicant.

CUMULATIVE IMPACTS AND MITIGATION

When field intensities are measured or estimated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive, or subtractive depending on prevailing conditions. Since the proposed project transmission line and switchyard would be designed according to applicable field-reducing SCE guidelines (as currently required by the CPUC for effective field management), any contribution to cumulative area exposures should be at levels expected for SCE lines of similar voltage and current-carrying capacity. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. The actual field strengths and contribution levels for the proposed line designs would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-3**.

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 SCE. Since the proposed project line and related switchyard would be designed according to the respective requirements of the LORS listed in Table 1, and operated and maintained according to current SCE 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 requirements 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 nuisance and safety aspects of the proposed CPP.

CONCLUSIONS

Since the proposed underground line and related riser poles do not 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 SCE guidelines (reflecting standard industry practices). The proposed undergrounding would not produce the electric fields associated with radio-frequency interference or audible noise. Such lack of radio-frequency interference would also be true for the design proposed for the related riser poles.
The potential for hazardous shocks would (in the case of the riser poles), 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, would 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 CPP and similar underground 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 underground lines' design and operational plan would be adequate to ensure that the generated fields are managed to an extent the CPUC considers appropriate to mitigate any potential health effects as presently understood. Given the close-placement of the lines' conductors along the proposed underground routes, the related magnetic fields would be much lower than from their overhead counterparts of the same current-carrying capacity. This means that the line would be built in a way that generates magnetic fields of the lowest intensity possible without impacting safety, efficiency, reliability, and maintainability. The long-term, mostly residential magnetic exposure of health concern in recent years would be insignificant for the proposed lines given the general absence of residences along the proposed routes. On-site worker or public exposure would be short term and at levels expected for SCE 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 underground project lines and related riser poles would be operated to minimize the health, safety, and nuisance impacts of concern to staff and would be located along a route without nearby residences, staff considers the proposed design, maintenance, and construction plan as complying with the applicable LORS. 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 underground transmission lines and related riser poles according to the respective requirements of California Public Utility Commission's 128, 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 Southern California Edison'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 all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards.

Verification: At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

TLSN-3 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from the proposed underground and existing overhead lines at the points of maximum intensity for which intensity estimates were provided by the applicant. The measurements shall be made before and after energization according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures. 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 with the CPM within 60 days after completion of the measurements.

REFERENCES

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

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.

COA2007a-City of Anaheim/S. Sciortino URS2007a. City of Anaheim's Canyon Power Plant Application for Certification t, Volumes I and II submitted to the California Energy Commission on June 25, 2007.

VISUAL RESOURCES

Testimony of James Adams

SUMMARY OF CONCLUSIONS

Energy Commission staff analyzed the potential visual impacts of the proposed Canyon Power Plant project (CPP) in accordance with the California Environmental Quality Act (CEQA), and the project's compliance with applicable laws, ordinances, regulations, and standards (LORS). Effective implementation of the applicant's proposed mitigation measures and staff's recommended conditions of certification would reduce adverse visual impacts from the project to a less than significant level, and ensure that the project complies with the applicable LORS regarding visual resources.

INTRODUCTION

Visual resources are the natural and human-made features of the environment where a proposed project is located. This analysis focuses on whether construction and operation of the CPP would cause significant visual impact(s) under the CEQA, and whether the project would be in compliance with applicable LORS.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

VISUAL RESOURCES Table 1 provides a general listing of applicable LORS that staff has evaluated to determine the proposed project's compliance. The project's consistency with specific LORS is discussed in **VISUAL RESOURCES Table 2** in this analysis.

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

Jurisdiction & Applicable LORS	LORS Description
Federal	The proposed project is not located on federally administered public lands and is not subject to federal regulations pertaining to visual resources.
State	There are no officially designated State Scenic Highways or Scenic Routes within the project viewshed. There are no state regulations pertaining to scenic resources applicable to the project.

Local	
Orange County General Plan	
Land Use Element – Open Space – Goal 1, Objective 1.1	Retain the character and natural beauty of the environment through the preservation, conservation, and maintenance of open space. The objective is to designate open space areas that preserve, conserve, maintain, and enhance the significant natural resources and physical features of unincorporated Orange County.
Growth Management Element – Buffer Zones- Goal 7	There shall be buffer zones established through Feature Plans, Specific Plans and/or Scenic Corridor Plans which provide for the physical separation of major communities by means of open space areas/corridors. Said open space areas/corridors will be based upon natural features such as creaks or prominent topographic or aesthetic features.
City of Anaheim General Plan	
Community Design Element Goal 1.1	Create an aesthetically pleasing and unified community appearance within the context of distinct districts and neighborhoods. Screen public and private facilities and above-ground infrastructure support structures and equipment, such as electric substations, and water wells and recharge facilities, with appropriately scaled landscaping or other methods of screening. Minimize visual impacts of public and private facilities and support structures through sensitive site design and construction. This includes, but is not limited to: appropriate placement of facilities; under-grounding where possible; and aesthetic design (e.g. cell tower stealthing).
Goal 2.1	Attractively landscape and maintain Anaheim's major arterial corridors and prepare/implement distinctive streetscape improvement plans. Continue to underground overhead utility lines along the city's arterial corridors. Ensure adherence to sign regulations which address issues of scale, type, design, materials, placement, compatibility, and maintenance for uses along freeways, toll roads and major arterials.
Goal 3.1	Single-family neighbors are attractive, safe and comfortable. Continue to maintain and improve the visual image and quality of life of single-family homes. Require new and infill development to be of compatible scale, materials, and massing as existing development. Maintain, improve and/or develop parkways with canopy street trees, providing shade, beauty and a unifying identity to residential streets.
Circulation Element Goal 4.1	Preserve and enhance uniquely scenic or special visual resources along highways and designated state scenic

	routes for the enjoyment of all travelers. Continue to work with Caltrans in its implementation of the State Scenic Highway Program. Landscape arterial highways in keeping with the intent of the Scenic Corridor Overlay Zone and the Santa Ana River Greenbelt Plan, and maintain the residential character of the neighborhood by avoiding interference and intrusion into adjacent communities.
Goal 9.1	Involves strengthening the identity of industrial areas through the use of various methods such as using a complementary range of building colors and types.
Goal 12.1	Ensure adequate parking is made available to city residents, visitors and businesses. Encourage the use of well designed, aesthetically enhanced parking structures as an alternative to large, expansive surface parking lots.
Green Element Goal 23.2	Complete the city's comprehensive program of corridor landscaping, including entryways, medians, and parkways to strengthen the identity of major corridors and the city as a whole. Develop, implement and maintain a comprehensive landscape program for corridors in need of landscaping improvements. Develop guiding policies for accommodating drought-tolerant landscaping (xeriscaping) where it is considered appropriate.
<u>General Plan/Zoning Code EIR</u> 5. Environmental Analysis 5.1 Aesthetics	The evaluation of aesthetic resources in the built environment and natural landscape requires the application of a process that objectively identifies the visual features of the landscape and their importance, and the sensitivity of receptors that view them.
<u>Northeast Specific Plan</u> Landscape Plan	Based on a simple overall concept to enhance the major arterial roadway corridors (e.g. Miraloma Avenue) and the image of the Specific Plan area will be enhanced for visitors and employees alike. Project development along these corridors must comply with specific landscape standards.
Electricity	City policy requires all new electrical construction (12kv and 69kv projects) be installed underground.

SETTING

REGIONAL SETTING

The CPP is proposed to be constructed within an industrial area in the northern part of the city of Anaheim, just south of the city of Placentia, and less than a mile northwest of the city of Orange. The project site is a 10-acre parcel that was used for food catering services by a fleet of 75 to 100 trucks (CofA 2007a, pg. 6.13-1) but is currently vacant.

The CPP site is one mile east of SR-57, one mile north of SR-91, and one mile north of the Santa River corridor. The project site is located on a relatively flat paved site within a thoroughly developed industrial/commercial area identified as Santa Ana Canyon (Canyon). Foreground and midground views from the proposed project site consist of various commercial and industrial structures in all directions. **Visual Resources Figure 1** shows the existing view from above near the intersection of Miraloma Avenue and Kraemer Boulevard. Background views include East Coyote Hills to the northwest, hillsides and ridgelines of the San Gabriel/Santa Ana/San Bernardino/San Jacinto Mountains to the north, and the Peralta Hills to the east and southeast (Ibid, pg. 6.13-4).

As noted in the applicant's Regional Setting of the Visual Resources section of the Application for Certification (AFC), the area around the project is designated for industrial and commercial uses (Ibid. 2007a, pg. 6.13-3). The Canyon is a 2,450-acre zoned area for commercial and industrial as described in the Anaheim Northeast Specific Plan (City of Anaheim 1995).

PROJECT STRUCTURES AND VICINITY DESCRIPTION

This section describes the aspects of the proposed project that may have the potential to cause adverse impacts to visual resources. Please refer to the **PROJECT DESCRIPTION** section of the Final Staff Assessment (FSA) for a more comprehensive description of the project.

Power Plant

The most visible components of the proposed power plant would include four 86-foot tall combustion turbine generator stacks, two 92-foot tall transmission towers, and one 43-foot tall cooling tower. The applicant has proposed building a wall around the project site and landscaping using plant species appropriate for the setting that would provide acceptable aesthetic benefits and visual relief (CofA 2007a, Table 6.13-6, pg. 6.13-35).

Linear Facilities and Construction Laydown Area

Four 69kV electrical circuits and natural gas, make-up process water, potable water, and sanitary sewer pipelines would be buried underground. The construction of the linears would result in a noticeable but temporary visual disruption along 2,660 feet of Kraemer Boulevard, 4,000 feet of East Miraloma Avenue, and 3,000 feet of Miller Avenue. During construction activities, equipment (cranes), excavated piles of dirt, concrete and asphalt pavement, construction personnel and vehicles would be visible.

A 3.6-acre construction laydown area would be located along the western boundary of the project site. Access to the laydown area would be via East Miraloma Avenue.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Please refer to **Appendix VR-1** for a complete description of staff's visual resources evaluation process and **Appendix VR-2** for the definition of visual analysis terms.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The following discussion of project impacts is organized around the four questions found in the CEQA Guidelines Appendix G Environmental Checklist pertaining to Aesthetics. These questions relate to scenic vistas and resources, visual character or quality, and light and glare.

Scenic Vistas

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. The project site is not located within an area that includes an identified federal, state or county scenic vista. Staff did not observe any scenic vistas in the project area, nor are any identified in the Orange County General Plan or the city of Anaheim General Plan. Thus, the proposed project would not cause a significant visual impact to a scenic vista.

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); historical building; or a designated federal, state, or local scenic highway corridor. According to the Circulation Element of the city of Anaheim General Plan, scenic highways are transportation corridors where visual intrusions would impact views of natural beauty from the highway (City of Anaheim 2004).

SR-91, beginning at the junction of SR-91 and SR-55 and proceeding for 4.5 miles to the east, is designated as a scenic highway by the county of Orange. The designated section begins about 2.25 miles southeast of the CPP site. There is also a section of SR 142/Carbon Canyon (4.5 miles northeast of the project site) that is an Orange County designated scenic highway, but motorists that use this highway section would not have views of the CPP (CofA 2007a, pg. 6.13-1). The city of Anaheim considers SR-91 a scenic highway from Santiago Boulevard, which is about 2.5 miles south east of the project site, to Weir Canyon Road, which is about 4.5 miles east of the CPP site (CofA 2004). SR-91, east of Weir Canyon Road is an eligible state scenic highway. The Aesthetics section of the city of Anaheim General Plan and Environmental Impact Report does not identify any scenic resources such as trees, rock outcroppings, and historic buildings in the project area. Therefore, staff concludes that the project would not cause a significant impact on the city's scenic resources.

Visual Character or Quality

CEQA Checklist Question: *"Would the project substantially degrade the existing visual character or quality of the site and its surroundings?"*

The project aspects that were evaluated under this criterion include project construction, laydown area, power plant and transmission structures, and visible water vapor plumes.

Project Construction

Construction of the power plant is expected to take approximately 12 months (CofA 2007a, pg. 1-4). Project construction activities at the site would be noticeable to motorists on nearby roadways and a few local residences. On the project site (including the laydown area) during the construction period, views of tall cranes and other heavy equipment, building materials, piles of debris, and parked cars are expected. This would degrade the visual quality of the existing view of motorists and pedestrians using Miraloma Avenue and a few residences in the local area. Construction screening is typically accomplished by attaching a fabric or adding wooden slats to the perimeter fence. This screening would provide some visual relief from new industrial features. Staff is proposing Condition of Certification **VIS-1** to require visual screening during construction. Staff has proposed Condition of Certification **VIS-3** to require the restoration of the laydown area upon the completion of the CPP. With the effective implementation of **VIS-3** there would be no adverse visual impact from the area previously used as the project laydown area.

Linear Facilities

Four underground transmission cables would rise from ground level to connect to the existing 69kV Vermont-Yorba and Dowling-Yorba overhead lines (Ibid, pg. 1-4). The proposed electric transmission line and the two transition structures would not generate a significant visual impact because the two risers that bring the cables up to the overhead lines would be the only visible structure related to the new transmission lines. One of the goals of the city of Anaheim General Plan encourages strengthening the identity of industrial areas by, among other things, using a complimentary range of building colors and types (CofA 2004). Staff is proposing Condition of Certification **VIS-4** which would require surface treatment of project structures with colors and finishes that blend in with the landscape and reduce the potential for glare.

Power Plant Structures

Staff uses Key Observation Points[1], or KOPs, as representative locations 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 locations from which the project would be seen. However, KOPs are not the only locations that staff considered in each view area. Because the proposed project would be visible from several areas near the project site, three KOPs were chosen by the applicant, with input from staff, for analysis of the proposed CPP.

[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.

VISUAL RESOURCES - Figure 2 (Photo Locations) shows the location and view direction of the KOPs selected to represent the most sensitive viewing areas impacted by the proposed project. All visual resources figures are presented at the end of this analysis.

Project Operations

KOP 1 – Pedestrians and Vehicles on East Miraloma Street

VISUAL RESOURCES Figure 3A presents a view looking west from a grassy knowl on East Miraloma Avenue about 0.30 of a mile east of the project site. The view is dominated in the foreground and midground by a Kraemer Basin groundwater recharge pond bed, adjacent dirt perimeter road, trucks and heavy equipment, chain link fence, commercial buildings, grassy mound, eucalyptus trees, and East Miraloma Avenue. The background view consists of commercial buildings, an Adelphia communications tower, additional eucalyptus trees, and transmission lines and poles. The proposed project site is adjacent to the communications tower. The existing view includes open sky as part of the background.

Visual Sensitivity

From KOP 1, visibility of the proposed project would be from a ground-level perspective that is blocked at a midground viewing distance by commercial buildings. A portion of East Miraloma Street is visible along the left edge of the view. Motorists and pedestrians traveling west on this section of East Miraloma Avenue would have a similar view through the chain link fence and trees and would also see the planned 20 foot high wall that would help screen the project.

Visual quality is moderately low reflecting the mix of commercial and industrial features in the midground and background, and a more scenic view of sky in the background. Viewer concern is moderate for pedestrians and motorists. Viewer exposure is considered to be moderately low based on the moderately low visibility, high number of viewers (14,300 average daily traffic [CofA 2007a, Table 6.11-3, pg. 6.11-6]), and low duration of view. Overall visual sensitivity for pedestrians and motorists is moderately low based on moderately low visual quality, moderate viewer concern, and moderately low viewer exposure.

Visual Change

VISUAL RESOURCES Figure 3B provides a simulation of the proposed power plant from KOP 1. The only visible aspects of the power plant structures would be the upper portion of the four combustion turbine generators exhaust stacks. The proposed project structures would slightly increase the industrial character of the view from KOP 1.

The project exhaust stacks (86 feet in height) would introduce vertical structural forms that are different than the existing communications tower (over 200 feet high) and transmission line poles (92 feet high). They would be much more noticeable than the transmission towers but much smaller than the cell phone tower. In fact, existing eucalyptus trees could screen most of one stack and a portion of another. Visual contrast is considered moderately low due to the presence of other vertical elements in the view. Staff has proposed Condition of Certification **VIS-4** which requires that that the exhaust stacks and other project structures be colored to minimize visual intrusion and contrast by blending with the landscape.

The visual landscape from KOP 1 is comprised of commercial and industrial features, grassy mound, and trees. Proposed power plant exhaust stacks would be noticeable in the KOP view but would be subordinate to other visual features. Project dominance is rated low. View disruption and blockage would be low because the proposed power plant stacks would only block a very small portion of the background sky. Overall visual change is low given the moderately low contrast, subordinate dominance, and low view disruption.

Considering the moderately low visual sensitivity for viewers, and the low visual change that would be perceived from KOP 1, the proposed project would not cause a significant adverse visual impact.

KOP 2 – McFadden Park

Visual Resources Figure 4A presents a view looking southeast from the outfield of the baseball field at McFadden Park toward the project site which is about 0.45 miles west of the CPP site. A commercial equipment and vehicle yard and fence line are in the foreground view. Light poles, commercial buildings, communications tower, trees, transmission lines and poles are visible in the middleground. The Anaheim Hills and sky provide the background view.

Visual Sensitivity

From KOP 2, visual quality is moderately low reflecting the mix of transmission poles and lines, equipment and vehicles, light and communication towers, commercial buildings, and trees. Viewer concern and number of viewers is moderately low because park users would be focused on recreational activities and not looking towards the CPP project (though no estimates of the number of viewers are available) [CofA 2007a, pg. 6.13-7]. Viewer exposure is moderately low due to the moderately low visibility, moderately low number of viewers, and the moderately low duration of view. Overall sensitivity is moderately low due to the moderately low visual quality, moderate viewer concern, and the moderately low viewer exposure.

Visual Change

Visual Resources Figure 4B is a simulation depicting the power plant in the view from KOP 2. This view could be seen by recreationists visiting McFadden Park. The introduced forms and lines would be consistent with the existing commercial and industrial buildings, communication tower, light, and transmission poles and lines. The introduction of neutral tan colored project structures into the view would present a moderately low color contrast with existing structures, trees, and sky. Project exhaust stacks would be subordinate to the light poles and communication tower, and commercial buildings. View disruption and blockage would be low because very little of the hills in the background would be blocked. Overall visual change is moderately low given the moderately low contrast, subordinate dominance, and low viewer disruption and blockage.

Considering the moderately low visual sensitivity for recreationists, and the moderately low visual change that would be perceived at KOP 2, the project would cause a less than significant adverse visual impact.

KOP 3 – Corridor along SR-91

Visual Resources Figure 5A represents the view looking west from SR-91 about 2.5 miles east of the CPP site. A residential development is visible in the foreground with various commercial and industrial structures, an elevated road, numerous light poles and transmission poles and line, the Adelphia communications tower, and a number of trees in the midground view. The East Coyote Hills and the sky provide the background view.

Visual Sensitivity

From KOP 3, visual quality is considered moderately low. Viewer concern is moderately low because most viewers driving along SR-91 expect a visual setting with a mix of residential areas, commercial and industrial buildings, trees, and the sky and hills in the background. Project visibility could be low because of almost complete screening by buildings and trees and the 2.5 mile distance from the project site. Although the potential number of viewers is high (232,000 average daily traffic counts [CofA 2007a, Table 6.11-3, pg. 6.11-6]), overall viewer exposure is rated low because of low duration of view (only a few seconds) and very low visibility. Overall visual sensitivity is moderately low due to moderately low visual quality, moderately low viewer concern, and low viewer exposure.

Visual Change

Visual Resources Figure 5B is a simulation of the proposed plant from KOP 3 point. Only the upper portion of the proposed project's exhaust stacks would be visible from this KOP. The form and line of these structures are consistent with the forms and lines of existing commercial buildings and transmission towers and poles. The introduction of project structures into the view would present a minor color contrast with all the elements in the existing view. Project dominance is subordinate to existing commercial and industrial structures, and trees. View disruption and blockage would be low. Overall visual change would be low due to the minor color contrast, low dominance, and low view disruption and blockage.

Considering the low overall visual change along with the moderately low visual sensitivity of the existing landscape and viewing characteristics, the project would not cause a significant adverse visual impact from KOP 3.

Landscaping

The applicant has proposed a 20 foot tall wall of decorative masonry be installed around the perimeter of the CPP that would screen most of the plant structures, including portions of the stacks, to greatly reduce the visibility of the plant from viewers on East Miraloma Avenue (Ibid. 2007a, pg. 6.13-25). Pursuant to the city of Anaheim LORS, landscaping would be planted outside the wall along East Miraloma Avenue and the selected trees and shrubs will be drought tolerant species. Staff has reviewed the landscaping plan and believes that it is adequate (CofA 2007b). Staff is proposing

Condition of Certification **VIS-5** to ensure implementation of landscaping measures. With the implementation of staff's recommended mitigation measures, the CPP would not have a significant adverse impact on visual resources.

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?"*

Daytime light or glare would be minimized by ensuring that project structures are treated with colors and finishes that do not create excessive glare as required by Condition of Certification **VIS-4**. These measures would ensure that the project would not be a source of substantial glare that would adversely affect daytime views. **VIS-4** would also require that transmission line conductors are non-specular and non-reflective, and the insulators are non-reflective and non-refractive.

General sources of night lighting in the project area include residential street lighting, commercial and industrial buildings. Staff recommends that nighttime lighting during construction would, to the extent feasible and consistent with workers safety procedures, be directed toward the center of the construction site and shielded to prevent offsite leakage. Staff is proposing Condition of Certification **VIS-2** that would minimize potential night lighting impacts that could occur during construction.

During operation, the proposed project's night lighting would be used for safety and security. Areas that are not continuously occupied would have light switches and motion censors to turn off lights when not needed. Staff's proposed Condition of Certification **VIS-6** would require the placement of lights for direct illumination of appropriate areas and the use of shielding would ensure spill light from light sources does not occur offsite. In addition, the use of non-glare fixtures would minimize glare.

The added lighting generated by the proposed project is not expected to significantly change ambient lighting conditions as viewed from KOPs 1, 2 and 3. However, the applicant has noted that if final design analysis indicates that significant glint/glare impacts would occur, mitigation will be proposed (CofA 2007a, pg. 6.13-24). To ensure that offsite light impacts are kept to a minimum, staff proposes Condition of Certification **VIS-6** to require review and approval of a lighting plan for the project by Energy Commission staff to ensure that the CPP would not generate a substantial new source of light that could cause a significant adverse effect on nighttime views.

Impact of Cooling Tower and Combustion Exhaust Stack Plumes

The proposed CPP would use four simple-cycle LM 6000 turbines that would produce exhaust gas with exit temperatures ranging from 710F to 859F. Given these high exhaust temperatures, visible plumes would only occur at low ambient temperatures or high relative humidity. Since the CPP is a peaker facility it would normally operate during the warmer (six) months of the year. Therefore, visible plumes would not occur during normal plant operation.

The severity of the impacts created by the project's visible plumes depends on several factors, including the frequency, duration, and physical size of the plumes, the sensitivity of the viewers who will see the plumes, the distance between the plumes and the viewers, the visual quality of the existing viewshed, and whether any scenic landscape features would be blocked by the plumes.

MODELING ANALYSIS

A visible water vapor plume frequency of 20 percent of seasonal (November through April), 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 percent, plume dimensions are calculated, and a significance analysis of the plumes is included as part of the Visual Resources impact analysis.

There is the potential for visible water vapor plumes to be produced from the project’s chiller cooling tower exhaust. However, due to: 1) the plant capacity operating limitations proposed by the applicant; and 2) more importantly the limited operation of the chiller, which will not operate during low temperatures when plumes are most likely to be formed, the potential for visual plumes for the proposed Canyon project’s cooling tower will be very limited and will not occur greater than staff’s initial screening significance criteria of 20 percent of seasonal daylight clear hours. Staff also used the SACTI model to assess the cooling tower’s plume potential and has determined that if any plumes due occur, they would be very small and would not significantly impact the visual resources of the project area.

There is no potential for visible water vapor plumes to be produced from the simple cycle gas turbine exhausts. The combination of the very high exhaust temperature and relatively low exhaust water content make visible plume formation impossible under the range of ambient conditions normally experienced in Anaheim (Aspen 2008). Therefore, there is a less than significant visual impact from the visible water vapor plumes for the proposed CPP.

CUMULATIVE IMPACTS AND MITIGATION

As defined in Section 15355 of the CEQA Guidelines (California Code of Regulation, 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, though any one project in a given area may not create a significant impact to visual resources, the combination of the new project with all existing or planned projects in the area may create significant impacts. The significance of the cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) visual access to scenic resources is impaired; or (3) visual quality is diminished.

The applicant has identified several other proposed projects within a five mile radius, most of which are commercial and industrial in nature (CofA 2007a, Table 6.13-6, pg. 6.13-28). There is also a mixed use residential project and a hospital planned near SR - 91.The CPP is located within the Northeast Area Specific Plan of the city of Anaheim General Plan which allows for commercial and industrial development. Staff believes that the construction and operation of the CPP in conjunction with these other projects being built would not have a significant cumulative visual impact. City of Anaheim staff concur with this conclusion (CofA 2008).

Staff has considered the minority populations (as identified in **Socioeconomics Figure 1**) and low income populations in its cumulative impact analysis. There are no significant adverse direct or cumulative visual impacts, and therefore, no environmental justice issues.

COMPLIANCE WITH LORS

The proposed power plant and associated linear facilities would be constructed in Orange County within the jurisdiction of the city of Anaheim. Therefore, the CPP would be subject to LORS pertaining to open space and scenic corridors which are found in the Orange County General Plan. In addition, issues regarding aesthetics, scenic corridors, and green growth policies are found in three elements of the city of Anaheim's General Plan: the Community Design Element, the Circulation Element, and the Green Element. There are also applicable policies in the Anaheim General Plan/Zoning Code EIR, the Northeast Specific Plan, and the Circulation Element of the city of Placentia's General Plan.

VISUAL RESOURCES Table 2 provides a consistency review discussion of the project with applicable local LORS.

VISUAL RESOURCES Table 2
Proposed Project's Consistency with
Applicable Local LORS Specific To Visual Resources

Applicable LORS	Description
Federal	The proposed project is not located on federally administered public lands and is not subject to federal regulations pertaining to visual resources.
State	There are no officially designated State Scenic Highways or Scenic Routes within the project viewshed. There are no state regulations pertaining to scenic resources applicable to the project.
Local: Orange County General Plan-Land Use Element. Open Space Goal 1, Objective 1.1	The objective is to designate open space areas that preserve, conserve, maintain, and enhance the significant natural resources and physical features of unincorporated Orange County.
	Consistent: There are no open space areas that would be affected by the project.
Growth Management Element –Buffer Zones-Goal 7	There shall be buffer zones established through Feature Plans, Specific Plans and/or Scenic Corridor Plans which provide for the physical separation of major communities by means of open space areas/corridors. Said open space open space areas/corridors will be based upon natural features such as creaks or prominent topographic or aesthetic features.

	Consistent: No open space areas/corridors would be affected by the project.
City of Anaheim General Plan Community Design Element- Goal 1.1	Create an aesthetically pleasing and unified community appearance within the context of distinct districts and neighborhoods. Screen public and private facilities and above-ground infrastructure support structures and equipment, such as electric substations, and water wells and recharge facilities, with appropriately scaled landscaping or other methods of screening. Minimize visual impacts of public and private facilities and support structures through sensitive site design and construction. This includes, but is not limited to: appropriate placement of facilities; under-grounding where possible; and aesthetic design (e.g. cell tower stealthing).
	Consistent: The project would provide screening for most project structures by building a wall around the project area and implementing a landscaping plan along East Miraloma Avenue.
Goal 2.1	Attractively landscape and maintain Anaheim's major arterial corridors and prepare/implement distinctive streetscape improvement plans. Continue to underground overhead utility lines along the city's arterial corridors. Ensure adherence to sign regulations which address issues of scale, type, design, materials, placement, compatibility, and maintenance for uses along freeways, toll roads and major arterials.
	Consistent: The CPP would provide landscaping as noted above, would install transmission lines underground, and would comply with city sign regulations.
Goal 3.1	Single-family neighbors are attractive, safe and comfortable. Continue to maintain and improve the visual image and quality of life of single-family homes. Require new and infill development to be of compatible scale, materials, and massing as existing development. Maintain, improve and/or develop parkways with canopy street trees, providing shade, beauty and a unifying identity to residential streets.
	Consistent: The project would be of compatible scale, materials, and massing as existing development and would add canopy street trees providing shade and beauty to East Miraloma Avenue.
Circulation Element Goal 4.1	Preserve and enhance uniquely scenic or special visual resources along highways and designated state scenic routes for the enjoyment of all travelers. Continue to work with Caltrans in its implementation of the State Scenic Highway Program. Landscape arterial highways in keeping with the intent of the Scenic Corridor Overlay Zone and the Santa Ana River Greenbelt Plan, and maintain the residential character of the neighborhood by avoiding interference and intrusion into adjacent communities.
	Consistent: The project is not within the Scenic Corridor Overlay Zone and is not subject to the Santa Ana River Greenbelt Plan.
Goal 9.1	Involves strengthening the identity of industrial areas through the use of various methods such as using a complementary range of building colors and types.
	Consistent: The project is consistent with this goal which encourages strengthening the identity of industrial areas by, among other things, using a complimentary range of building colors and types
Goal 12.1	Ensure adequate parking is made available to city residents, visitors and businesses. Encourage the use of well designed, aesthetically enhanced parking structures as an alternative to large, expansive surface parking lots.

	Consistent: Project parking for both construction and operation would be onsite and would not impact city residents, visitors, and businesses.
Green Element Goal 23.2oning	Complete the city's comprehensive program of corridor landscaping, including entryways, medians, and parkways to strengthen the identity of major corridors and the city as a whole. Develop, implement and maintain a comprehensive landscape program for corridors in need of landscaping improvements. Develop guiding policies for accommodating drought-tolerant landscaping (xeriscaping) where it is considered appropriate.
	Consistent: The CPP will add landscaping to the East Miraloma Avenue corridor.
General Plan/Zoning Code EIR Chapter 5 Environmental Analysis 5.1 Aesthetics	The evaluation of aesthetic resources in the built environment and natural landscape requires the application of a process that objectively identifies the visual features of the landscape and their importance, and the sensitivity of receptors that view them.
	Consistent": The applicant has performed an objective visual analysis that includes a sensitivity analysis of receptors near the project area.
Northeast Specific Plan Landscape Plan	Based on a simple overall concept to enhance the major arterial roadway corridors (e.g. Miraloma Avenue) and the image of the Specific Plan area will be enhanced for visitors and employees alike. Project development along these corridors must comply with specific landscape standards.
	Consistent: The projects landscaping plan would comply with this policy.
Electricity	City policy requires all new electrical construction (12kv and 69kv projects) be installed underground.
	Consistent: The projects four new 69 kV lines would be installed underground

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has reviewed a letter from the city of Anaheim Planning Department that acknowledges that the treatment of structures and landscaping plans submitted by the applicant to the City Planning Department are acceptable (CofA 2009).

CONCLUSIONS

The visual analysis focused on two main issues; (1) does the construction and operation of the project cause visual impacts; and (2) would the project be in compliance with applicable local LORS.

- The project site is within the boundary of the Orange County General Plan and the city of Anaheim General Plan. In general, the visual resources components of these plans are meant to protect scenic vistas and visual features for the enjoyment of the public. There are no scenic vistas or outstanding visual features near the CPP site.
- The project site is within an area that has commercial and industrial features. The development under way in this area is consistent with existing land use features.

- There are no State or County designated scenic highway corridors in the project area, but a section of SR-91 heading east from the intersection with Santiago Boulevard is considered scenic by the city of Anaheim.
- The proposed CPP would be consistent with applicable visual policies of the Orange County General Plan Land Use-Open Space and Growth Management Elements, as well as the city of Anaheim General Plan Community Design and Green Elements, the General Plan/Zoning Code EIR Aesthetics policy, the Northeast Specific Plan Landscape Plan, and the city of Placentia General Plan Circulation Element's Traffic Management Policies.
- The proposed project would not cause significant visual impacts on a minority or low income population; and there would be no environmental justice issues pertaining to visual resources.
- With mitigation, construction and operation of the CPP would not cause any significant visual impacts to adjacent land uses, nor would the operation of the CPP contribute considerably to cumulative visual impacts.

The construction and operation of the CPP as proposed, with the effective implementation of the staff recommended conditions of certification below, would ensure that adverse visual impacts from the project are less than significant and ensure that the project complies with all applicable LORS regarding visual resources.

PROPOSED CONDITIONS OF CERTIFICATION

CONSTRUCTION SCREENING

VIS-1 The project owner shall provide construction screening using a fabric, wooden slats, or other material along the perimeter fence line. A fencing plan shall be submitted to the city of Anaheim Planning Department showing all fence locations and typical views of all types of fences proposed. This plan shall require anti-graffiti coatings on fences where applicable.

Verification: At least 60 days prior to site mobilization, the project owner shall submit a construction screening plan to the city of Anaheim Planning Department for review and comment and to the CPM for review and approval. If the CPM notifies the project owner that any revisions of the screening plan are needed, the project owner shall submit to the CPM a plan with the specified revisions within 30 days of receiving that notification.

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 direct light trespass (direct light extending outside the boundaries of the power plant site or the site of construction of ancillary facilities, including any security related boundaries);

C. Low pressure sodium vapor lighting or overhead high pressure sodium vapor lighting with shields or cutoff luminaries shall be utilized;

D. Wherever feasible, safe and not needed for security, lighting shall be kept off when not in use; and

E. Complaints concerning adverse lighting impacts will be promptly addressed and mitigated.

<u>Verification:</u> Within seven days after the first use of construction lighting, the project owner shall notify and the CPM that the lighting is ready for inspection. If the CPM requires modifications to the lighting, within 15 days of receiving that notification the project owner shall implement the necessary modifications and notify the CPM that the modifications have been completed.
Within 48 hours of receiving a lighting complaint, the project owner shall provide the CPM with a complaint resolution form report as specified in the General Conditions section including a proposal to resolve the complaint, and a schedule for implementation. The project owner shall notify the CPM within 48 hours 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.

SITE SURFACE RESTORATION

VIS-3 The project owner shall remove all evidence of the laydown area and linear facility construction activities, and shall restore the ground surface to the original condition or better condition, including the replacement of any vegetation or paving removed during construction where project development does not preclude this. The project owner shall submit to the CPM for review and approval a surface restoration plan, the proper implementation of which will satisfy these requirements.

<u>Verification:</u> At least 60 days prior to the start of commercial operation, the project owner shall submit the surface restoration plan to the city of Anaheim Planning Department for review and comment and to the CPM for review and approval. If the CPM notifies the project owner that any revisions of the surface restoration plan are needed, the project owner shall submit to the CPM a plan with the specified revisions within 30 days of receiving that notification.

The project owner shall complete surface restoration within 60 days after the start of commercial operation. The project owner shall notify the CPM within seven days after completion of surface restoration that the restoration is ready for inspection.

SURFACE TREATMENT OF PROJECT STRUCTURES AND BUILDINGS

VIS-4 The project owner shall treat the surfaces of all project structures and buildings visible to the public such that a) their color(s) minimize(s) visual intrusion and contrast by blending with the landscape; b) their colors and finishes do not create excessive glare; and c) their colors and finishes are consistent with local 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 for CPM review and approval, a specific surface treatment plan that will satisfy these requirements. 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; the 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. A specific schedule for completion of the treatment; and

E. A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the project owner receives comment from the city of Anaheim Planning Department and notification of approval of the treatment plan by the CPM. Subsequent modifications to the treatment plan are prohibited without CPM approval.

Verification: At least 90 days prior to specifying to the vendor the color(s) and finish(es) of the first structures or buildings that are surface treated during manufacture, the project owner shall submit the proposed treatment plan to the CPM for review and approval and simultaneously to the city of Anaheim Planning Department for review and comment. 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 they are ready for inspection, and shall submit one set of electronic color photographs from the same key observation points identified in (d) above.
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; and b) maintenance activities that occurred during the reporting year; and c) the schedule of maintenance activities for the next year.

LANDSCAPE SCREENING

VIS-5 The project owner shall provide landscaping that reduces the visibility of the power plant structures and complies with local policies and ordinances as noted in the city of Anaheim's General Plan Community Design and Green Elements.

The project owner shall submit to the CPM for review and approval and simultaneously to the city of Anaheim Planning Department for review and comment a landscaping plan whose proper implementation will satisfy these requirements. The plan shall include:

A. A detailed landscape, grading, and irrigation plan, at a reasonable scale. The plan shall demonstrate how the requirements stated above shall be met. The plan shall provide a detailed installation schedule demonstrating installation of as much of the landscaping as early in the construction process as is feasible in coordination with project construction.

B. A list (prepared by a qualified professional arborist familiar with local growing conditions) of proposed species, specifying installation sizes, growth rates, expected time to maturity, expected size at five years and at maturity, spacing, number, availability, and a discussion of the suitability of the plants for the site conditions and mitigation objectives, with the objective of providing the widest possible range of species from which to choose;

C. Maintenance procedures, including any needed irrigation and a plan for routine annual or semi-annual debris removal for the life of the project; and

D. A procedure for monitoring for and replacement of unsuccessful plantings for the life of the project.

The plan shall not be implemented until the project owner receives final approval from the CPM.

Verification: The landscaping plan shall be submitted to the CPM for review and approval and simultaneously to the city of Anaheim Planning Department for review and comment at least 90 days prior to installation.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM and simultaneously to the city of Anaheim Planning Department a revised plan for review and approval by the CPM.

The planting must occur during the first optimal planting season following site mobilization. The project owner shall simultaneously notify the city of Anaheim Planning Department and the CPM within seven days after completing installation of the landscaping, that the landscaping is ready for inspection.

The project owner shall report landscape maintenance activities, including replacement of dead or dying vegetation, for the previous year of operation in each Annual Compliance Report.

PERMANENT EXTERIOR LIGHTING

VIS-6 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) the plan complies with local policies and ordinances. Lighting shall be consistent with Condition of Certification **VIS-2**.

The project owner shall simultaneously submit to city of Anaheim Planning Department for review and comment and to the CPM for review and approval a lighting mitigation plan that includes the following:

A. Location and direction of light fixtures shall take the lighting mitigation requirements into account;

B. Lighting design shall consider setbacks of project features from the site boundary to aid in satisfying the lighting mitigation requirements;

C. Lighting shall incorporate commercially available fixture hoods/shielding, with light directed downward or toward the area to be illuminated;

D. Light fixtures shall not cause obtrusive spill light beyond the project boundary;

E. Low pressure sodium vapor lighting or overhead high pressure sodium vapor lighting with shields or cutoff luminaries shall be utilized;

F. All lighting shall be of minimum necessary brightness consistent with operational safety and security; and

G. 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 discuss the documentation required in the lighting mitigation plan.At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit the proposed lighting mitigation plan to city of Anaheim Planning Department for review and comment and to the CPM for review and approval.

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 completed 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 48 hours 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.

SIGNAGE

VIS-7 The project owner shall install minimal signage visible to the public, which shall a) have unobtrusive colors and finishes that prevent excessive glare; and b) be consistent with the policies and ordinances of. The design of any signs required by safety regulations shall conform to the criteria established by those regulations.

Verification: At least 45 days prior to commercial operation, the project owner shall provide a copy of the plans for the sign to the city of Anaheim Planning Department for review and comment and to the CPM for review and approval.
Within 30 days of CPM approval, the project owner shall provide the CPM with electronic color photographs of the installed signage. Prior to the start of commercial operation, the project owner shall notify the CPM and the city of Anaheim Planning Department that appropriate signage has been installed and is ready for inspection. If the CPM determines that signage requires changes, the project owner shall complete the changes within 60 days and notify the CPM that the changes have been completed.

REFERENCES

Aspen 2008. E-mail from William Walters to James Adams, California Energy Commission, on June 9, 2008.

CofA 1995. City of Anaheim's Northeast Specific Plan.

CofA 2004. City of Anaheim's General Plan.

CofA 2007a – City of Anaheim. City of Anaheim's Canyon Power Plant Application for Certification Volume I & II. Submitted to CEC/Docket Unit on 12/18/07.

CofA 2007b – City of Anaheim's Data Responses. Submitted to CEC/Docket Unit on March 7, 2008.

CofA 2008. Personal communication between Jonathan Borrego, Principal Planner, and James Adams on June 13, 2008.

CofA 2009. Letter from Jonathan Borrego, Planning Department, to Eric Solorio, California Energy Commision, dated May 29, 2009.

CofP 1978. City of Placentia's General Plan.

CofO 2005. County of Orange's General Plan.

Orange County Planning Department. General Plan. October 2005.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX VR-1: STAFF'S VISUAL RESOURCES EVALUATION METHODOLOGY

Staff evaluates the visual characteristics of the existing physical setting, the proposed project, the circumstances affecting the viewer, and the degree of visual change that a proposed project may introduce using the identified elements, and generally accepted criteria for determining substantial environmental impact significance identified below.

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.

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),

---

[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.

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 percent 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 percent 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 percent, 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 percent have been determined to generally have a less than significant impact. If the modeling predicts seasonal daylight clear plume frequencies greater than 20 percent, 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.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX VR-2

ENERGY COMMISSION STAFF - VISUAL ANALYSIS TERMS

For the purpose of this visual analysis, Energy Commission staff has defined the following visual related terms:

Duration of View - ranges from high (extended) a view of the project site that is reached across a stretched out distance, or amount of time; to, low (brief) a view of the project site that is reached in a short amount of distance or time. The range of view duration generally differs depending on the type of activity in which the viewers is engaged.

Scenic Resource - 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.

Scenic Vista - a distant view through and along a corridor or opening that exhibits a high degree of pictorial quality.

Viewer Concern - estimated level of a viewer's anticipated interest in preserving and protecting the existing physical environment. Viewer attitudes and expectations is often correlated with viewer activity type (e.g., viewers engaged in certain activities, such as recreation, are considered to have high levels of concern for scenic quality, while those engaged in other activities, such as work, are generally considered to have lower levels of concern). Residences are generally considered to have high viewer concern.

Existing landscape character may temper viewer concern on some State and locally designated scenic highways and corridors. Similarly, travelers on other highways and roads, including those in agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features. Commercial uses, including business parks, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements related to visual quality, with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, indicate a higher level of viewer concern. Industrial uses typically have the lowest viewer concern because workers are focused on their work, and generally are working in surroundings with relatively low visual value.

Viewer Exposure – visibility of a landscape feature, the number of viewers, distance, and the duration of the view are primary factors affecting viewer susceptibility to impacts.

Viewshed – an area visible to an observer from a fixed vantage point (Key Observation Point [KOP]). Staff uses a 35mm camera with a focal length of 50mm which encompasses an approximate image angle of 46^0 similar to the field-of-view of the human eye. The staff uses a viewshed that is not to be confused with a panoramic (180^0) or cycloramic (360^0). These are broad horizontal composition with no apparent limits to the view.

Visibility - the level the proposed project site is visually obstructed by natural and/or man-made surface features (development, vegetation, hills) from the Key Observation Point.

Visual Contrast - The conspicuousness or prominence of a project, and its compatibility with its setting. Contrast is described in terms of formal attributes of form, line, color, and texture of the project in comparison to those of the setting. Consider the proposed project's introduction of **form** (shape and mass), **line** (changes in edge types and interruption or introduction of edges, bands and silhouette lines), **color** (surface color, reflectivity, and glare), and **texture** (noticeable differences in the grain, or irregularity and directional patterns) to the existing physical environment to determine the degree of contrast**.** Degree of contrast: None – the element contrast is not visible or perceived; Weak – the element contrast can be seen but does not attract attention; Moderate – the element contrast begins to attract attention and begins to dominate the characteristic landscape; Strong – the element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Visual Disruption - the extent to which a previously visible scenic resource or scenic vista in the existing physical environment is blocked from view by the proposed project. The view disruption is assigned greater weight according to the quality and importance of the block view.

Visual Quality – the estimated visual impression and appeal of the existing physical environmental setting and the associated public value attributed to it. An outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as "picture postcard" landscapes. Low visual quality describes landscapes that are often dominated by visually discordant human alterations, and do not provide views that people would find inviting or interesting (Buhyoff et al., 1994).

Visual Scale - the proposed project's apparent size relationship with other components in the existing physical environment relative to the total field-of-view as viewed by the human eye, or the lens of a 35mm camera with a focal length of 50mm.

Visual Sensitivity - the overall level of sensitivity of a viewshed due to visual change is a function of visual quality, viewer concern, and viewer exposure.

VISUAL RESOURCES - FIGURE 1

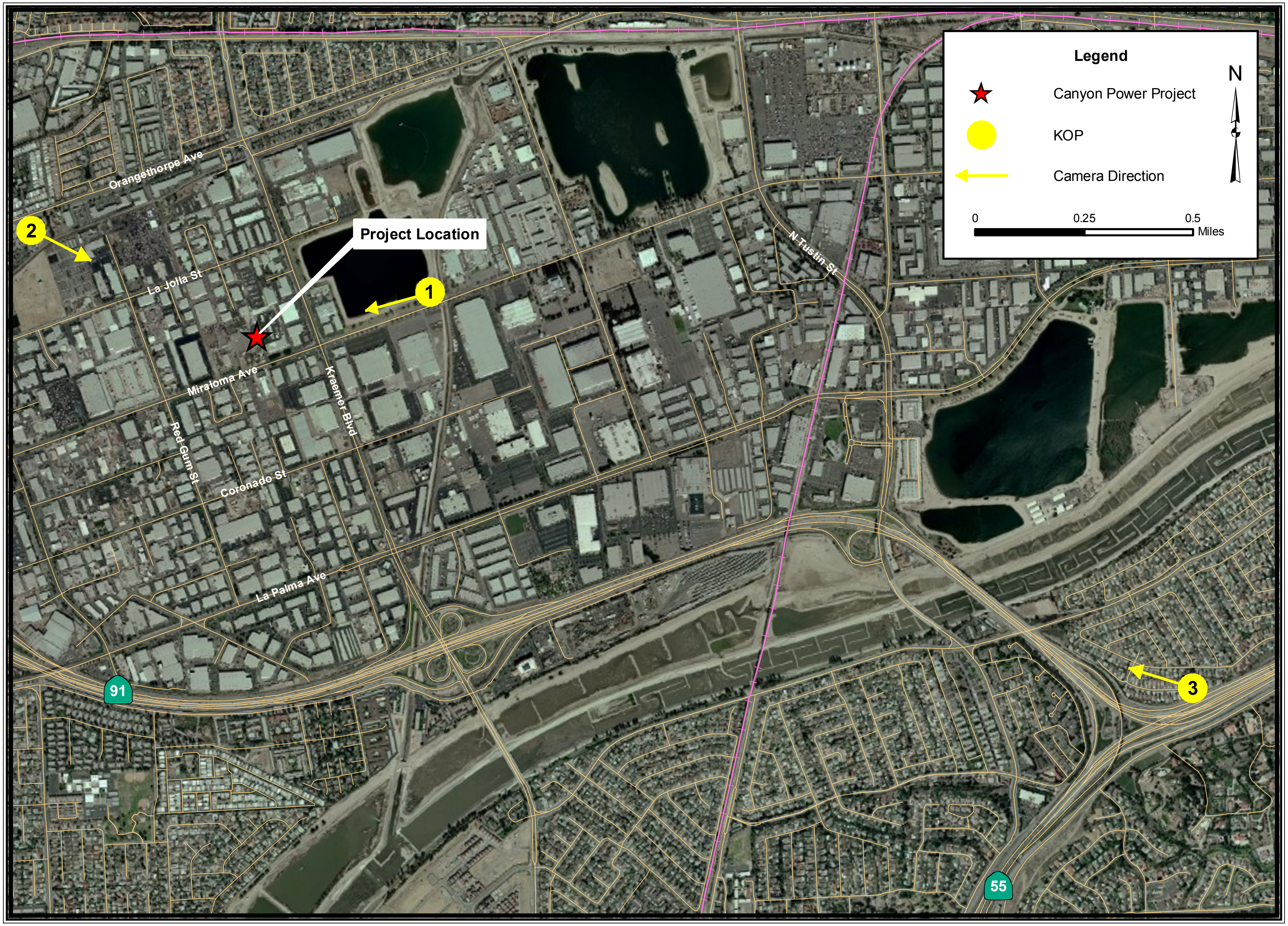
Canyon Power Project - Proposed Project Site

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: AFC Figure 1-2

VISUAL RESOURCES - FIGURE 2

Canyon Power Project - KOP Sites



CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: Digital Orthophoto Quarter Quadrangle's & California Energy Commission Statewide Power Plant Maps 2009

VISUAL RESOURCES - FIGURE 3A

Canyon Power Project - Existing View of CPP From KOP #1

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: Adapted from AFC Figure 6.13-10

VISUAL RESOURCES - FIGURE 3B

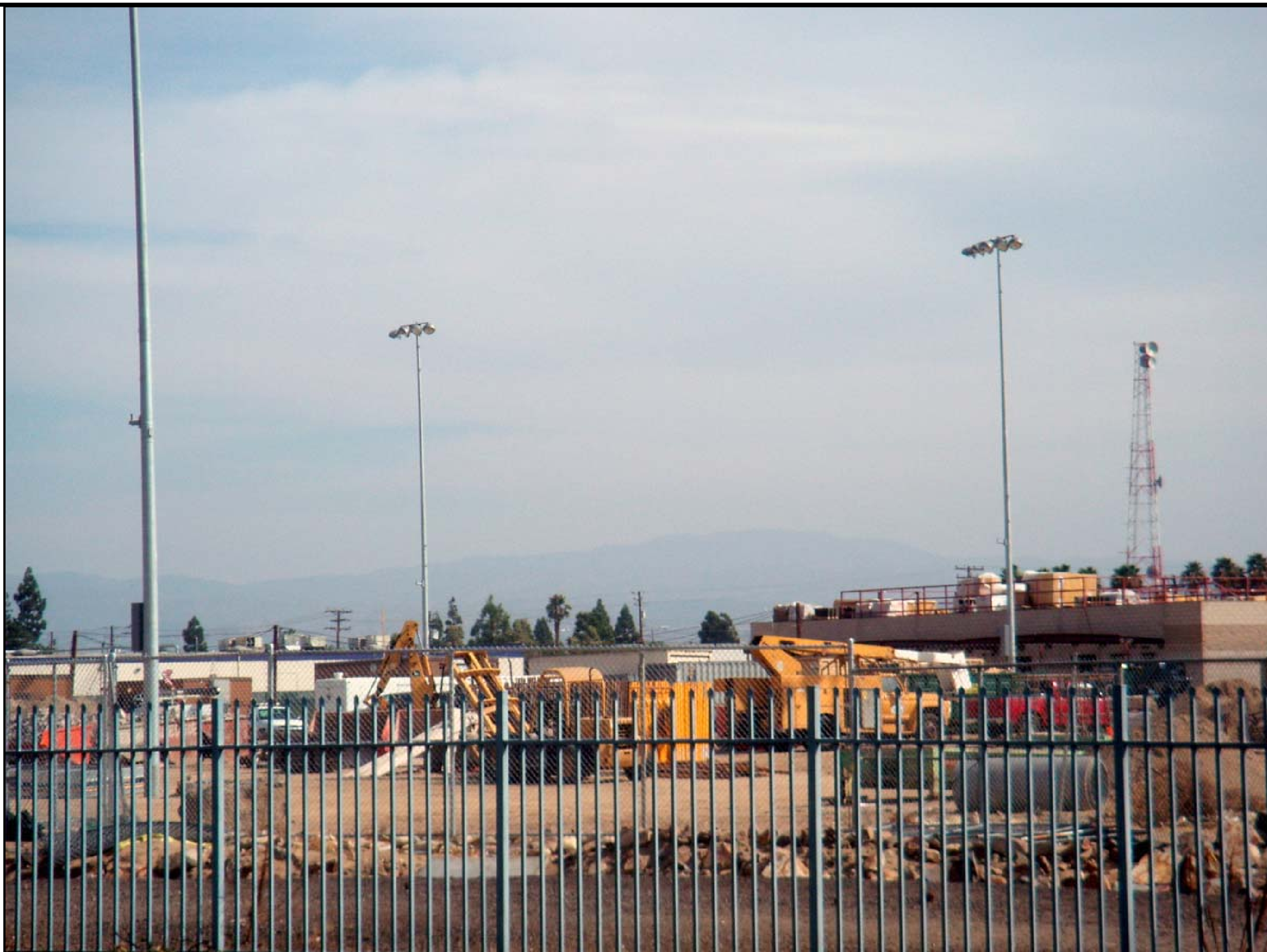
Canyon Power Project - Simulated View of CPP From KOP #1

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: Adapted from AFC Figure 6.13-11

VISUAL RESOURCES - FIGURE 4A

Canyon Power Project - Existing View of CPP From KOP #2

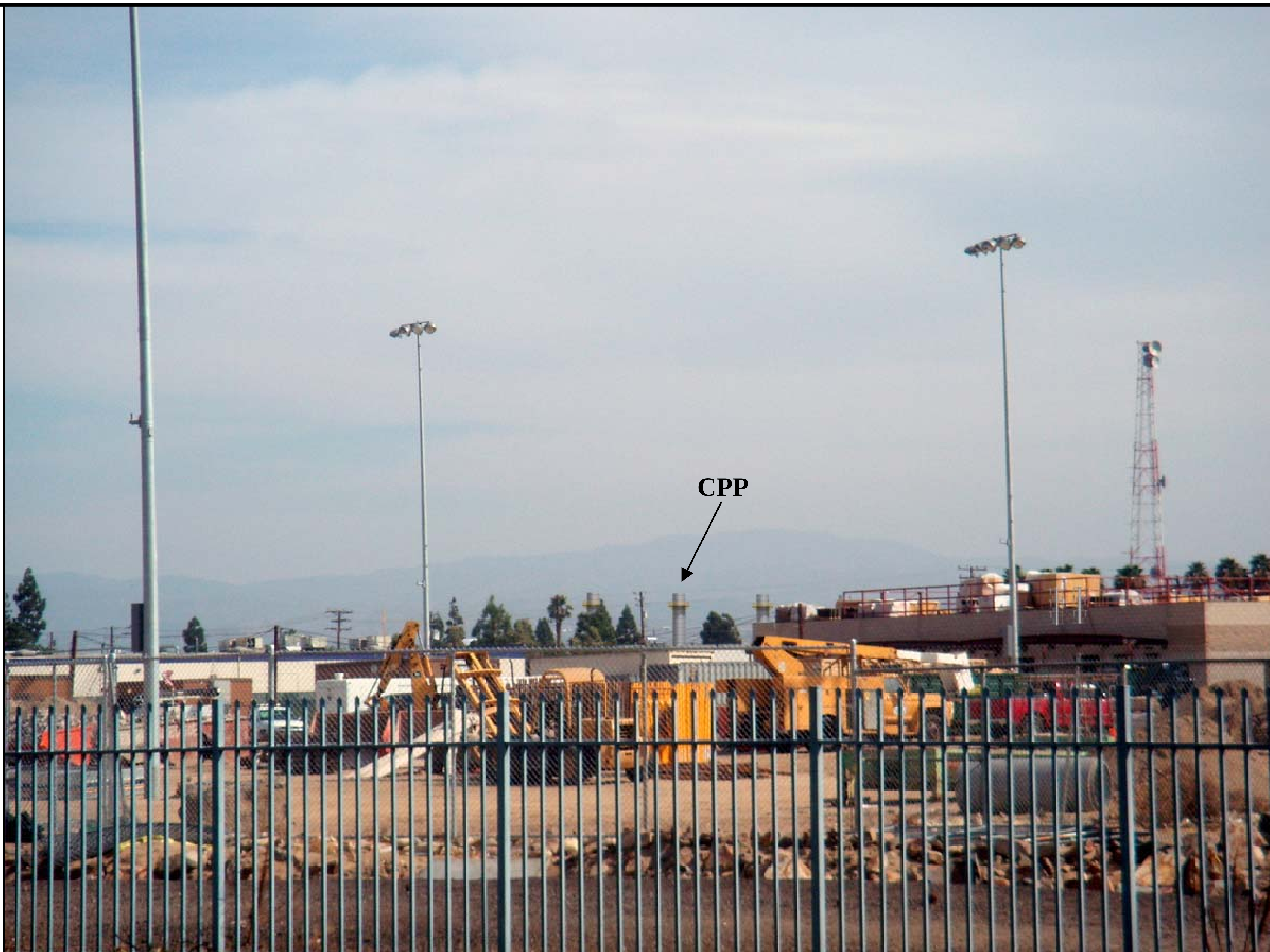


CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: Adapted from AFC Figure 6.13-12

VISUAL RESOURCES - FIGURE 4B

Canyon Power Project - Simulated View of CPP From KOP #2



CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: Adapted from AFC Figure 6.13-13

VISUAL RESOURCES - FIGURE 5A

Canyon Power Project - Existing View of CPP From KOP #3

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: Adapted from AFC Figure 6.13-14

VISUAL RESOURCES - FIGURE 5B

Canyon Power Project - Simulated View of CPP From KOP #3

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, SEPTEMBER 2009

SOURCE: Adapted from AFC Figure 6.13-15

WASTE MANAGEMENT

Testimony of Ellie Townsend-Hough

SUMMARY OF CONCLUSIONS

Management of the waste generated during construction and operation of the Canyon Power Plant would not result in any significant adverse impacts and would comply with applicable waste management laws, ordinances, regulations, and standards if the measures 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 wastes generated from the proposed construction and operation of the Canyon Power Plant (CPP). The technical scope of this analysis encompasses solid wastes existing on site and those to be generated during facility construction and operation. Management and discharge of wastewater is addressed in the **Soil and Water Resources** section of this document. Additional information related to waste management may also be covered in the **Worker Safety** and **Hazardous Materials Management** sections of this document.

The Energy Commission staff's objectives in conducting this waste management analysis are to ensure that:

- the management of project 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; and
- upon project completion, the site is managed in such a way that project wastes and waste constituents would not pose a significant risk to humans or the environment.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental laws, ordinances, regulations, and standards (LORS) have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment. Project compliance with the various LORS is a major component of staff's determination regarding the significance and acceptability of the CPP 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, §§ 6901, et seq. Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al.)	The Solid Waste Disposal Act, as amended and revised by the Resource Conservation and Recovery Act (RCRA) et al., establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation, and delegation to states, enforcement provisions, and responsibilities, as well as research, training, and grant funding provisions. RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing: • generator record keeping practices that identify quantities of hazardous wastes generated and their disposition; • waste labeling practices and use of appropriate containers; • use of a manifest when transporting wastes; • submission of periodic reports to the United States Environmental Protection Agency (U.S. EPA) or other authorized agency; and • corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills. RCRA is administered at the federal level by U.S. EPA and its 10 regional offices. The Pacific Southwest regional office (Region 9) implements U.S. EPA programs in California, Nevada, Arizona, and Hawaii.
Title 42, United States Code, §§ 9601, et seq. Comprehensive Environmental Response, Compensation and Liability Act	The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as Superfund, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses: • reporting requirements for releases of hazardous substances; • requirements for remedial action at closed or abandoned hazardous waste sites and brownfields; • liability of persons responsible for releases of hazardous substances or waste; and • requirements for property owners/potential buyers to conduct “all appropriate inquiries” into previous ownership and uses of the property to 1) determine if hazardous substances have been or may have been released at the site and 2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA “all appropriate inquiries” requirements.
Title 40, Code of Federal Regulations (CFR), Subchapter I –	These regulations were established by U.S. EPA to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic

Solid Wastes	criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes. • Part 246 addresses source separation for materials recovery guidelines. • Part 257 addresses the criteria for classification of solid waste disposal facilities and practices. • Part 258 addresses the criteria for municipal solid waste landfills. • Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps). U.S. EPA implements the regulations at the federal level. However, California is an authorized state so the regulations are implemented by state agencies and authorized local agencies in lieu of U.S. EPA.
Title 49, CFR, Parts 172 and 173 Hazardous Materials Regulations	U.S. Department of Transportation established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, section 262.20.
State	
California Health and Safety Code, Chapter 6.5, §§ 25100, et seq. Hazardous Waste Control Act of 1972, as amended	This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements. The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) administers and implements the provisions of the law at the state level. Certified Unified Program Agencies (CUPAs) implement some elements of the law at the local level.
Title 22, California Code of Regulations (CCR), Division 4.5 Environmental Health Standards for the Management of Hazardous Waste	These regulations establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and federal RCRA. As with the federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes. Hazardous waste generators must obtain identification numbers, prepare manifests before transporting the waste off site, and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters. The standards addressed by Title 22, CFR include: • Identification and Listing of Hazardous Waste (Chapter 11, §§ 66261.1, et seq.) • Standards Applicable to Generators of Hazardous Waste (Chapter 12,

	§§ 66262.10, et seq.) • Standards Applicable to Transporters of Hazardous Waste (Chapter 13, §§ 66263.10, et seq.) • Standards for Universal Waste Management (Chapter 23, §§ 66273.1, et seq.) • Standards for the Management of Used Oil (Chapter 29, §§ 66279.1, et seq.) • Requirements for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, §§ 67450.1, et seq.) The Title 22 regulations are established and enforced at the state level by DTSC. Some generator standards are also enforced at the local level by CUPAs.
California Health and Safety Code, Chapter 6.11 §§ 25404–25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)	The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below. • Aboveground Storage Tank Program • Business Plan Program • California Accidental Release Prevention (CalARP) Program • Hazardous Material Management Plan / Hazardous Material Inventory Statement Program • Hazardous Waste Generator / Tiered Permitting Program • Underground Storage Tank Program The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as Certified Unified Program Agencies (CUPAs). City of Anaheim's Fire Department is the area CUPA. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program. Other elements of the Unified Program may be addressed in the **Hazardous Materials** and/or **Worker Health and Safety** analysis sections.
Title 27, CCR, Division 1, Subdivision 4, Chapter 1, §§ 15100, et seq. Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses. • Article 9 – Unified Program Standardized Forms and Formats (§§ 15400–15410). • Article 10 – Business Reporting to CUPAs (§§ 15600–15620).
Public Resources Code, Division 30, §§ 40000, et seq. California	The California Integrated Waste Management Act of 1989 (as amended) establishes mandates and standards for management of solid waste. Among other things, the law includes provisions addressing solid waste source reduction and recycling, standards for design and construction of municipal landfills, and programs for county waste management plans

Integrated Waste Management Act of 1989.	and local implementation of solid waste requirements.
Title 14, CCR, Division 7, § 17200, et seq. California Integrated Waste Management Board	These regulations further implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions. • Chapter 3 – Minimum Standards for Solid Waste Handling and Disposal. • Chapter 3.5 – Standards for Handling and Disposal of Asbestos Containing Waste. • Chapter 7 – Special Waste Standards. • Chapter 8 – Used Oil Recycling Program. • Chapter 8.2 – Electronic Waste Recovery and Recycling.
California Health and Safety Code, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq. Hazardous Waste Source Reduction and Management Review Act of 1989 (also known as SB 14).	This law was enacted to expand the state's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (~ 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a 4-year cycle, with a summary progress report due to DTSC every 4^{th} year.
Title 22, CCR, § 67100.1 et seq. Hazardous Waste Source Reduction and Management Review.	These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the act.
CCR, Title 23, Chapter 16	This regulation clarifies the procedures for underground storage tank removal.
California Health & Safety Code Sections 101480-101490	These regulations authorize local agencies, such as the Orange County Health Care Agency (OCHCA) Environmental Health Division, to enter into voluntary agreements for the oversight of remedial action at sites contaminated by wastes.
Title 8 California Code of Regulations §1529 and §5208	These regulations require the proper removal of asbestos containing materials in all construction work and are enforced by California Occupational Safety and Health Administration (Cal-OSHA).
Local	
Anaheim Fire Department, Hazardous Material Section	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 tanks (UST) cleanup. Regulates hazardous waste handling and storage. Implemented by the Anaheim Fire Department Hazardous Materials Section.

South Coast Air Quality Management District Rule 1403	The purpose of this rule is to specify work practice requirements to limit asbestos emissions from building demolition and renovation activities, including the removal and associated disturbance of asbestos-containing materials.

SETTING

The proposed CPP is a 200-megawatt (MW) natural gas-fired, simple cycle generating facility (CofA 2007a p. 6.14-1). The project will consist of four natural gas-fired General Electric LM 6000PC sprint combustion turbines and associated support equipment.

The proposed project would sit on a 9.3-acre property. The property consists of three parcels, addressed 3051, 3053, 3055, 3065 and 3071 East Miraloma Avenue in the city of Anaheim, County of Orange, California (CofA 2007a, Appendix M). The site was previously used as a food catering facility for a fleet of approximately 75 to 100 trucks, operated by Orange County Food Service. The addresses of 3053 and 3055 correspond to residential structures on the southern portion of the property that were demolished and disposed of prior to submittal of the AFC. A number of facilities remain on site such as ice houses, a truck wash, underground storage tanks and an automotive shop. **Waste Figure 1** displays the abandoned facilities and chemical storage currently on site (AMEC 2007c).

Operation and maintenance of the plant and associated facilities would generate a variety of wastes, including hazardous wastes. To control air emissions, the project's turbine units would use selective catalytic reduction and oxidation catalyst equipment and chemicals, which generate both solid and hazardous waste.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This waste management analysis addresses: a) existing project site conditions and the potential for contamination associated with prior activities on or near the project site, and b) the impacts from the generation and management of wastes during project construction and operation.

A. For any site in California proposed for the construction of a power plant, the applicant must provide documentation about the nature of any potential or existing releases of hazardous substances or contamination at the site. If potential or existing releases or contamination at the site are identified, the significance of the release or contamination would be determined by site-specific factors, including, but not limited to: the amount and concentration of contaminants or contamination; the proposed use of the area where the contaminants/contamination is found; and any potential pathways for workers, the public, or sensitive species or environmental areas to be exposed to the contaminants (Siting Regulations Appendix B (g)(12)(A)). Any unmitigated contamination or releases of hazardous substances that pose a risk to human health or environmental receptors would be considered significant by Energy Commission staff.

As a first step in documenting existing site conditions, the Energy Commission's power plant site certification regulations require that a Phase I Environmental Site Assessment (ESA) be prepared[1] and submitted as part of an AFC. The Phase I ESA is conducted to identify any conditions indicative of releases and threatened releases of hazardous substances at the site and to identify any areas known to be contaminated (or a source of contamination) at or near the site.

In general, the Phase I ESA uses a qualified environmental professional to conduct inquiries into past uses and ownership of the property, research hazardous substance releases and hazardous waste disposal at the site and within a certain distance of the site, and visually inspect the property, making observations about the potential for contamination and possible areas of concern. After conducting all necessary file reviews, interviews, and site observations, the environmental professional then provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the environmental professional may also give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were significant gaps in the information available about the site, an ongoing release is suspected, or to confirm an existing environmental condition.

If additional investigation is needed to identify the extent of possible contamination, a Phase II ESA may be required. The Phase II ESA usually includes sampling and testing of potentially contaminated media to verify the level of contamination and the potential for remediation at the site.

In conducting its assessment of a proposed project, Energy Commission staff will review the project's Phase I ESA and work with the appropriate oversight agencies as necessary to determine if additional site characterization work is needed and if any mitigation is necessary at the site to ensure protection of human health and the environment from any hazardous substance releases or contamination identified.

B. Regarding the management of project-related wastes generated during construction and operation of the proposed project, staff reviewed the applicant's proposed solid and hazardous waste management methods and determined if the methods proposed are consistent with the LORS identified for waste disposal and recycling. The federal, state, and local LORS represent a comprehensive regulatory system designed to protect human health and the environment from impacts associated with management of both non-hazardous and hazardous wastes. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management.

   Staff then reviewed the capacity available at off-site treatment and disposal sites and determines whether or not the proposed power plant's waste would have a significant impact on the volume of waste a facility is permitted to accept.

[1] Title 20, California Code of Regulations, section 1704(c) and Appendix B, section (g)(12)(A). Note that the Phase I ESA must be prepared according to American Society for Testing and Materials protocol or an equivalent method agreed upon by the applicant and the Energy Commission staff.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Site Conditions

A Phase I ESA dated November 20, 2006, was prepared by AMEC for the 9.3 acre property consisting of three parcels. The ESA was completed in accordance with the American Society for Testing and Materials Standard Practice E 1527-05 for ESAs. The Phase I ESA is included as Appendix M of the project's AFC.

Volume I of the Phase I ESA identified numerous Recognized Environmental Conditions (REC). As a result of these findings, three Phase II ESAs, dated December 1, 2006, May 4, 2007, and November 14, 2007, was conducted to further evaluate the nature and extent of potential contamination due to REC's. A recognized environmental condition is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicated an existing release, past release, or a material threat of a release of any hazardous substance or petroleum products into structures on the property or in the ground, groundwater, or surface water of the property.

Some of the RECs include but are not limited to: presence of a 500-gallon waste oil underground storage tank (UST), a 500-gallon UST containing waste food, multiple leaking chemical storage containers, four subsurface clarifiers, active truck maintenance operations, and staining on asphalt pavement, soil, and concrete throughout the potential project site (AMEC 2007a).

The May 4, 2007 Phase II ESA indicated soil gas at the site contained tetrachloroethylene (PCE) at concentrations greater than the 180 micrograms per meter cubed (µg/m$^{3)}$ California Human Health Screening Level (CHHSLs) for residential land use. It also indicates that since there will be total petroleum hydrocarbon (TPH) remediation at the site, most of the PCE will be excavated. In one area where the PCE is 600 µg/m^3, which is below the maximum contamination level for commercial land use of 603 µg/m^3, the Phase II ESA suggests the area not be excavated because a concrete slab is covering the soil and there will not be any construction activity in that location. The May 4 and November 14, 2007 Phase II Assessments indicate that groundwater beneath the project site is impacted with TPH at concentrations exceeding levels protective of groundwater. The assessments also show shallow soil within the residential properties exceed the soluble threshold limit concentrations (STLC) for lead of 5 milligrams per liter (mg/L). Soluble lead analysis (STLC) performed on the soil samples showed some samples had total lead concentrations exceeding 7.17 mg/L (URS 2007 page 4-5). At those concentrations for lead the soil may be classified as hazardous waste for disposal purposes.

Prior to project site development the site must be remediated and underground structures such as USTs, clarifiers, and hydraulic hoists must be removed and disposed of properly. The Preliminary Staff Assessment discussed and included a condition of certification requiring the abandonment of septic tanks associated with the residential housing that was previously located on the proposed project site. The applicant subsequently provided additional information showing the septic tanks associated with the residential structures were abandoned by the city of Anaheim in accordance with appropriate city requirements. (GB 2009g). Staff has therefore removed the condition requiring abandonment of these structures.

The AFC indicates the applicant will develop a soil management plan designed to remediate soil impacted with metals, semi-volatile organic compounds (SVOC) and total petroleum hydrocarbon (all carbon chains) (TPH-cc) at concentrations above preliminary screening levels to protect human health and the environment (CofA 2007a page 6.14-3). The applicant will also develop a post-excavation confirmation sampling plan to ensure the proper removal of impacted soil (URS 2007a page 5-1). There is a possibility that the groundwater at the proposed project site may be contaminated (OCHCA 2008a). As indicated in the Soil and Water section of this PSA, the project owner is not expected to encounter groundwater during construction or operation and that there would be no impacts to groundwater. In addition, Staff believes that implementation of a Soil Management Plan would mitigate potential impacts to groundwater resources due to project construction and operation.

Sections 101480 through 101490 of the California Health and Safety Code provide that a party responsible for remediation of a contaminated site may request regulatory oversight by a local agency that has assumed enforcement authority, to supervise a site investigation and any remediation necessary to mitigate the site (G&B 2008d Data Request 52& 53). The OCHCA is the local agency responsible for the program that oversees the voluntary cleanup of contaminated property. Oversight activities include review of required site assessment and remediation work plans, review of required sampling operations, analysis of sampling data and establishment of site cleanup criteria.

The city of Anaheim requested that OCHCA supervise the Corrective Action Plan for the proposed project site. OCHCA has agreed to provide oversight of the project in a letter dated June 20, 2008 (OCHCA 2008a). After the site has been remediated in accordance with the approved corrective action plan, OCHCA will issue a closure letter demonstrating satisfactory completion of site assessment and necessary soil remediation. Staff proposed Condition of Certification **WASTE-1** requiring that any remedial work must be conducted under the oversight of OCHCA, with Energy Commission Compliance Project Manager (CPM) involvement.

During site remediation removal of USTs will be required. Prior to the start of the UST removal activities, the applicant must obtain a permit from the Anaheim Fire Department. Staff proposes Condition of Certification **WASTE-2** to ensure proper permitting and removal of the USTs.

Furthermore, staff recommends proposed Conditions of Certification **WASTE-3** and **WASTE-4** be adopted to address any soil contamination contingency that may be encountered during remediation and construction. **WASTE-3** would require that an experienced and qualified Professional Engineer or Professional Geologist be available for consultation in the event contaminated soil is encountered. If contaminated soil is identified, **WASTE-4** would require that the Professional Engineer or Professional Geologist inspect the site, determine what is required to characterize the nature and extent of contamination, and provide a report to the CPM and OCHCA with findings and recommended actions. Staff believes this would be adequate to address identification and investigation of any previous unknown soil contamination that may be encountered.

Demolition and Construction Impacts and Mitigation

Site preparation, demolition, and construction of the proposed power plant and associated facilities would last approximately 12 months and generate both nonhazardous and hazardous wastes in solid and liquid forms. Before construction can begin, the project owner would be required to develop and implement a Demolition and Construction Waste Management Plan, per proposed Condition of Certification **WASTE-5**.

Non-Hazardous Wastes

During demolition, the applicant will generate 50 tons of non-recyclable waste and 3,000 tons of reusable nonhazardous waste (G&B 2008d Data Response 55). Metal debris from welding/cutting activities, packing materials, electrical wiring, and empty non-hazardous chemical containers would be generated during construction. Approximately 13 tons of waste metal and 34 tons of excess concrete are anticipated to be generated during construction. Non-hazardous solid wastes generated during construction would include approximately 10 tons of scrap wood, concrete, steel/metal, paper, glass, and plastic waste (CofA 2007a Section 6.14.2.1.1). All non-hazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed in a solid waste disposal facility, in accordance with Title 14, California Code of Regulations, section 17200 et seq.

Non-hazardous liquid wastes would also be generated during construction, including sanitary wastes, dust suppression drainage, and equipment wash water. 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. Please see the **Soil and Water Resources** section of this document for more information on the management of project wastewater.

Hazardous Wastes

Certain building material wastes are banned from disposal in California Class III landfills. Treated wood, paint and coatings, plumbing and pipes, fluorescent lamps, batteries, thermostats and switches may contain asbestos, arsenic, lead, mercury or polychlorinated biphenyls (PCBs), lights, batteries, thermostats, electrical switches and solvent-based and lead-based paints are wastes banned from California trash. Asbestos is included in various types of older building material including cement, roofing, flooring, insulating or fire-proofing materials.

During demolition of the existing buildings, approximately 12,330 square feet of asbestos tiles will be collected and disposed of in a Class I landfill (G&B 2008d Data Response 55). SCAQMD Rule 1403 specifies work practice requirements to limit asbestos emissions from building demolition and renovation activities, including the removal and associated disturbance of asbestos containing materials. The SCAQMD requires that project owners complete and submit an Asbestos Demolition Notification form to the District. The form requires an asbestos survey, notification, asbestos containing material removal procedures, time schedules, asbestos containing handling and cleanup procedures, and storage, disposal and landfill requirements (www.aqmd/comply/asbestos/asbestosNotifInstrctions.html). **WASTE-6** requires that the project owner submit the South Coast Air Quality Management District's (SCAQMD) Asbestos Notification Form for review and approval prior to removal and disposal of asbestos. All friable asbestos (Class I) collected during demolition activities would be disposed of as hazardous waste. Asbestos collected during demolition activities would be disposed of at the Class I landfill located in the city of Azusa, California (G&B 2008d data response 55).

Hazardous wastes anticipated to be generated during construction include welding materials, paint, flushing and cleaning fluids, batteries, and solvents. The amount of waste generated would be minor if handled in the manner identified in the AFC (CofA 2007a § 6.14.2.1.2).

The project owner would be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction, pursuant to proposed Condition of Certification **WASTE-7**. Although the hazardous waste generator number is determined based on site location, both the construction contractor and the project owner/operator could be considered the generator of hazardous wastes at the site. Wastes would be accumulated on site for less than 90 days and then properly manifested, transported, and disposed at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Staff reviewed the disposal methods described in AFC section 6.14.2 and concluded that all wastes would be disposed of 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-8** to notify the Energy Commission's Compliance Project Manager (CPM) whenever the owner becomes aware of any such action.

In the event that construction excavation, grading, or trenching activities for the proposed project encounter potentially contaminated soils and/or specific handling, disposal, and other precautions that may be necessary pursuant to hazardous waste management LORS, staff finds that proposed Conditions of Certification **WASTE-3** and **WASTE-4** would be adequate to address any soil contamination contingency that may be encountered during construction of the project and would ensure compliance with LORS. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management activities.

Operation Impacts and Mitigation

The proposed CPP would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. Table 6.14-3 of the project AFC gives a summary of the operation waste streams, expected waste volumes and generation frequency, and management methods proposed. Before operations can begin, the project owner would be required to develop and implement an Operation Waste Management Plan pursuant to proposed Condition of Certification **WASTE-9**.

Non-Hazardous Solid Wastes

The generation of non-hazardous solid wastes expected during project operation include routine maintenance wastes (such as used air filters, spent deionization resins, sand and filter media) as well as domestic and office wastes (such as office paper, newsprint, aluminum cans, plastic, and glass). All wastes will be recycled to the extent possible, and non-recyclable wastes will be regularly transported off site to a local solid waste disposal facility (CofA 2007a, § 6.14.2.2.1).

Two hundred pounds per year of cooling tower basin sludge would be generated during operation. The sludge would be disposed of in a Class II landfill if testing shows it is nonhazardous. If testing shows the sludge is hazardous then disposal in a Class I landfill would be required. To ensure proper disposal of sludge, staff proposes **WASTE-10** which requires that the project owner perform the appropriate tests to classify the waste and determine the appropriate method of disposal.

Non-Hazardous Liquid Wastes

Non-hazardous liquid wastes would be generated during facility operation and are discussed in the **Soil and Water Resources** section of this document.

Hazardous Wastes

The project owner/operator would be considered the generator of hazardous wastes at the site during facility operations. Therefore, the project owner's unique hazardous waste generator identification number, obtained prior to construction in accordance with proposed Condition of Certification **WASTE-7** would be retained and used for hazardous waste generated during facility operation.

One thousand pounds, combined, spent Selective Catalytic Reduction (SCR) units and carbon monoxide units would be recycled every three to five years. The generation of hazardous wastes expected during routine project operation includes more than 600 pounds per year of used hydraulic fluids, oils, greases, oily filters and rags, spent SCR catalysts, cleaning solutions and solvents, and batteries. In addition, spills and unauthorized releases of hazardous materials or hazardous wastes may generate contaminated soils or materials that may require corrective action and management as hazardous waste. Proper hazardous material handling and good housekeeping practices would help keep spill wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, staff proposes Condition of Certification **WASTE-11** requiring the project owner/operator to report, clean up, and remediate as necessary, any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. More information on hazardous material management, spill reporting, containment, and spill control and countermeasures plan provisions for the project are provided in the **Hazardous Material Management** section of the PSA.

The amount of hazardous wastes generated during the operation of CPP would be minor, with source reduction and recycling of wastes implemented whenever possible. The hazardous wastes would be temporarily stored on site, transported off site by licensed hazardous waste haulers, and recycled or disposed at authorized disposal facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, CCR, §§ 66262.10 et seq.). 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-11** to notify the CPM whenever the owner becomes aware of any such action.

Impact on Existing Waste Disposal Facilities

Non-Hazardous Solid Wastes

During construction solid waste would be generated and recycled or disposed in a Class III landfill (CofA 2007a, § 6.14.1). The non-hazardous solid wastes generated yearly at CPP would also be recycled, if possible, or disposed in a Class III landfill.

Table 6.14-1 of the project AFC identifies two non-hazardous (Class III) waste disposal facilities that could potentially take the non-hazardous construction and operation wastes generated by the CPP. These Class III landfills are all located in Southern California in Orange County. The remaining capacity for the three landfills combined is over 56 million cubic yards (CofA 2007a Table 6.14-1). The total amount of non-hazardous waste generated from project construction and operation would contribute less than 1 percent of the available landfill capacity. Staff finds that disposal of the solid wastes generated by the CPP can occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

Section 6.14.1 of the AFC discusses the three Class I landfills in California: the Buttonwillow landfill in Kern County and the Kettleman Hills Landfill in King’s County. The Kettleman Hills facility also accepts Class II and Class III wastes. Kettleman Hills and Buttonwillow landfills have a combined excess of 10 million cubic yards of remaining hazardous waste disposal capacity, with up to 33 years of remaining operating life (CofA 2007a, §6.14.1,4).

Hazardous wastes generated during construction and operation would be recycled to the extent possible and practical. Those wastes that cannot be recycled will be transported off site to a permitted treatment, storage, or disposal facility. The volume of hazardous waste from the CPP requiring off-site disposal would be minor and would therefore not significantly impact the capacity or remaining life of the Class I waste facilities.

CUMULATIVE IMPACTS AND MITIGATION

The CEQA Guidelines (Section 15355) define cumulative impacts as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” There are multiple projects within a five-mile radius of the CPP that may cause a cumulative effect. Some of the projects proposed are the Orange County Anaheim Medical Center, a mixed-use residential project and industrial park, two commercial industrial buildings, and a middle school (CofA 2007a, §6.18).Each of the proposed projects will generate both nonhazardous and hazardous wastes in solid and liquid forms. Exact quantities of the waste generated from these projects are not available.

As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the CPP would add to the total quantity of waste generated in the State of California. However, project wastes would be generated in modest quantities, approximately 4,000 tons of solid waste during construction, and 2,000 pounds of hazardous waste every three to five years from operations (G&B 2008d Data Response 54). Waste recycling would be employed wherever practical, and sufficient capacity is available at several treatment and disposal facilities to handle the volumes of wastes that would be generated by the project. In 2006, 4,877,255 tons of solid waste was landfilled in Orange County (http://www.ciwmb.ca.gov/Landfills/Tonnages/Default.aspx). CPP's contribution would be less than one percent of the county's waste generation. Therefore, staff concludes that the waste generated by the CPP is so minimal compared to the amount of waste disposed of in Orange County that this project would not result in significant cumulative waste management impacts.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed CPP would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. The applicant is required to recycle and/or dispose hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during both project construction and operation, the CPP would be required to obtain a hazardous waste generator identification number from U.S. EPA. The CPP would also be required to properly store, package, and label all hazardous waste; use only approved transporters; prepare hazardous waste manifests; keep detailed records; and appropriately train employees, in accordance with state and federal hazardous waste management requirements.

In the **Socioeconomics** section of this staff assessment, staff presents census 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.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The California Department of Toxic Substances Control (DTSC), the City of Anaheim Fire Department, and the County of Orange Health Care Agency Public Health Services Environmental Health Department (OCHCA) have all received a copy of the AFC and notices regarding CPP. OCHCA has agreed to supervise the remedial action of the proposed project site in a June 20, 2008 letter addressed to the city of Anaheim (OCHCA 2008a). The city of Anaheim Fire Department would be responsible for overseeing the removal and cleanup of the underground storage tanks on site pursuant to Title 23, Division 3, Chapters 16 and 18 of the California Code of Regulations, as it relates to the hazardous material storage and petroleum underground storage tank cleanup.

Staff received comments from the DTSC (DofT 2009a). DTSC provided staff with a memorandum outlining eleven steps that would be necessary for safe construction and operation of CPP (DofT 2009a). In the memorandum DTSC commented that CPP should be required to supply documentation on the information that would normally be included in a Phase I and Phase II ESA (DofT 2009a). The applicant provided staff with two Phase I's and a Phase II ESA. Staff believes these submittals address DTSC's comments.

CONCLUSIONS

Staff concludes that management of the waste generated during construction and operation of the CPP would not result in any significant adverse impacts and would comply with applicable LORS, if the waste management practices and mitigation measures proposed in the CPP AFC and staff's proposed conditions of certification are implemented.

Staff has proposed Conditions of Certification **WASTE-1** through **11** (below) requiring that:

- no CPP project construction shall occur until the CPP project site is remediated as necessary in accordance with the OCHCA's requirements;
- the project owner must obtain a permit from the Anaheim Fire Department to remove USTs;
- if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the professional engineer or professional geologist shall inspect the site, determine the need for sampling, file a written report, and seek guidance from the CPM and the appropriate regulatory agencies;
- the project owner shall prepare and submit a construction waste management plan for all wastes generated during construction of the facility and submit the plan to the CPM;
- a copy of the SCAQMD Asbestos Demolition Notification Form be submitted to the CPM;
- the project owner shall prepare and submit an operation waste management plan for all wastes generated during operation of the facility and submit the plan to the CPM;
- cooling tower sludge shall be tested and disposed of in accordance with Title 22;
- the project owner shall obtain a unique hazardous waste generator identification number in accordance with federal and state hazardous waste management requirements;

- the project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous wastes are reported, cleaned up, and remediated as necessary, in accordance with all applicable federal, state, and local requirements; and
- the project owner shall notify the CPM whenever the owner becomes aware of any impending waste management-related enforcement action.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall ensure that the Canyon Power Plant project site is properly characterized and remediated as necessary pursuant to the Corrective Action Plan reviewed and signed by the Orange County Health Care Agency Environmental Health Division (OCHCA). In no event shall project construction commence in areas requiring characterization and remediation until OCHCA has determined that all necessary remediation has been accomplished.

Verification: The project owner shall submit to the CPM copies of all pertinent correspondence, work plans, agreements, and authorizations between Canyon Power Plant and OCHCA regarding the Corrective Action Plan requirements and activities at the Canyon Power Plant project site. CPM shall review and comment on the Corrective Action Plan. At least 60 days prior to the start of site mobilization, the project owner shall provide to the CPM written notice from OCHCA that the CPP site has been investigated and remediated as necessary for compliance with the Corrective Action Plan.

WASTE-2 Prior to removal of the underground storage tanks (USTs), the project owner shall obtain a permit from the Anaheim Fire Department. The CPM and the Public Works and Planning Departments must acknowledge review of the plans for the project prior to permit issuance. After receiving approval from the CPM, the project owner shall obtain a permit for removal of all USTs.

Verification: No less than sixty (60) days prior to commencement of site mobilization, the project owner shall provide the plans to remove the underground storage tanks to the CPM for review and approval. The project owner shall inform the CPM via the monthly compliance report, of the data when all USTs were removed from the site.

WASTE-3 The project owner shall provide the resume of an experienced and qualified professional engineer or professional geologist, who shall be available for consultation during site characterization, demolition, excavation, and grading activities, to the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The professional engineer or professional 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-4 If potentially contaminated soil is identified during site characterization, demolition, excavation, or grading at either the proposed site or linear facilities, as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the professional engineer or professional geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and provide a written report to the project owner, OCHCA, and the CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the professional engineer or professional 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 professional engineer or professional geologist, significant remediation may be required, the project owner shall contact the CPM and representatives of the OCHCA for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the professional engineer or professional 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-5 The project owner shall prepare a Demolition and Construction Waste Management Plan for all wastes generated during demolition and construction of the facility and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

A. a description of all construction waste streams, including projections of frequency, amounts generated, and hazard classifications;

B. a survey of structures to be demolished that identifies the types of waste to be managed; and

C. management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to ensure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans.

Verification: The project owner shall submit the Construction Waste Management Plan to the CPM for approval no less than 30 days prior to the initiation of construction activities at the site.

WASTE-6 Prior to demolition of existing structures, the project owner shall complete and submit a copy of a SCAQMD Asbestos Demolition Notification Form to the CPM and the SCAQMD for approval. After receiving approval, the project owner shall remove all Asbestos Containing Material (ACM) from the site prior to demolition.

Verification: No less than sixty (60) days prior to commencement of structure demolition, the project owner shall provide the Asbestos Demolition Notification Form to the CPM for review and approval. The project owner shall inform the CPM via the monthly compliance report, of the data when all ACM is removed from the site.

WASTE-7 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency prior to generating any hazardous waste during construction and operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide the number to the CPM in the next Monthly Compliance Report.

WASTE-8 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 way project-related wastes are managed.

WASTE-9 The project owner shall prepare an Operation Waste Management Plan for all wastes generated during operation of the facility and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

A. a detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;

B. management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to ensure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;

C. information and summary records of conversations with the local Certified Unified Program Agency and the Department of Toxic Substances Control regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations shall be included in the plan and updated as necessary;

D. a detailed description of how facility wastes will be managed and any contingency plans to be employed, in the event of an unplanned closure or planned temporary facility closure; and

E. a detailed description of how facility wastes will be managed and disposed upon closure of the facility.

Verification: The project owner shall submit the Operation Waste Management Plan to the CPM for approval no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions to the CPM within 20 days of notification from the CPM that revisions are necessary.

The project owner shall also document in each Annual Compliance Report the actual volume of wastes generated and the waste management methods used during the year; provide a comparison of the actual waste generation and management methods used to those proposed in the original Operation Waste Management Plan; and update the Operation Waste Management Plan as necessary to address current waste generation and management practices.

WASTE- 10 The project owner shall ensure that the cooling tower sludge is tested pursuant to Title 22, California Code of Regulations, and section 66262.10 and report the findings to the CPM.

Verification: The project shall include the results of sludge testing in a report provided to the CPM. If two consecutive tests show that the sludge is non-hazardous, the project owner may apply to the CPM to discontinue testing.

WASTE-11 The project owner shall ensure that all spills or releases of hazardous substances, materials, or waste are reported, cleaned up, and remediated as necessary, in accordance with all applicable federal, state, and local requirements.

Verification: The project owner shall document all unauthorized releases and spills of hazardous substances, materials, or wastes that occur on the project property or related pipeline and transmission corridors. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; amount of contaminated soil/material generated; how release was managed and material cleaned up; if the release was reported; to whom the release was reported; release corrective action and cleanup requirements placed by regulating agencies; level of cleanup achieved and actions taken to prevent a similar release or spill; and disposition of any hazardous wastes and/or contaminated soils and materials that may have been generated by the release. Copies of the unauthorized spill documentation shall be provided to the CPM within 30 days of the date the release was discovered.

REFERENCES

AMEC 2007a – AMEC/C. Confar (tn: 46322). Phase I Environmental Site Assessment Proposed Power Generation, 11/20/06/Peaker Site 3051, 3056 and 3071 Miraloma Avenue, Anaheim, California 92806 - Volume I. Submitted to CEC/Docket Unit on 12/27/2007.

AMEC 2007b – AMEC/C. Confar (tn: 46323). Phase I Environmental Site Assessment Proposed Power Generation, 11/20/06/Peaker Site 3051, 3065 and 3071 Miraloma Avenue, Anaheim, California 95806 - Volume II. Submitted to CEC/Docket Unit on 12/27/2007.

AMEC 2007c – AMEC/N. Starr (tn: 46324). Additional Phase II Subsurface Assessment Proposed Power Generation, 5/4/07/Peaker Site 3051, 3065 and 3071 Miraloma Avenue, Anaheim, California 92806. Submitted on 12/27/2007.

CofA 2007a – City of Anaheim/S. Sciortino (tn: 43903). City of Anaheim's Canyon Power Plant Application for Certification Volume I & II. Submitted to CEC/Docket Unit on 12/28/2007.

CEC 2008g – CEC/M. Jones (tn: 45141). Data Adequacy Recommendation. Submitted to CEC/Docket Unit on 01/28/2008.

DofT 2009a – Department of Toxic/G. Holmes (tn 51798). Comments on Preliminary Staff Assessment, dated 5/27/09. Submitted to CEC/Docket Unit on 6/3/09.

G&B 2008d – GB/M. Cosens (tn: 46614). Data Responses to Data Requests 1-55. Submitted to CEC/Docket Unit on 06/05/2008.

GB 2009f – Galati & Blek/S. Galati (tn 51589). SCPPA's Initial Comments on the Preliminary Staff Assessment, dated 5/15/09. Submitted to CEC/Docket Unit on 5/15/09.

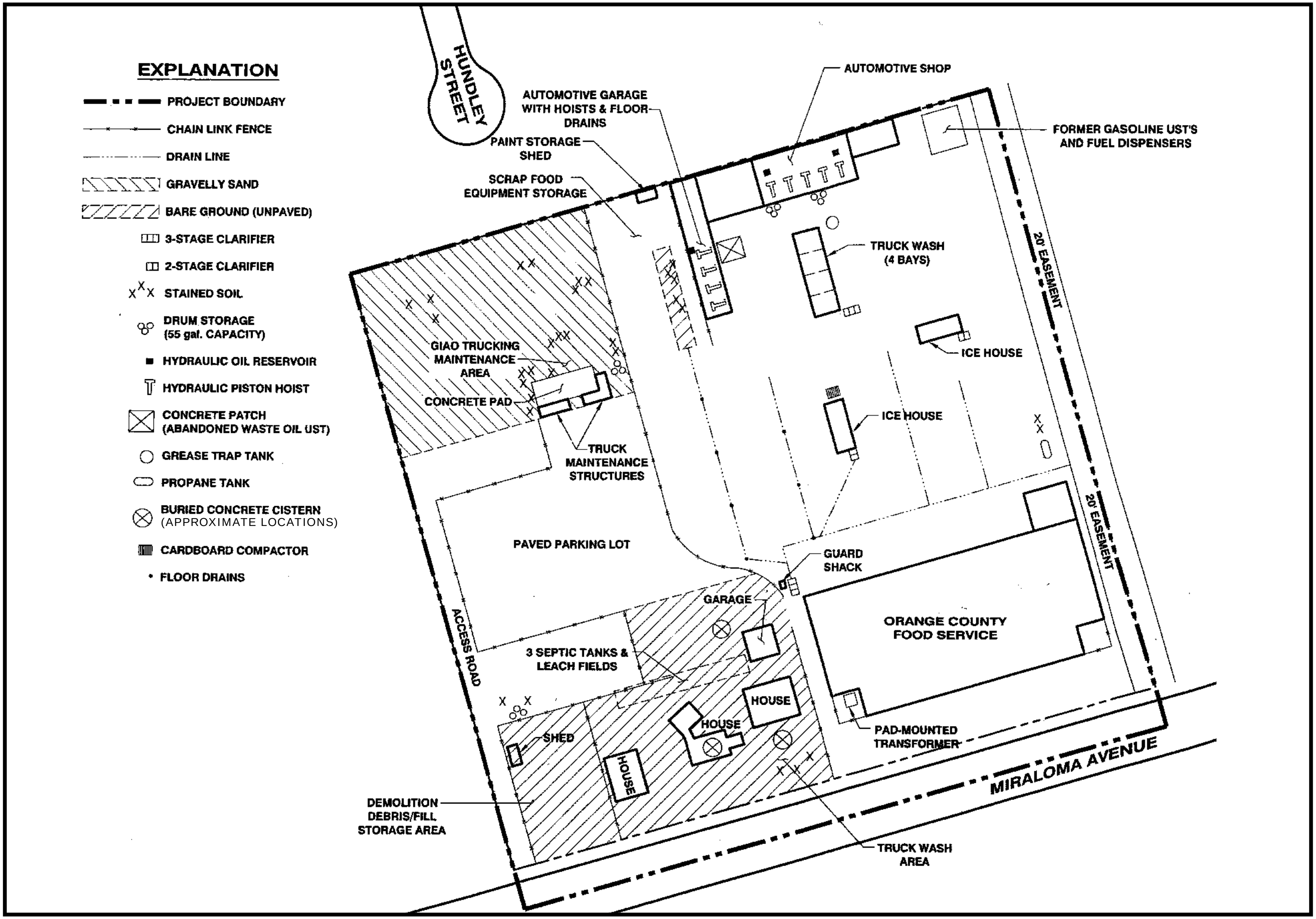
GB 2009g – Galati & Blek/M. Mills (tn 51881). SCPPA's Final Comments on the Preliminary Staff Assessment, dated 6/9/09. Submitted to CEC/Docket Unit on 6/9/09.

OCHCA 2008a – OCHCA/L. Lodrigueza (tn: 46908). Letter from the County of Orange Health Care Agency, Public Health Services Agreeing to Provide Remedial Oversight for Proposed Canyon Power Plant Site. Submitted to CEC/Docket Unit on 07/03/2008.

URS 2007c – AMEC/N. Starr. Additional Phase II Additional Environmental Investigation Report for Proposed Power Generation, 11/14/07/Peaker Site 3051, 3065 and 3071 Miraloma Avenue, Anaheim, California 92806. Submitted on 12/27/2007.

WASTE MANAGEMENT - FIGURE 1

Canyon Power Project - Areas of Environmental Concern



SOURCE: November 20, 2006 amec Phase I Environmental Site Assessment (appendix M) Figure 3

WORKER SAFETY AND FIRE PROTECTION

Testimony of Alvin J. Greenberg, Ph.D. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff concludes that if the applicant for the proposed Canyon Power Plant (CPP) 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 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.

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 Canyon Power Plant (CPP) 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, REGULATIONS, AND STANDARDS

WORKER SAFETY AND FIRE PROTECTION Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
29 U.S. Code § 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. Enforced by the City of Anaheim Fire Department (AFD).
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.
Local (or locally enforced)	
1998 Edition of Ca. Fire Code and the UFC	Provide standards for fire prevention and suppression equipment. Enforced by the AFD.
City of Anaheim Fire Department, Hazardous Materials Section (HMS)	Provides for the implementation of the Hazardous Materials Business Plan and Risk Management Plan.

SETTING

The proposed facility would be located in the City of Anaheim within an industrial area that is currently served by the local fire department. Fire support services to the site will be under the jurisdiction of the City of Anaheim Fire Department (AFD). According to the AFD, the closest station to the CPP site would be the Kraemer Station, located at 1154 N. Kraemer Street (approximately 0.43 miles away) with a response time of one minute. The next nearest stations would be Lakeview Station and Stadium Station located at 4555 E. Riverdale (approximately 3.78 miles away) and 2222 E. Ball Road (approximately 5.18 miles away), respectively. The AFD stated that the response time from these stations would be about 6 minutes from Lakeview and 7 minutes from Stadium (AFD 2008).

The AFD would also be the first responder to hazardous materials incidents. Backup support would be provided by Hazmat response teams from Irvine, Santa Ana, and Huntington Beach through mutual aid agreements with the AFD (AFD 2008).

WORKER SAFETY AND FIRE PROTECTION Table 2
Equipment and Personnel at AFD*

AFD Station	Total Response Time**	Distance to CPP	EMS/HazMat Capability***
Kraemer Station	1 min.	0.43 mi	Y/N
Lakeview Station	6 min.	3.78 mi	Y/Y
Stadium Station	7 min.	5.18 mi	Y/N

*****Source: E-mail correspondence with AFD Deputy Chief Larry Waterhouse (AFD 2008).
**Total response times are estimated from the moment a 911 call is made to arrival at the site and are dependent upon traffic conditions and other variables.
***All personnel are trained to EMT-1 level.

In addition to construction and operations worker safety issues, the potential exists for exposure to contaminated soil during site preparation. The Phase I Environmental Site Assessment conducted for this site recommended further sampling due to potential contamination at the site. The Phase II ESA performed in 2007 recommended that underground structures be removed prior to site development, a soil management plan be prepared to address the remediation of contaminated soil, and a post-excavation sampling plan be prepared to assure that all contaminated soil was properly removed (CPP 2007a, Section 6.14.1.1). To address the possibility that soil contamination would be encountered during construction of the CPP, proposed Condition of Certification **Worker Safety-6** would require that site be properly remediated and proposed **Waste-1,** and **Waste-2** would 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:

A. The potential for impacts on the safety of workers during demolition, construction, and operations activities and

B. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by California Division of Occupational Safety and Health (Cal-OSHA) regulations. 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 and response time in each area 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 would, 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 CPP project would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the CPP project to have well-defined policies and procedures, training, and hazard recognition and control at its 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

CPP 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 in 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 to 1522)
- Emergency Action Program and Plan

Additional programs 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 include:

- Electrical Safety Program,
- Motor Vehicle and Heavy Equipment Safety Program,
- Forklift Operation Program,
- Excavation/Trenching Program,
- Fall Protection Program,
- Scaffolding/Ladder Safety Program,
- Articulating Boom Platforms Program,
- Crane and Material Handling Program,
- Housekeeping and Material Handling and Storage Program,
- Respiratory Protection Program,
- Employee Exposure Monitoring Program,
- Hand and Portable Power Tool Safety Program,
- Hearing Conservation Program,
- Back Injury Prevention Program,
- Hazard Communication Program,
- Heat and Cold Stress Monitoring and Control Program,
- Pressure Vessel and Pipeline Safety Program,
- Hazardous Waste Program,
- Hot Work Safety Program, and
- Permit-Required Confined Space Entry Program.

The Application for Certification (AFC) includes an adequate outline of the Construction Health & Safety Program (CPP 2007a, Section 6.17.2.1.1). Staff proposes that prior to the start of construction of CPP, detailed programs and plans be provided to the California Energy Commission Compliance Project Manager (CPM) and to the AFD pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at CPP, 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 Protection and 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 CPP, 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, Personal Protective Equipment Program, Emergency Action Plan, and Fire Protection and Prevention Program (CPP 2007a, Section 6.17.2.1.2). Staff proposes that prior to operation of CPP, all detailed programs and plans be provided to the CPM and AFD 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

The Injury and Illness Prevention Program (IIPP) will include the following components as presented in the AFC (CPP 2007a, Section 6.17.2.1.2):

- identity of person(s) with authority and responsibility for implementing the program;
- a system for ensuring that employees comply with safe and healthy work practices;
- 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 inspections and training and maintaining records for 3 years.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 CCR § 3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff (CPP 2007a, Section 6.17.2.1.2). The plan will accomplish the following actions:

- identity of persons responsible for maintaining equipment and accumulation of flammable or combustible material control;
- procedures in the event of a fire;
- fire alarm and protection equipment;
- system and equipment maintenance;
- monthly inspections;
- annual inspections;
- firefighting demonstrations;
- housekeeping practices; and
- training.

Staff proposes that the applicant submit a final Fire Prevention Plan to the CPM for review and approval and to the AFD 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 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 §§ 3380 to 3400). The CPP operational environment will require personal protective equipment.

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 (CPP 2007a, Section 6.17.2.1.2):

- proper use, maintenance, and storage;
- when to use the protective clothing and equipment;
- benefits and limitations;
- when and how to replace the protective clothing and equipment; and
- each employee is checked for proper fit and to see if they are medically capable of wearing the equipment.

The Personal Protective Equipment Program ensures that employers comply with the applicable requirements for the program 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 (CPP 2007a, Section 6.17.2.1.2, Table 6.17-4).

The Emergency Action Plan will address the following:

- emergency escape procedures and emergency escape route for the facility;
- handling accidents involving serious injury or death;
- handling fires;
- hazardous waste or chemical spills;
- earthquakes;
- bomb threat;
- emergency shutdown;
- site security;
- emergency medical treatment and first aid
- decontamination;
- documentation and recordkeeping;
- news media;
- emergency notification list; and
- emergency telephone numbers.

Written Safety Program

In addition to the specific plans listed above, additional LORS called "safe work practices" apply to the project. 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 found under the heading Construction Safety and Health Program earlier in this staff assessment.

Safety Training Programs

Employees will be trained in the safe work practices described in the above-referenced safety programs.

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 percent of the labor force. Approximately 1.5 million of these workers are self employed.
- Of approximately 600,000 construction companies, 90 percent employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year, totaling more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6 percent) between 1980 and 1993.
- Construction injuries account for 15 percent of workers' compensation costs.
- 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 work sites 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 Ca/-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 work sites 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;
- inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility but too close to the perimeter fence; and
- 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 professional Safety Monitor on site to track 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 proposed Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner yet reporting to the Chief Building Official and CPM, would 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 the team in questions about its 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 CPP project, there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, or 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 corresponded with representatives of the Anaheim 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 on-site fire protection systems and local fire protection services. The on-site 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 AFD (CPP 2007a Section 6.17.2.1.2, AFD 2008).

Construction

During construction, portable fire extinguishers, small hose lines, and fixed fire suppression equipment would be placed throughout the site at appropriate intervals and periodically maintained. An on-site water supply sufficient to operate the fire suppression equipment would be provided, and safety procedures and training would be implemented in accordance with CalOSHA regulations, National Fire protection Association (NFPA) standards, and the guidelines of the Construction Fire Protection and Prevention Program (CPP 2007a, Section 6.17.2.1.1).

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. The fire water will be supplied by the municipal water supply system off of East Miraloma Ave. through two independent points that connect into the fire loop. The fire loop would supply the sprinkler system, water deluge system, and the fire hydrants with 1,500 gallons per minute of water flow (CPP 2007a, Section 6.17.2.1.2).

A fixed water sprinkler system would be installed in areas of risk and in administrative buildings in accordance with NFPA requirements. A dry pipe pre-action sprinkler system would be installed in the control room. A carbon dioxide fire protection system would be provided for each of the combustion turbine generators. The CTG auxiliary equipment and transformers would be contained each in a separate concrete berm and protected with a water deluge system. Chemical and gas extinguishers would be installed in areas of risk where water would be ineffective as a fire suppressant. Other plant equipment such as electrical enclosures and the switchyard would be protected with a dry-type and/or a Dupont FE-25 type fire suppression system (CPP 2007a, Section 6.17.2.1.2).

The fire protection system would have fire detection sensors that will trigger alarms and alert the control room as well as the AFD. In addition to the fixed fire protection system, the appropriate class of service portable extinguishers and fire hydrants would be located throughout the facility at code-approved intervals (CPP 2007a, Sections 3.10.1.2.1 and 6.17.2.1.2). These systems are standard requirement by the NFPA and the Uniform Fire Code, and staff has determined that they will ensure adequate fire protection.

The applicant would be required by proposed Conditions of Certification **WORKER SAFETY-1** and **-2** to provide the final Fire Protection and Prevention Program to staff and to the AFD prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

Emergency Medical Services Response

Staff conducted a statewide survey 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 firefighting staff. However, staff has determined that the potential for both work-related and nonwork-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 nonwork-related incidences, including those involving 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 automatic external defibrillator (AED); 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 the maintenance of on-site cardiac defibrillation devices at many private and public locations (e.g., airports, factories, government buildings). 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 device on site to address cardiac arrythmias resulting from industrial accidents or other nonwork-related causes.

Therefore, staff proposes a Condition of Certification **WORKER SAFETY-5** which would require that this portable AED be located on site, that all power plant employees on site during operations be trained in its use, and that a representative number of workers on site during construction and commissioning also be trained in its use.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the proposed CPP project combined with existing light industrial and commercial facilities in the immediate vicinity and expected new facilities in the area (which are limited by zoning to light industrial and commercial operations), to result in impacts on the fire and emergency service capabilities of the AFD. The AFD stated that this proposed facility has the potential to increase the burden on their department, especially being considered a hazardous facility which requires more planning for emergency responses. The AFD also stated that they would be able to adequately respond to incident at the proposed facility with assistance from internal and external agencies such as Public Utilities, the Gas Company, and Public Works (AFD 2008).

Given the lack of unique fire hazards associated with a modern gas-fired power plant, staff finds that this project will not have any significant incremental burden on the department's ability to respond to a fire or medical emergency.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments have been received from the public or agencies on the topic of worker safety and fire protection.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the CPP project would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of worker safety and fire protection.

CONCLUSIONS

Staff concludes that if the applicant for the proposed CPP 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 Conditions of Certification **WORKER SAFETY-3** through **-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also proposes **WORKER SAFETY-6** to ensure that any hazardous waste on the site is remediated to a level of insignificant risk to workers on the site. Staff also concludes that incidents at power plants that require fire or EMS response are infrequent and thus will represent an insignificant impact on the local fire department.

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. a Construction Personal Protective Equipment Program;

B. a Construction Exposure Monitoring Program;

C. a Construction Injury and Illness Prevention Program;

D. a Construction Emergency Action Plan; and

E. 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 programs with all applicable Safety Orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Anaheim Fire Department 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 Anaheim Fire Department 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:

A. an Operation Injury and Illness Prevention Plan;

B. an Emergency Action Plan;

C. a Hazardous Materials Management Program;

D. an Operation Fire Prevention Program (8 CCR § 3221); and

E. a 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 programs with all applicable Safety Orders. The Operation Fire Prevention Plan, the Hazardous Materials Management Program, and the Emergency Action Plan shall also be submitted to the Anaheim Fire Department 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 Anaheim Fire Department 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:

A. have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;

B. assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;

C. assure that all construction and commissioning workers and supervisors receive adequate safety training;

D. complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and

E. assure that all the plans identified in Conditions of Certification 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 Condition of Certification **WORKER SAFETY-3**, implements all appropriate Cal/OSHA and Energy Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: At least 30 days 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 external defibrillator (AED) 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. During construction and commissioning, the following persons shall be trained in use of the AED and shall be on site whenever the workers that they supervise are on site: the Construction Project Manager or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in use of the AED. The training program shall be submitted 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 proof that a portable automatic external defibrillator (AED) exists on site and a copy of the training and maintenance program for review and approval.

WORKER SAFETY-6 The project owner shall ensure that workers will not be exposed to harmful levels of contaminants in soils on the site during site preparation, demolition, and construction by either removing contaminated soil down to depths where workers would be exposed or showing that the site has been remediated to levels of contaminants that will not cause a significant risk to worker health.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM a letter from the Orange County Health Care Agency Environmental Health Division that the site has been properly characterized and remediated.

REFERENCES

AFD (Anaheim Fire Department) 2008 – Electronic mail correspondence with Deputy Chief of Operations, Larry Waterhouse. July 9.

California Fire Code 1998 – Published by the International Fire Code Institute comprised of the International Conference of Building Officials, the Western Fire Chiefs Association, and the California Building Standards Commission. Whittier, Ca.

Canyon Power Plant (CPP) 2007 – Application for Certification Volumes 1 and 2. Submitted by the Southern California Public Power Authority to the California Energy Commission, December, 2007.

Uniform Fire Code 1997, Vol. 1 – Published by the International Fire Code Institute comprised of the International Conference of Building Officials and the Western Fire Chiefs Association, Whittier, Ca.

U.S. OSHA (United States Occupational Safety and Health Administration). 1993 – Process Safety Management / Process Safety Management Guidelines for Compliance. U.S. Department of Labor, Washington, D.C.

ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the design, construction, and eventual closure of the Canyon Power Plant 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 Canyon Power Plant (CPP). The purpose of this analysis is to:

- verify that the laws, ordinances, regulations, and standards (LORS) that apply to the engineering design and construction of the project have been identified;
- verify that both the project and its ancillary facilities are sufficiently described, including proposed design criteria and analysis methods, in order to provide reasonable assurance that the project will be designed and constructed in accordance with all applicable engineering LORS, in a manner that also ensures the public health and safety;
- determine whether special design features should be considered during final design to address conditions unique to the site which could influence public health and safety; and
- describe the design review and construction inspection process and establish the conditions of certification used to monitor and ensure compliance with the engineering LORS, in addition to any special design requirements.

Subjects discussed in this analysis include:

- identification of the engineering LORS that apply to facility design;
- evaluation of the applicant’s proposed design criteria, including identification of criteria essential to public health and safety;
- proposed modifications and additions to the application for certification (AFC) necessary for compliance with applicable engineering LORS; and
- conditions of certification proposed by staff to ensure that the project will be designed and constructed to ensure public health and safety and comply with all applicable engineering LORS.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the AFC (CofA 2007a, Appendix 2C). 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	2007 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	Orange County regulations and ordinances City of Anaheim 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 CPP will be located on approximately 10 acres in an industrial area of the City of Anaheim, Orange County (CofA 2007, AFC §§ 1.1, 1.3, 2.1, 3.1, 3.2). The site lies in Seismic Risk 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 AFC (CofA 2007a, AFC Appendix A).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project would be built to applicable engineering codes and ensure public health and life safety. This analysis further verifies that applicable engineering LORS have been identified and that the project and its ancillary facilities have been described in adequate detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes conditions of certification that would monitor and ensure compliance with engineering LORS and any other special design requirements. These conditions allow both the California Energy Commission (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, in addition to the criteria for designing and constructing linear support facilities such as natural gas and electric transmission interconnections. The applicant proposes the use of accepted industry standards (see CofA 2007a, AFC Appendix A, for a representative list of applicable industry standards), design practices, and construction methods in preparing and developing the site. Staff concludes that this 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 that compliance.

MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production; costly or time consuming to repair or replace; used for the storage, containment, or handling of hazardous or toxic materials; or capable of becoming potential health and safety hazards if not constructed according to applicable engineering LORS. Major structures and equipment are identified in the proposed Condition of Certification **GEN-2,** below. Typically, **Facility Design Table 2** in Condition of Certification **GEN-2** lists the major structures and equipment identified in the AFC and other project related information available before project licensing; this list is based on the preliminary design of the project. The master drawing and master specifications lists described in Condition of Certification **GEN-2**, however, include the project-related documents based on the project's detailed design and may include additional documents for structures and equipment not identified in **Facility Design Table 2**. (Detailed project design typically occurs after project licensing and is not available at this time.)

The CPP shall be designed and constructed to the 2007 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 when the design and construction of the project actually begin. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2007 CBSC takes effect, the 2007 CBSC provisions shall be replaced with the updated 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 according to their appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1**, below, which, in part, requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins.

PROJECT QUALITY PROCEDURES

The project's AFC (CofA 2007a, AFC § 2.2.2.5, Appendix A) describes a quality program intended to inspire confidence that its systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with all appropriate power plant technical codes and standards. Compliance with design requirements will be verified through specific inspections and audits. Implementation of this quality assurance/quality control (QA/QC) program will ensure that the CPP is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.1 in Appendix Chapter 1 of the CBC, the CBO is authorized and directed to enforce all provisions of the CBC. The Energy Commission itself serves as the building official and has the responsibility to enforce the code for all of the energy facilities it certifies. In addition, the Energy Commission has the power to interpret the CBC and adopt and enforce both rules and supplemental regulations that clarify application of the CBC's provisions.

The Energy Commission's design review and construction inspection process conforms to CBC requirements and ensures that all facility design conditions of certification are met. As provided by section 103.3 in Appendix Chapter 1 of the CBC, the Energy Commission appoints experts to perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. The applicant, through permit fees provided by the CBC, section 108 in Appendix Chapter 1, pays the cost of these reviews and inspections. While building permits in addition to Energy Commission certification are not required for this project, the applicant, consistent with CBC section 108, pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite the City of Anaheim, Orange County, or a third-party engineering consultant to act as CBO for this project. When an entity has been assigned CBO duties, Energy Commission staff will complete a memorandum of understanding (MOU) with that entity to outline both 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 engineers who will design and build the proposed project (Conditions of Certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction (subject to CBO review and approval) be approved by the CBO before it is performed. They also require that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written so that no element of construction (of permanent facilities subject to CBO review and approval) that could be difficult to reverse or correct can proceed without prior CBO approval. Elements of construction that are not difficult to reverse may proceed without approval of the plans. The applicant bears the responsibility to fully modify construction elements in order to comply with all design changes resulting from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service (decommissioning) when it reaches the end of its useful life ranges from "mothballing" to the removal of all equipment and appurtenant facilities and subsequent restoration of the site. Future conditions that could affect decommissioning are largely unknown at this time.

In order to ensure that decommissioning will be completed in a manner that is environmentally sound, safe, and protects the public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval before the project's decommissioning begins. The plan shall include a discussion of:

- proposed decommissioning activities for the project and all appurtenant facilities that were constructed as part of the project;
- all applicable LORS and local/regional plans and proof of adherence to those 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.

Satisfying the above requirements should serve as adequate protection, even in the unlikely event that the project is abandoned. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure Plan.

PUBLIC AND AGENCY COMMENTS

No comments were received.

CONCLUSIONS AND RECOMMENDATIONS

1. The laws, ordinances, regulations, and standards (LORS) identified in the AFC and supporting documents directly apply 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 will likely comply with applicable engineering LORS.

3. The proposed conditions of certification will ensure that the CPP is designed and constructed in accordance with applicable engineering LORS. This will be

accomplished through design review, plan checking, and field inspections that will be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

4. Though future conditions that could 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** section of this document prior to decommissioning, decommissioning procedures will comply with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The proposed conditions of certification be adopted to ensure that the project is designed and constructed in a manner that protects the public health and safety and complies with all applicable engineering LORS;

2. The project be designed and built to the 2007 CBSC (or successor standards, if in effect when initial project engineering designs are submitted for review); and

3. The CBO reviews the final designs, checks plans, and performs 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 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California 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 laws, ordinances, regulations and standards (LORS) in effect at the time initial design plans are submitted to the chief building official (CBO) for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility (2007 CBC, Appendix Chapter 1, § 101.2, Scope). All transmission facilities (lines, switchyards, switching stations, and substations) are covered in the 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 the successor to the 2007 CBSC is in effect, the 2007 CBSC provisions 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 ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

Verification: Within 30 days following 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 (2007 CBC, Appendix Chapter 1, § 110, 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 that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

GEN-2 Before submitting the initial engineering designs for CBO review, the project owner shall furnish the CPM and the CBO with a schedule of facility design submittals, master drawing, and master specifications lists. 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 upon request.

Verification: At least 60 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the master drawing, and master specifications lists 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 (CT) Foundation and Connections	4
CT Generator Foundation and Connections	4
SCR Catalyst System Structure Foundation and Connections	4
SCR Exhaust Stack Foundation and Connections	4
Tempering Air Fans (Blowers) Foundation and Connections	4
CEMS Station Foundation and Connections	4
CT Auxiliary Skid Foundation and Connections	4
CT Fire Protection System Foundation and Connections	4
SPRINT/Spray Mist Cooler Skid Foundation and Connections	4
NOx Water Injection Skid Foundation and Connections	4
Packaged CT Inlet Air Chiller System Foundation and Connections	2
Chilled Water Pumps Foundation and Connections	2
4-CellCooling Tower, Cooling Tower Foundation and Connections	1
Cooling Water Pumps Foundation and Connections	2
Ammonia Delivery Skid Foundation and Connections	4
Offsite Water Booster Pump Station Foundation and Connections	1
Natural Gas Fuel Filter Foundation and Connections	2
Air Compressor Skid Foundation and Connections	1
Station Service Transformer Foundation and Connections	2
Auxiliary Transformer Foundation and Connections	2
Control/Admin/Shop/Warehouse Building Foundation and Connections	1
Electrical/Control Building Foundation and Connections	1
Wastewater Drainage Sump System Foundation and Connections	1
Demineralized Water Storage Tank Foundation and Connections	1
Demineralized Water Forwarding Pumps Foundation and Connections	1
Demineralizer System Foundations and Connections	2
Raw Water Storage Tank Foundation and Connections	1
Fuel Gas Compressor Foundation and Connections	5
Fuel Gas Recycle Cooler Foundation and Connections	1
Oil/Water Separator Foundation and Connections	1
Black Start Diesel Generator Foundation and Connections	1

GEN-3 The project owner shall make payments to the CBO for design review, plan checks, and construction inspections, 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 2007 CBC (2007 CBC, Appendix Chapter 1, § 108, Fees; Chapter 1, Section 108.4, Permits, Fees, Applications and Inspections), 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 otherwise agreed upon 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 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 the resident engineer in charge of the project (2007 California Administrative Code, § 4-209, Designation of Responsibilities). All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the conditions of certification in the **Transmission System Engineering** section of this document.

The resident engineer 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 that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The resident engineer shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;

2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;

3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;

4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets 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 when they do not conform to approved plans and specifications.

The resident engineer shall have the authority to halt construction and to require changes or remedial work if the work does not meet requirements.

If the resident engineer 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.

<u>Verification:</u> At least 30 days (or within a project owner- and CBO-approved alternative time frame) 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 resident engineer and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the resident engineer and other delegated engineer(s) within five days of the approval.

If the resident engineer or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five days 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 civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and 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: 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; a mechanical engineer; and an electrical engineer. (California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 require 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 the 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 (for example, 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 (2007 CBC, Appendix Chapter 1, § 104, Duties and Powers 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, geotechnical, or soils reports 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 the design of), 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; and 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 resident engineer during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to 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, geotechnical or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement, or collapse when saturated under load (2007 CBC, Appendix J, § J104.3, Soils Report; Chapter 18, § 1802.2, Foundation and Soils Investigations);

   3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 2007 CBC, Appendix J, section J105, Inspections, and the 2007 California Administrative Code, section 4-211, Observation and Inspection of Construction (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both); and

   4. Recommend field changes to the civil engineer and resident engineer.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earthwork or foundations (2007 CBC, Appendix Chapter 1, § 114, Stop Orders).

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare a 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 2007 California Administrative Code, section 4-211, Observation and Inspection of Construction (depending on the site conditions, this may be the responsibility of either the soils engineer, the 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 resident engineer 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 to 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.

<u>Verification:</u> At least 30 days (or within a project owner- and CBO-approved alternative time frame) 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 within a project owner- and CBO-approved alternative time frame) 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 2007 CBC, Chapter 17, Section 1704, Special Inspections; Chapter 17A, Section 1704A, Special Inspections; and Appendix Chapter 1, Section 109, Inspections. 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 resident engineer. All discrepancies shall be brought to the immediate attention of the resident engineer for correction, then, if uncorrected, to the CBO and the CPM for corrective action (2007 CBC, Chapter 17, § 1704.1.2, Report Requirements); and

4. Submit a final signed report to the resident engineer, 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, specifications, and other provisions of the applicable edition of the CBC.

Verification: At least 15 days (or within a project owner- and CBO-approved alternative time frame) 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 required corrective actions (2007 CBC, Appendix Chapter 1, § 109.6, Approval Required; Chapter 17, § 1704.1.2, Report Requirements). 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, 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 an alternative site approved by the CPM during the operating life of the project (2007 CBC, Appendix Chapter 1, § 106.3.1, Approval of Construction Documents). 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 the final approved engineering plans, specifications, and calculations described above, the project owner shall submit to the CPM a letter stating both that the above documents have been stored and the storage location of those 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" files (Adobe .pdf 6.0), with restricted (password-protected) printing privileges, 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, geotechnical, or foundation investigation reports required by the 2007 CBC, Appendix J, section J104.3, Soils Report, and Chapter 18, section 1802.2, Foundation and Soils Investigation.

Verification: At least 15 days (or within a project owner- and CBO-approved alternative time frame) 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 (2007 CBC, Appendix Chapter 1, § 114, Stop Work 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 2007 CBC, Appendix Chapter 1, section 109, Inspections, and Chapter 17, section 1704, Special Inspections. 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 (2007 CBC, Chapter 17, § 1704.1.2, Report Requirements). 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 (2007 CBC, Chapter 17,§ 1703.2, Written Approval).

Verification: Within 30 days (or within a project owner- and CBO-approved alternative time frame) 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, along 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 begin 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 (for example, 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 (2007 CBC, Appendix Chapter 1, § 109.6, 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 (2007 California Administrative Code, § 4-210, Plans, Specifications, Computations and Other Data);

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 (2007 CBC, Appendix Chapter 1, § 106.3.4, Design Professional in Responsible Charge); and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS (2007 CBC, Appendix Chapter 1, § 106.3.4, Design Professional in Responsible Charge).

Verification: At least 60 days (or within a project owner- and CBO-approved alternative time frame) 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 comply with the requirements set forth in 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 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 2007 CBC, Chapter 17, section 1704, Special Inspections, and section 1709.1, Structural Observations.

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 (2007 CBC, Chapter 17, § 1704.1.2, Report Requirements). 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 necessary to obtain the CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 2007 CBC, 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 (2007 CBC, Appendix Chapter 1, § 106.1, Submittal Documents; § 106.4, Amended Construction Documents; 2007 California Administrative Code, § 4-215, Changes in Approved Drawings and Specifications).

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 the 2007 CBC, Chapter 3, Table 307.1(2),shall, at a minimum, be designed to comply with the requirements of that chapter.

Verification: At least 30 days (or within a project owner- and CBO-approved alternate time frame) 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 that construction (2007 CBC, Appendix Chapter 1, § 106.1, Submittal Documents; § 109.5, Inspection Requests; § 109.6, Approval Required; 2007 California Plumbing Code, § 301.1.1, Approvals).

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems, subject to CBO design review and approval, and submit a signed statement to the CBO when the proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations, and industry standards (2007 CBC, Appendix Chapter 1, § 106.3.4, Design Professional in Responsible Charge), which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI/NFPA Z223.1 (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
- Orange County codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency (2007 CBC, Appendix Chapter 1, § 103.3, Deputies).

<u>**Verification:**</u> At least 30 days (or within a project owner- and CBO-approved alternative time frame) 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 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 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 that installation (2007 CBC, Appendix Chapter 1, § 109.5, Inspection Requests).

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or within a project owner- and CBO-approved alternative time frame) 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 that 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 (2007 CBC, Appendix Chapter 1, § 109.3.7, Energy Efficiency Inspections; § 106.3.4, Design Professionals in Responsible Charge).

Verification: At least 30 days (or within a project owner- and CBO-approved alternative time frame) 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 or 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 (2007 CBC, Appendix Chapter 1, § 106.1, 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 (2007 CBC, Appendix Chapter 1, § 109.6, Approval Required; § 109.5, 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 within a project owner- and CBO-approved alternative time frame) 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

CofA 2007a — City of Anaheim/S. Sciortino (tn: 43903). City of Anaheim's Canyon Power Plant Application for Certification Volume I & II. Submitted to CEC/Docket Unit on 12/28/2007.

GEOLOGY AND PALEONTOLOGY

Testimony of Dal Hunter, Ph.D., C.E.G.

SUMMARY OF CONCLUSIONS

The proposed Canyon Power Plant (CPP) is located in an active geologic area in Northern Orange County, Southern California. The project would be in a designated industrial zone of the City of Anaheim (COA). Because of its geologic setting, the site could be subject to intense levels of earthquake-related ground shaking. While the potential for earthquake ground rupture is low, at least 34 major on-shore and off-shore faults are located between 5 and 50 miles of the site. The effects of strong ground shaking must be mitigated, to the extent practical, through structural designs required by the California Building Code (CBC, 2007). The CBC (2007) requires that structures be designed to resist seismic stresses from ground acceleration and, to a lesser extent, liquefaction potential. The design-level geotechnical investigation required for the project by the California Building Code, and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**, presents standard engineering design recommendations for mitigation of potential expansive clay soils, as well as excessive settlement due to compressible soils or dynamic compaction.

There are no known viable geologic or mineralogical resources at the proposed CPP site. Paleontological resources have been documented in older Quaternary sediments within three miles of the site, but no significant fossils were found during field evaluations at the plant site or near ancillary facilities. Potential impacts to paleontological resources due to construction activities would be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification, **PAL-1** through **PAL-7**.

Based on its independent research and review, the California Energy Commission believes that the potential is low for significant adverse cumulative impacts to the project from geologic hazards during its design life and to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project. It is staff's opinion that the CPP can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS), and in a manner that both protects environmental quality and assures public safety, to the extent practical.

INTRODUCTION

In this section, California Energy Commission (Energy Commission) staff discusses the potential impacts of geologic hazards on the proposed CPP as well as the CPP's impact on geologic, mineralogic, and paleontologic resources. Staff's objective is to ensure that there will be no consequential adverse impacts to significant geological and paleontological resources during the project construction, operation, and closure and that operation of the plant would not expose occupants to high-probability geologic hazards. A brief geological and paleontological overview is provided. The section concludes with staff's proposed monitoring and mitigation measures for geologic hazards and geologic, mineralogic, and palentologic resources, with the proposed Conditions of Certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable laws, ordinances, regulations and standards (LORS) are listed in the application for certification (AFC) (CPP, 2007a). The following briefly describes the current LORS for both geologic hazards and resources and mineralogic and paleontologic resources.

GEOLOGY AND PALEONTOLOGY Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	The proposed CPP is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State	
California Building Code (2007)	The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control). The CBC has adopted provisions in the International Building Code (ICC, 2006).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. The project site is not located within a designated Alquist-Priolo Fault Zone.
The Seismic Hazards Mapping Act, PRC section 2690–2699	Areas are identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches.
PRC, Chapter 1.7, sections 5097.5 and 30244	Regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.
Warren-Alquist Act, PRC, sections 25527 and 25550.5(i)	The Warren-Alquist Act requires the Energy Commission 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 sites…” With respect to paleontologic resources, the Energy Commission relies on guidelines from the Society for Vertebrate Paleontology (SVP), indicated below.
California Environmental Quality Act (CEQA), PRC sections 15000 et seq., Appendix G	Mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a definition of significant impacts on a fossil site.

Applicable Law	Description
Society for Vertebrate Paleontology (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.
Local	
1997 Uniform Building Code with Amendments by the COA Community Development Department	These codes address the excavation, grading, and earthwork construction, not limited to construction relating to earthquake safety and seismic activity hazards.
Orange County General Plan	Requires a general plan for long term development. Under this protection, paleontological resources shall be protected and preserved (Resolutions 77-866 and BR 87-516).
Anaheim General Plan and Zoning Code Update 2004	City staff shall require property owners/developers to provide studies to document the presence/absence of archaeological and/or paleontological resources for areas with documented or inferred resource presence. On properties where resources are identified, a detailed mitigation plan shall ensue, including a monitoring program and recovery and/or in situ preservation plan, based on the recommendations of a qualified specialist.

SETTING

The proposed CPP would be constructed on approximately 10 acres of previously developed land located at 3071 East Miraloma Avenue, in an industrial-zoned area of Anaheim, Orange County, California. The site was previously occupied by a food catering operation with a fleet of approximately 100 trucks. The site currently is predominantly covered in asphalt concrete and Portland cement concrete paving with several structures. The structures include a warehouse, a maintenance garage, a truck washing facility, an outdoor repair shop, storage sheds, and two ice manufacturing buildings. The repair shop includes petroleum products. All of these structures would be demolished as part of the CPP project.

The proposed power plant would include four natural gas-fired GE LM 6000 PC Sprint combustion turbines. Associated equipment would include generator step-up transformers (GSUs), a 69 kilovolt (kV) switchyard, fuel compressors, a metering station with gas pressure controls, and a packaged chilled water system for combustion turbine generator (CTG) power augmentation.

New project linears required outside the plant site boundaries include a 3,240-foot-long, 12-inch-diameter, 350 pounds per square inch gauge (psig) gas line owned and maintained by SoCal Gas Company (SoCalGas) which would be connected to new gas compressors that would be onsite as part of the CPP facility. This new pipeline would exit the CPP facility and run approximately 580 feet east in Miraloma Avenue to the intersection with Kraemer Boulevard, where it would run north in Kraemer Boulevard approximately 2,660 feet to East Orangethorpe Avenue and connect into the existing SoCalGas transmission line L-1218 at East Orangethorpe Avenue. A new 2,185-foot-long, 14-inch-diameter water pipeline would also be constructed as part of the project. The water pipeline would supply recycled water to the site from the Orange County Groundwater Replenishment System (GWRS). This water pipeline would run east of the site on the north side of Miraloma Avenue for 1,850 feet to the new pumping station located north of the curb in the COA easement of East Miraloma Avenue. From there it would turn north and run 210 feet in the new Orange County Water District (OCWD) easement, then east 125 feet in a new easement to the existing GWRS line. The GWRS line is west of the Carbon Canyon Diversion Channel. The GWRS line is a 60-inch-diameter recycled water line with an existing 36-inch stub-up. Plant wastewater would be discharged to the existing Orange County Sanitation District sewer system located along East Miraloma Avenue.

Four new 69kV underground circuits are proposed for connection to the offsite electrical grid. Two would pass beneath East Miraloma Avenue and surface approximately 100 feet to the south to connect to the two Vermont-Yorba overhead lines via two new transmission structures. The other two underground circuits would proceed approximately 4,000 feet east in East Miraloma Avenue and then south approximately 3,000 feet along Miller Street to connect to the Dowling-Yorba line at West La Palma Avenue. Fiber optic cable would run in the same excavations as the 69 kV circuits and would tie into existing fiber optic cables for supervisory control and data acquisition (SCADA).

REGIONAL SETTING

The CPP site is located in Orange County, California, on the coastal flood plain of the Santa Ana River within the Los Angeles Basin at the northern end of the Peninsular Ranges geomorphic province (Norris and Webb, 1990). In general, Orange County consists of about one-third coastal flood plain flanked on the north, east, and south by rolling hills and mountainous terrain of the Puente Hills, the Santa Ana Mountains, and the San Joaquin Hills. The coastal plain has been forming continuously during Quaternary time by lateral migration and associated deposition of locally derived sediments in the Santa Ana River and Santiago Creek channels. Surface elevations in the county range from sea level at the coast to approximately 5,687 feet at Santiago Peak on the eastern county margin (CDMG, 1976).

The Peninsular Ranges Geomorphic Province extends from the Los Angeles Basin in the north some 900 miles south to the tip of Baja California in Mexico (Norris and Webb, 1990). The Peninsular Ranges Geomorphic Province varies from approximately 30 to 100 miles in width. The highland and mountain masses of the Peninsular Range on the north and east sides of Orange County are characterized by Cenozoic to Tertiary volcanic, intrusive, metamorphic, and sedimentary rocks which slope steeply downward to alluvial, colluvial and uplifted marine deposits along the Pacific coast to the south and west. The age and overall type of geologic unit varies noticeably from north to south and east to west with the oldest Cretaceous volcanic and intrusive units which dominate the northeast portion of the county progressively giving way to younger Cretaceous and Cenozoic volcanic and sedimentary units to the south and west. These in turn transition to still younger Cenozoic and then Quaternary sedimentary rocks and unconsolidated sedimentary deposits in the southwest portion of the county (Morton and Miller, 1981).

PROJECT SITE DESCRIPTION

The proposed CPP site lies in the flood plain of the Santa Ana River at the point where the relatively narrow entrenched river channel descends from the highlands to the east and abruptly broadens and merges with sedimentary deposits of Santiago Creek to form the relatively flat-lying coastal alluvial fan which underlies approximately one-third of Orange County. The project site is reportedly covered by one to two feet of unconsolidated fill (MACTEC, 2007) and is mapped as being underlain by Quaternary (Holocene) younger fan deposits consisting of unconsolidated sand, sandy silt, and silt of the Santa Ana River. Alluvium beneath the site is described as generally loose to moderately dense and may be highly liquefiable if saturated near the surface (CDMG, 1997). Other alluvial units which may be encountered in the site area or along the planned arterials include older Quaternary alluvial deposits, old fan deposits, older elevated terrace deposits, lacustrine deposits, active wash deposits, and artificial fill. Review of local borehole logs indicates valley fill deposits beneath the site may be in excess of 4,000 feet thick (CDMG, 1980). A brief description of major geologic units is provided below, from youngest to oldest.

GEOLOGY AND PALEONTOLOGY Table 2
Geologic Units

Name	CDMG, 1997 Designation	Age	Description
Artificial Fill[1]	af	Historical	Silty Sand
Active Wash Deposits	Qwa/Qal	Recent to Holocene	Loose Sand
Younger Fan Deposits	Qyf	Holocene	Loose to Moderately Dense Sand, Sandy Silt, and Silt
Lacustrine Deposits	Qla	Holocene	Soft Silt to Silty Sand
Older, Elevated Terrace Deposits	Qvof 1a, 2a	Probable Late Pleistocene (Age not established)	Gravel and Sand

[1]Described by MACTECH, 2007

Mountains of the Peninsular Range are being actively offset by northwest trending right-lateral strike-slip faults. In addition, active regional reverse and thrust faulting, associated with compressional tectonics, continues to cause uplift in the east-west trending Transverse Ranges which form the northern boundary of the Peninsular Range Geomorphic Province (CGS, 2002). Some major fault systems found within the Peninsular Range Geomorphic Province within 50 miles of the project site are the Whittier, Puente Hills Blind Thrust, Elsinore (Chino-Central Avenue, Glen Ivy, and Temecula segments), San Joaquin Hills, San Jose, Newport-Inglewood (onshore and offshore segments), Sierra Madre, Cucamonga, Upper Elysian Park Blind Thrust, Raymond, Clamshell-Sawpit, Palos Verdes, Verdugo, Hollywood, San Jacinto (San Bernardino and San Jacinto Valley segments), Santa Monica, San Andreas (7 segments), Cleghorn, San Gabriel, Malibu Coast, Coronado Bank, Northridge, North Frontal Fault Zone, Anacapa-Dume, and Santa Susana (Blake, 2006a).

EQFAULT Version 3.00 was used to model seismic sources within 50 miles of the CPP site (Blake, 2006a). The various faults are listed below in **GEOLOGY AND PALEONTOLOGY Table 3**, along with the distance from the project site and maximum earthquake magnitude. The peak acceleration, fault type, and fault class for each fault is also given. The fault locations can be found on the Fault Activity Map of California (CDMG, 1994) and on the Southern California Earthquake Data Center website (SCEC, 2008).

GEOLOGY AND PALEONTOLOGY Table 3

Fault Name	Distance From Site (miles)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)	Fault Type and Strike	Fault Class
Whittier	4.7	6.8	0.368	Right-Lateral Reverse/Oblique Slip (Northeast)	A
Puente Hills Blind Thrust	4.8	7.1	0.518	Blind Thrust/Reverse (North)	B
Elsinore (Chino-Central Ave.)	8.1	6.7	0.310	Right-Lateral Reverse/Oblique Slip (Southwest)	B
San Joaquin Hills Blind Thrust	11.5	6.6	0.231	Blind Thrust/Reverse (Southwest)	B
San Jose	12.6	6.4	0.194	Left-Lateral Reverse/Oblique Slip (Northwest)	B
Elsinore (Glen Ivy)	12.8	6.8	0.195	Right-Lateral Strike Slip (Northwest)	A
Newport-Inglewood (LA Basin)	14.6	7.1	0.208	Right-Lateral Strike Slip (Northwest)	B
Newport-Inglewood (Offshore)	18.6	7.1	0.173	Right-Lateral Strike Slip	B
Sierra Madre	19.1	7.2	0.217	Reverse (North)	B
Cucamonga	20.0	6.9	0.180	Reverse (North)	B
Upper Elysian Park Blind Thrust	20.1	6.4	0.138	Blind Thrust/Reverse (Northeast)	B
Raymond	22.4	6.5	0.133	Left-Lateral Reverse/Oblique Slip (North)	B
Clamshell-Sawpit	23.5	6.5	0.129	Reverse (Northwest)	B
Palos Verdes	23.8	7.3	0.160	Right-Lateral Strike Slip	B
Verdugo	25.4	6.9	0.150	Reverse (Northeast)	B
Hollywood	27.9	6.4	0.107	Left-Lateral Reverse/Oblique Slip (Southwest)	B

Active Faults Relative to the Proposed CPP Site

Fault Name	Distance From Site (miles)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)	Fault Type and Strike	Fault Class
Elsinore (Temecula)	32.9	6.8	0.096	Right-Lateral Strike Slip (North)	A
San Jacinto-San Bernardino	33.2	6.7	0.090	Right-Lateral Strike Slip (Northwest)	A
Santa Monica	35.0	6.6	0.100	Left-Lateral Reverse/Oblique Slip (North)	B
San Andreas – Mojave	36.2	7.4	0.122	Right-Lateral Strike Slip (Northwest)	A
San Andreas – Cholame-Mojave	36.2	7.8	0.151	Right-Lateral Strike Slip (Northwest)	A
San Andreas – 1857 Rupture	36.2	7.8	0.151	Right-Lateral Strike Slip (Northwest)	A
San Andreas - Entire	36.2	8.0	0.167	Right-Lateral Strike Slip (Northwest)l	A
San Andreas – San Bernardino-Coachella	36.4	7.7	0.142	Right-Lateral Strike Slip (Northwest)	A
San Andreas - San Bernardino	36.4	7.5	0.128	Right-Lateral Strike Slip (Northwest)	A
San Jacinto Valley	37.7	6.9	0.091	Right-Lateral Strike Slip (Northwest)	A
Sierra Madre (San Fernando)	38.3	6.7	0.098	Reverse (North)	B
Cleghorn	38.8	6.5	0.072	Left-Lateral Strike Slip	B
San Gabriel	39.9	7.2	0.102	Right-Lateral Strike Slip	B
Malibu Coast	40.4	6.7	0.094	Left-Lateral Reverse/Oblique Slip (Southwest)	B
Coronado Bank	40.8	7.6	0.124	Right-Lateral Strike Slip	B
Northridge (East Oak Ridge)	41.3	7.0	0.109	Blind Thrust/Reverse (South)	B
North Frontal Fault Zone (Western)	46.4	7.2	0.110	Reverse (South)	B
Anacapa-Dume	48.7	7.5	0.125	Reverse/Left-Lateral/Oblique Slip (North)	B

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section considers two types of impacts. The first is geologic hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the 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 concerning geologic hazards and geologic and mineralogic resources apply to this project. The California Building Standards Code (CBSC) and CBC (2007) provide geotechnical and geological investigation and design guidelines, which engineers must follow when designing a facility. As a result, the criteria used to assess the significance of a geologic hazard includes evaluating each hazard’s potential impact on the design and construction of the proposed facility. Geologic hazards include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, seiches, and others as may be dictated by site-specific conditions.

The California Environmental Quality Act (CEQA) guidelines, Appendix G, provide a checklist of questions that lead agencies typically address.

- Section (V) (c) includes guidelines that determine if a project will either directly or indirectly destroy a unique paleontological resource or site, or a unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) focus on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) concern the project's effects on mineral resources.

Staff has reviewed geologic and mineral resource maps for the surrounding area, as well as site-specific information provided by the applicant, to determine if geologic and mineralogic resources exist in the area and to determine if plant operations could adversely affect any such resources.

Staff reviewed existing paleontologic information and requested records searches from the Natural History Museum of Los Angeles and the vertebrate paleontology section of the San Bernardino County Museum for the surrounding area. The University of California (at Berkeley) Museum of Paleontology's website, which gives generalized information for locality records of their collection, was consulted as well (UCMP, 2008). Site-specific information generated by the applicant for the CPP was also reviewed. All research was conducted in accordance with accepted assessment protocol (SVP, 1995) to determine whether any known paleontologic resources exist in the general area. If present or likely to be present, Conditions of Certification which outline required procedures to mitigate impacts to potential paleontological resources, and proposed as part of the projects approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking, foundation settlement and expansive clays represent the main geologic hazards at this site. These potential hazards can be effectively mitigated through facility design by incorporating recommendations contained in a project-specific geotechnical report. The requirements of the proposed **Facility Design** Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section should also aid in mitigating these impacts to a less than significant level.

Numerous historic sand and gravel production pits are present along the length of the Santa Ana River. However, no viable geologic or mineralogic resources are known to exist within three miles of the proposed CPP plant site or project linears.

At least 18 current or former producing oil fields are present in Orange County or immediately offshore. These are primarily found along structural traps formed by the Whittier Fault north of the site and along the Newport-Inglewood Fault at the coastline south of the site. The nearest oilfields shown are the Olive Field (approximately 2,600 feet south) and the Richfield oil field which is approximately 4,400 feet north of the CPP site. No petroleum or natural gas deposits are known to exist beneath the project site (CDC, 1982; CDC, 1992; CDC, 2001).

No important paleontological resources were observed on the CPP site or along the off-site pipeline and cable routes during the paleontological field survey conducted for the project AFC (CPP, 2007a). The Natural History Museum of Los Angeles County and the San Bernardino County Museum consider the most recent unconsolidated alluvial deposits, which form the natural site surface, to hold little potential for preservation of significant fossil remains. However, the older Quaternary alluvium, which directly underlies the recent alluvium, has yielded fossils including fossil horse, mammoth, mastodon, sloth, wolf, bear, saber-toothed cats, camels, and bison from depths as shallow as 8 feet below surface in other areas. For this reason the paleontological sensitivity of older Quaternary (older Pleistocene) alluvium is considered to be high. Since the proposed CPP site construction would include significant amounts of grading, excavation, possible pile driving, and utility trenching, staff considers the probability that paleontological resources would be encountered during such activities to be high anytime excavation activities fully penetrate the fill and recent alluvial deposits and encounter older Quaternary alluvium. Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate paleontological resource impacts, as discussed above, to less than significant levels. These conditions essentially require a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist (paleontologic resource specialist; PRS).

The proposed Conditions of Certification allow the Energy Commission's compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, it is staff's opinion that the potential for significant adverse direct or indirect impacts to the project from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources from the proposed project, is low assuming the proposed Conditions of Certification are adopted and enforced.

GEOLOGICAL HAZARDS

The AFC (CPP, 2007a) provides documentation of potential geologic hazards at the proposed plant site. Review of the AFC, coupled with staff's independent research, indicates that the possibility of geologic hazards at the plant site, during its practical design life, is low. Geologic hazards, such as potential for expansive clay soils and settlement due to compressible soils and dynamic compaction, hydrocompaction, or dynamic compaction, are addressed in the project geotechnical report per CBC (2007) requirements (MACTEC, 2007).

Staff's independent research included the review of available geologic maps, reports, and related data of the CPP plant site. Geological information was available from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG), the U.S. Geological Survey (USGS), and other government organizations. Since 2002, the CDMG has been known as the California Geologic Survey.

Faulting and Seismicity

Type A faults have slip-rates of ≥5 mm per year and are capable of producing an earthquake of magnitude 7.0 or greater. Type B faults have slip-rates of 2 to 5 mm per year and are capable of producing an earthquake of magnitude 6.5 to 7.0. Eleven Type A Faults and 19 Type B faults have been identified within 50 miles of the proposed CPP Site. The fault type, potential magnitude, and distance from the site were summarized previously in **GEOLOGY AND PALEONTOLOGY Table 3**.

The Alquist-Priolo Act of 1973 and subsequent California state law (California Code of Regulations 2001) require that all occupied structures be set back 50 feet or more from the surface trace of an active fault. Since no active faults have been documented within the CPP power plant site, setbacks of occupied structures would not be required.

Energy Commission staff reviewed the CDMG publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions* (1994) and Alquist-Priolo Special Studies Zone mapping and reports (CDMG, 2003; CGS, 2002; and Hart and Bryant, 1999). No active faults are shown on published maps as crossing the boundary of new construction at the proposed CPP power plant site or its proposed pipeline and transmission routes. The nearest major active fault is the Whittier Fault located approximately 4.7 miles northeast. At least eight other active or potentially active faults are present within 20 miles of the site (**GEOLOGY AND PALEONTOLOGY Table 3**).

Most of the faults listed on **GEOLOGY AND PALEONTOLOGY Table 3** within 50 miles of the CPP plant site are northwest-striking right-lateral strike-slip faults related to regional transform faulting, of which San Andreas Fault Zone is the central structure. Most of the Elsinore Fault is strike-slip in character; however, the fault splays to the north near the Transverse Ranges into the Whittier and Chino-Central Avenue Faults. The history and sense of movement on these, and other faults, becomes more complicated as the transition zone between the Peninsular Ranges and Transverse Ranges Geomorphic Provinces are approached. For example, relative motion on the Whittier Fault has changed over time from normal in the Miocene epoch, to reverse in the Pliocene to early Pleistocene, to late Quaternary right-lateral strike-slip (Yeats, 2004). Structures that predominantly show reverse and thrust movement characteristic of the compressional tectonics of the Transverse Ranges include, the North Frontal Fault Zone, and the Cleghorn, Cucamonga, San Jose, and Sierra Madre Faults. The Elysian Park, Puente Hills and San Joaquin Hills (Compton) Blind Thrusts are also included in **GEOLOGY AND PALEONTOLOGY Table 3,** and developed in response to compressional tectonics. The reverse structures are generally north-dipping and trend east-west, although some are relatively shallow-dipping with variable orientations.

The project geotechnical investigation determined that the site soil class is seismic Class D. Seismic site Class D indicates that the soils profile is expected to amplify the ground shaking, relative to a bedrock site with the same earthquake loading. Site Class D requires the default amplification factors, typically used when no site-specific data is available. Evaluation of actual site class requires soils borings to a depth of 100 feet or in situ measurement of shear-wave velocity. Neither procedure was conducted for the proposed CPP site; however, default Class D is normally adequate for occupied structures of three stories or less. The soils borings also indicate that Class D is appropriate, at least for the upper 50 feet of the soils profile.

The estimated peak horizontal ground acceleration for the power plant is 0.63 times the acceleration of gravity (0.63g) for bedrock acceleration based on 2 percent probability of exceedence in 50 years under 2007 CBC criteria (USGS, 2007).

Liquefaction

Liquefaction is a condition where in a cohesionless soil may lose shear strength because of sudden increase in pore water pressure caused by an earthquake. The seismic hazards zones map for the Orange Quadrangle where the CPP site may be located indicates the project site is in an area "*…where historic occurrence of liquefaction or local geological, geotechnical, and groundwater conditions indicate a potential for permanent ground displacement such that mitigation as defined in Public Resources Code Section 2693(c) would be required*" (CDMG, 1999). The historic depth to ground water beneath the CPP site has been reported to be as shallow as 20 feet below surface. The more recent geotechnical report indicates groundwater was encountered approximately 50 feet below surface, which is too deep for significant surface settling due to liquefaction to occur (MACTEC, 2007). Liquefaction may not even occur below a depth of about 40 feet, simply due to the high overburden pressure. Therefore, the potential for liquefaction to significantly affect this project is negligible.

Lateral Spreading

Lateral spreading of the ground surface can occur within liquefiable beds during seismic events. Lateral spreading generally requires an abrupt change in slope, such as a nearby steep hillside or deeply eroded stream bank, but can also occur on gentle slopes. Other factors such as distance from the epicenter, magnitude of the seismic event, and thickness and depth of liquefiable layers also affect the amount of lateral spreading. Because the CPP site is not subject to significant liquefaction, and the slope is nearly flat, the potential for lateral spreading of the site surface during seismic events is negligible.

Dynamic Compaction

Dynamic compaction of soils can occur 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 is soil density). The decrease in volume can result in settlement of overlying structural improvements. Geotechnical investigation at the proposed CPP project site indicates the site surface consists of one to two feet of granular fill which is underlain by generally medium dense to dense granular soils with a loose layer occurring between approximately 5 to 10 feet below surface (MACTEC, 2007). Mechanical compaction of fill materials during placement could not be confirmed. Mitigation of the possible effects of dynamic compaction of site native and fill soils during an earthquake should be addressed in the final project geotechnical report, per CBC (2007) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**.

Hydrocompaction

Hydrocompaction (also known as hydro-collapse) is generally limited to young soils that were deposited rapidly in a saturated state, most commonly by a flash flood. The soils dry quickly, leaving an unconsolidated, low density deposit with a high percentage of voids. Foundations built on these types of compressible materials can settle excessively, particularly when landscaping irrigation dissolves the weak cementation that is preventing the immediate collapse of the soil structure. The geologic environment and geotechnical investigation of the CPP site suggests a low hydrocollapse potential. Any necessary mitigation measures for the effects of hydrocompaction of site soils should be addressed as required in the project-specific geotechnical report, per CBC (2007) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**.

Subsidence

Local subsidence or settlement may occur when areas containing compressible soils are subjected to foundation loads. Compressibility testing of soil samples from the site are presented in the geotechnical report (MACTEC, 2007). Test results indicate a low potential for compressibility at the CPP site. Additionally, regional studies conducted to evaluate the effects of subsidence due to pumping of groundwater, oil, and gas reserves indicate no significant regional subsidence is occurring. The recommendations for mitigation of the effects of normal subsidence due to foundation loads the project-specific geotechnical report, per CBC (2007) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. When needed, mitigation is normally accomplished by over-excavation and replacement of the compressible soils. For deep-seated conditions, deep foundations are commonly used.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist at a moisture content below their plastic limit. The addition of moisture from irrigation, precipitation, capillary tension, water line breaks, etc. causes the clay soils to absorb water molecules into their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to excessive movement (heave) of overlying structural improvements. Plasticity index tests, which are also an indicator of the expansive potential and clay content in soils, were not performed during the site geotechnical investigation. The potential for and mitigation of the effects of expansive soils was addressed in the project-specific geotechnical report by conducting compaction testing of site native soil samples, per CBC (2007) requirements and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Site subsurface soils were found to have low expansion potential (MACTEC, 2007). Expansive soil mitigation, when necessary, is normally accomplished by over-excavation and replacement of the soils. For deep-seated conditions, deep foundations are commonly used. Lime-treated (chemical modification) is often used to mitigate expansive clays in pavement areas.

Landslides

The CPP site slopes gently to the south-southwest at a gradient of approximately 1%. Although numerous landslides and slumping have been documented along the northern margin of the Peralta Hills, approximately 2.5 miles east of the site (CDMG, 1998 and

Tan, 1995), the gradual slope of the site coupled with the absence of topographically high ground within or immediately upgradient from the site suggest it is not susceptible to landslide activity. The project-specific engineering geology report should verify that landslide potential is minimal, in accordance with the requirements of the CBC (2007) and proposed **Facility Design** Condition of Certification **GEN-4**.

Flooding

The Federal Emergency Management Agency (FEMA) has identified the CPP site and project linears as lying in Unshaded Zone X, which are “areas determined to be outside the 0.2% annual chance flood plain” (FEMA, 2004). The site is listed as being located in a potential inundation area if earthquake induced dam failure should occur at the Prado or Carbon Canyon dams. However, current design and construction practices coupled with ongoing monitoring, design review and dam modification all work to ensure the dams are capable of withstanding the maximum credible earthquake at their location. Therefore, the potential for CPP site inundation due to dam failure is considered to be low.

Tsunamis and Seiches

Tsunamis are large-scale seismic-sea waves caused by offshore earthquakes, landslides and/or volcanic activity. The proposed CPP power plant site lies inland approximately 15 miles from the Pacific Ocean. The potential tsunami height that might impact Southern California has been estimated at up to 11.5 feet (McCullogh, 1985). Recently, run-up heights up to three feet above mean sea level (msl) have been predicted on the Southern California coastline, although heights up to 16 feet could occur at San Diego due to the configuration of the bay (CSSC, 2005). Given the power plant footing elevation of approximately 130 feet msl, a tsunami of the maximum indicated height of 11.5 feet cannot impact the CPP site. No large inland surface water bodies which could produce seiches are located near the proposed plant site.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff has reviewed applicable geologic maps and reports for this area (CDC, 2001; CDC, 1992; CDMG, 1966; CDMG, 1990; CDMG, 1994; CDMG, 1997; CDMG, 1998b; CDMG, 1999; CDMG, 2003; McCleod, 2008; Randall, 2008; Scott, 2008; UCMP, 2008). Historically, minor quantities of gold, silver, and other metals as well as industrial minerals such as barite and kaolinite were produced in Orange County, primarily from the Cenozoic to Tertiary volcanic, intrusive, metamorphic, and sedimentary rocks which form the highlands of the northeast, east, and southeast portions of the county (CDMG, 1998). Alluvium and colluvium of the Santa Ana River and Santiago Creek have yielded primarily aggregate in the form of sand and gravel.

Staff did not identify any geological resources at the facility location or along project linears. Borehole data reviewed by the CDMG (1980) has indicated the site is underlain by between 100 to 110 feet of Holocene age alluvium which overlies approximately 3,400 to 3,600 feet of older (non-Holocene) Quaternary sediments. This may be due to the presence of a deep structural syncline beneath the Santa Ana River which has formed in response to regional compressional tectonics (CDMG, 1976). Given the absence of rock outcrops on or near the site surface there is very low potential for this site to have economically valuable mineral deposits.

Energy Commission staff has reviewed the Paleontological Resources assessment in Section 5.8 and Paleontological Records Search and Literature Review (Confidential) in Appendix E3 of the AFC (CPP, 2007a). Staff has also reviewed the paleontological literature and records searches conducted by the Natural History Museum of Los Angeles County (NHMLC) (McCleod, 2008), the San Bernardino County Museum (Scott, 2008), as well as the online records database maintained by the University of California, Museum of Paleontology (UCMP, 2008). No paleontological finds have been documented on the CPP plant site or along the project linears.

Construction Impacts and Mitigation

The design-level geotechnical investigation required for the project by the CBC (2007) and proposed **Facility Design** Condition of Certification **GEN-1** provides standard engineering design recommendations for mitigation of potential expansive clay soils, as well as excessive settlement due to compressible soils or dynamic compaction, as appropriate (See proposed **Conditions of Certification, Facility Design**).

As noted above, no viable geologic or mineralogic resources are known to exist within three miles of the CECP construction site or linear routes, although historic PCC-grade aggregate pits are present along the length of the Santa Ana River. The potential to impact significant paleontological resources in older Quaternary (older Pleistocene) sediments, especially in deeper excavations, is considered to be high. Fill materials have a negligible paleontological sensitivity. Construction of the proposed project would include grading, excavation, and utility trenching. Staff considers the probability of encountering paleontological resources to be generally high in excavations which penetrate through the recent alluvium and encounter older Quaternary alluvium. The potential for encountering fossils would increase with the depth of cut.

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. Essentially, these conditions require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (paleontologic resource specialist; PRS). Earthwork is halted any time potential fossils are recognized by either the paleontologist or the worker. When properly implemented, the Conditions of Certification yield a net gain to the science of paleontology since fossils that would not other wise have been discovered can be collected, identified, studied, and properly curated. A paleontological resource specialist is retained, for the project by the applicant, to produce a monitoring and mitigation plan, conduct the worker training, and provide the on site monitoring. During the monitoring, the PRS can and often does petition the CEC for a change in the monitoring protocol. Most commonly, this is a request for lesser monitoring after sufficient monitoring has been performed to ascertain that there is little chance of finding significant fossils. In other cases, the PRS can propose increased monitoring due to unexpected fossil discoveries or in response to repeated out-of-compliance incidents by the earthwork contractor.

Based upon the literature and archives search, field surveys, and compliance documentation for the CPP, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the project. Energy Commission staff believes that the facility can be designed and constructed to minimize the effect of geologic hazards at the site during project design life and that impacts to vertebrate fossils encountered during construction of the power plant and associated linears would be mitigated to a level of insignificance.

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, foundation settlement due to compressible soils, dynamic compaction, and the possible presence of expansive clay soils can be effectively mitigated through facility design (See proposed **Conditions of Certification 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

The proposed CPP project site is situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by the CBC (2007). Expansive materials, as well as compressible soils and soils that may possibly be subject to subsidence due to dynamic compaction, must be mitigated in accordance with the design-level geotechnical investigation as required by the CBC (2007), and proposed Conditions of Certification **GEN-1, GEN-5, and CIVIL-1** under **Facility Design**. Paleontological resources have been documented in the general area of the project and in sediments similar to those that are present at depth on the site. However, to date, none have been found on the plant site or along project linear routes. The potential impacts to paleontological resources due to construction activities would be mitigated as required by proposed Conditions of Certification **PAL-1 to PAL-7**.

Staff believes that the potential for significant adverse cumulative impacts to the proposed project from geologic hazards, during the project's design life, is low, and that the potential for impacts to geologic, mineralogic, and paleontologic resources is very low.

Based upon the literature and archives search, field surveys and compliance documentation for the proposed CPP project, the applicant proposes monitoring and mitigation measures for construction of the project. Energy Commission staff agrees with the applicant that the project can be designed and constructed to minimize the effects of geologic hazards at the site, and that impacts to scientifically significant vertebrate and invertebrate fossils encountered during construction would be mitigated to levels of less than significant.

The proposed Conditions of Certification allow the Energy Commission (CPM) and the applicant to adopt a compliance monitoring scheme ensuring compliance with applicable LORS for geologic hazards and geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

Facility closure activities are not expected to impact geologic or mineralogic resources since no such resources are known to exist at either the project location or along its proposed linears. In addition, the decommissioning and closure of the project should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any agency or public comments regarding geologic hazards, mineral resources, or paleontology at this time.

CONCLUSIONS

The applicant would be able to comply with applicable LORS, provided that the proposed Conditions of Certification are adopted and enforced. The design and construction of the project should have no adverse impact with respect to 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 engineering geology are proposed under Conditions of Certification **GEN-1, GEN-5, and CIVIL-1** in the **FACILITY DESIGN** section. Proposed paleontological Conditions of Certification follow in **PAL-1** through **PAL-7**. It is staff's opinion that the likelihood of encountering paleontologic resources is high on portions of the plant site and along buried pipelines connecting to the plant. Staff will consider reducing monitoring intensity, at the recommendation of the project PRS, following examination of sufficient, representative, deep excavations to fully understand site stratigraphy.

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 keep resumes on file for qualified 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 of 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, 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's 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 lay down areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and 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 be at a scale between 1 inch = 40 feet and 1 inch = 100 feet range. If the footprint of the project or its linear facilities change, the project owner shall provide maps and drawings reflecting those changes to the PRS and CPM.

If construction of the project proceeds 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. Before work commences 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 the following week, and 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 five days of identifying the changes.

PAL-3 The project owner shall ensure that 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 the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's 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 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 monitoring and sampling;

6. A discussion of 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 meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive 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 involved with or who 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 a CPM-approved video or in-person presentation. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance shall occur prior to CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontologic sensitivity;
3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;
4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and
7. A sticker that shall be placed 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 for workers 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 to use 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 potential 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 as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule 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 and will be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.

3. The project owner shall ensure that the PRS notifies the 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 event where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. 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, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings 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 or any changes to the monitoring plan that have been 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.

<u>Verification:</u> The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is 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, through the designated PRS, shall ensure that 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 project construction.

<u>Verification:</u> The project owner shall maintain in his/her 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 project completion and approval of the CPM-approved paleontological resource report (see **PAL-7**). The project owner shall be responsible for paying 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 submit it 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.

<u>Verification:</u> Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
Canyon Power Plant (07-AFC-09)

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, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands 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
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			

Cultural Trainer: ______________ Signature:___________________ Date: ___/___/____

PaleoTrainer: _______________ Signature:___________________ Date: ___/___/____

Biological Trainer: ______________Signature:________________ Date:___/___/__

REFERENCES

Blake, T.F., 2006a. EQFAULT Version 3.00. *A Computer Program for the Deterministic Estimation of Peak Acceleration Using Three-Dimensional California Faults as Earthquake Sources*, http://thomasfblake.con/eqfault.htm.

Blake, T.F., 2006b. EQSEARCH Version 3.00. *A Computer Program for the Estimation of Peak Acceleration from California Historical Earthquake Catalogs*, http://thomasfblake.con/eqsearch.htm.

California Code of Regulations, Title 24. 2001. (*California Building Standards Code* [CBSC]), Part 2, *California Building Code* (CBC).

CBC (California Building Code). 2007.

CCA (California Coastal Act). 2008. Division 20 of the California Public Resources Code.

CDC (California Department of Conservation). 2001. *Oil, Gas, and Geothermal Fields in California.*

CDC. 1992. *California Oil & Gas Fields, Volume II (Southern, Central Coast, and Offshore California).*

CDC. 1982. *Oil &, Gas Prospect Wells Drilled in California Through 1980.* Publication No. TR01, Second Edition.

CDMG (California Division of Mines and Geology). 2003. *Fault Investigation Reports for Development Sites Within Alquist-Priolo Earthquake Fault Zones in Southern California, 1974-2000.*

CDMG. 1999. *Mines and Mineral Producers Active in California (1997–1998).* Special Publication 103.

CDMG.1998a. *Seismic Hazard Zones Map, Orange Quadrangle.*

CDMG. 1998b. *Gold Districts of California*, Sesquicentennial Edition, California Gold Discovery to Statehood. Bulletin 193.

CDMG. 1997. *Seismic Hazard Zone Report for the Orange 7.5-Minute Quadrangle, Orange County, California.* Seismic Hazard Zone Report 011.

CDMG. 1994. *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions, Scale: 1:750,000.*

CDMG. 1990. *Industrial Minerals in California: Economic Importance, Present Availability, and Future Development*. Special Publication 105, reprinted from U.S. Geological Survey Bulletin 1958.

CDMG.1980. *Classification and Mapping of Quaternary Sedimentary Deposits for Purposes of Seismic Zonation, South Coastal Los Angeles Basin, Orange County, California*. Open File Report 80-19.

CDMG. 1976. *Environmental Geology of Orange County, California.* Open File Report 79-8 LA.

CDMG. 1966. *Geologic Map of California, Santa Ana Sheet.* Scale 1:250,000.

CGS (California Geological Survey). 2002. *California Geomorphic Provinces*. CGS Note 36.

CPP (Canyon Power Plant), 2007a. *Application for Certification, Canyon Power Plant, Anaheim, California.* SCPPA, December, 2007.

California Seismic Safety Commission (CSSC). 2005. The Tsunami Threat to California, Findings and Recommendations on Tsunami Hazards and Risks. December.

FEMA (Federal Emergency Management Agency), 1997. *Flood Insurance Rate Map, Orange County, California and Incorporated Areas, Flood Insurance Rate Map No. 06059C0151H, February 18, 2004.*

Hart, E. W. and Bryant, W. A., 1999. *Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps:* California Division of Mines and Geology Special Publication 42.

ICC (International Code Council), 2006. *International Building Code*.

Lajoie, K.R., Ponti, D.J., Powell, C.L., Mathieson, S.A., and Sarna-Wjcicki, A.M. 1991. *Emergent Marine Strandlines and Associated Sediments, Coastal California; A Record of Sea-Level Fluctuations, Vertical Tectonic Movements, Climate Changes and Coastal Processes*. In The Geology of North America, Volume K-2, Quaternary Non-Glacial Geology: Coterminous U.S. Geological Society of America.

MACTEC, 2007. *Report of Geotechnical Investigation Proposed City of Anaheim 200 MW Peaking Power Plant.*

McLeod, S.A. 2008. Unpublished paleontology resources report. Natural History Museum of Los Angeles County, Los Angeles, California, 2 p.

McCulloch, D.S. 1985. *Evaluating Tsunami Potential*. In Evaluating Earthquake hazards in the Los Angeles Region – An Earth-Science perspective. P. 375-413.

Morton, P.K., and Miller, R.V., 1981. *Geologic Map of Orange County California, Showing Mines and Mineral Deposits.* CDMG Mineral Map MM-007, Bulletin 204, Plate 1.

Norris, R. M. and R. W. Webb. 1990. *Geology of California*. Second Edition. John Wiley and Sons. New York.

Randall, K.A. 2008. Unpublished paleontology resources report. San Diego Natural History Museum, San Diego, California, 10 p.

Scott, E. 2008. Unpublished letter report. San Bernardino County Museum, Redlands, California, 4 p.

Southern California Earthquake Center (SCEC). 2008. Data Center Website: http://www.data.scec.org/.

SVP (Society for Vertebrate Paleontology), 1995. *Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontologic Resources: Standard Procedures.*

Tan, Siang S., 1995. *Landslide Hazards in the Orange Quadrangle, Orange County, California, Landslide Hazards Identification Map No. 34*. CDMG Open File Report OFR95-11.

United States Geological Survey (USGS). 2007. *Earthquake Ground Motion Parameters,* Version 5.0.8.

University of California Museum of Paleontology (UCMP). 2008. Paleontology Collection Locality Records Website: http://ucmpdb.berkeley.edu/.

Yeats, Robert S. 2004, Tectonics of the San Gabriel Basin and Surroundings, Southern California, GSA Bulletin, v. 116, no. 9/10.

POWER PLANT EFFICIENCY

Testimony of Erin Bright and Steve Baker

SUMMARY OF CONCLUSIONS

The Canyon Power Plant project, if constructed and operated as proposed, would generate a nominal 200 MW of peak electric power. While the project would consume substantial amounts of energy, with an overall project fuel efficiency of approximately 38% lower heating value (LHV) at maximum full load, it would do so in the most efficient manner practicable. The project would not require additional sources of energy supply, would not consume energy in a wasteful or inefficient manner, and would not create significant adverse impacts on energy supplies or resources.

INTRODUCTION

The Energy Commission makes findings as to whether energy use by the Canyon Power Plant project would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the Canyon Power Plant'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 support the Energy Commission's 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 apply to the efficiency of this project.

SETTING

The Southern California Public Power Authority (SCPPA) proposes to construct a 200 MW (nominal net output) natural gas fired, simple cycle electrical generating facility in Anaheim, California, to be operated by the city of Anaheim. The Canyon Power Plant (CPP) would provide electricity to meet internal demand from the city of Anaheim exclusively.

The applicant intends to operate each of the plant's four GE LM6000PC SPRINT combustion turbine generators no more than approximately 1,000 engine hours per year

(4,006 engine hours total for four CTGs), or approximately 11.4 percent of the year (CofA2007a, AFC §§ 3.4.1, 3.8). Each combustion turbine generator would utilize a mechanical inlet air chiller to maintain maximum output and efficiency at escalated temperatures. Natural gas would be transmitted to the plant via a new 12-inch diameter pipeline 3,240 feet to connect with a SoCal Gas Company transmission line (CofA2007a, AFC §§1.1, 3.1, 3.4.6).

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

At full load operation, the CPP is expected to consume natural gas at a maximum rate of 31,670 standard cubic feet per minute (CofA2007a, AFC § 3.4.6), or 1,735 million Btu per hour LHV. This is a substantial rate of energy consumption and could potentially impact energy supplies. Under expected project conditions, electricity would be generated at a thermal efficiency of approximately 38% LHV at full load operation (CofA2007a, AFC § 3.4.4.2, Figures 3-3, 3-4).

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of supply of natural gas for the project in the Application for Certification (CofA2007a, AFC §§ 1.1, 2.1, 3.4.6). Natural gas for the CPP would be supplied by a new 12-inch diameter natural gas transmission pipeline to be constructed, owned, operated and maintained by Southern California Gas Company (SoCalGas). The SoCalGas natural gas supply represents an adequate source for a project of this size; it is highly unlikely that the project could pose a significant adverse impact on natural gas supplies in California.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel would be supplied to the project by a new SoCalGas 12-in diameter high pressure pipeline (CofA2007a, AFC §§ 1.1, 2.1, 3.4.6). SoCalGas is a resource with adequate delivery capacity for a project of this size. There is no real likelihood that the CPP would require the development of additional energy supply capacity.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of the CPP or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT, AND UNNECESSARY ENERGY CONSUMPTION

The CPP 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 additional peak electricity generation to the city of Anaheim to meet projected summer load. The applicant expects that the CPP would mostly operate to meet peak demand and provide local reliability service, allowing the city of Anaheim to meet resource adequacy requirements (CofA2007a, AFC § 1.1, 2.1.2). A simple cycle configuration is consistent with and supports this expectation due to its operating flexibility.

The CPP would be configured as four simple cycle power plants in parallel, in which electricity is generated by one natural gas-fired turbine generator per plant, four combustion turbine generators (CTG) total. This configuration, with its short start-up time and fast ramping[1] capability, is well suited to providing peaking power. Further, when reduced output is required, one or more of the turbine generators can be shut down, allowing the remaining machines to produce a percentage of the full power at optimum efficiency, rather than operating a single, larger machine at an inefficient part load output.

The applicant intends for this facility to operate in peaking duty up to a total of 4,006 engine hours for the four CTGs (an average of approximately 1,000 hours per turbine operating at full load). This is equivalent to each of the four turbines operating approximately 11.4% of the year (CofA2007a, AFC § 3.8.2.1).

Equipment Selection

Modern gas turbines embody the most fuel-efficient electric generating technology available today. The applicant would employ four General Electric LM6000PC SPRINT gas turbine generators (CofA2007a, AFC § 1.2, 3.4.1). The LM6000PC SPRINT gas

[1] "Ramping" is increasing and decreasing electrical output to meet fluctuating load requirements.

turbine to be employed in the CPP represents one of the most modern and efficient such machines now available. The SPRINT version of this machine is nominally rated at 50 MW and 40.3% efficiency LHV at ISO[2] conditions (GTW 2008). This rating differs from the projected efficiency for the CPP of 38% LHV because of efficiency losses from parasitic loads and increased flow losses due to the selective catalytic reduction units used on the exhaust of each unit.

Efficiency of Alternatives to the Project

Alternative Generating Technologies

Alternative generating technologies for the CPP are considered in the AFC (CofA2007a, AFC § 5.5). Fossil fuels (oil and coal), biomass, geothermal, hydroelectric, solar, and wind technologies are all considered. Biomass and fossil fuels other than natural gas cannot meet air quality limitations. Renewables require more physical area and are not always available when peaking power is needed (see the "Alternative Electricity Generating Technologies" portion of the **Alternatives** section of this document). Given the project objectives, location, and air pollution control requirements, staff agrees with the applicant that only natural gas-burning technologies are feasible.

Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil-fired power plant (Power 1994). Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a power plant, the plant owner is thus strongly motivated to purchase fuel-efficient machinery.

Capital cost is also important in selecting generating machinery. Recent progress in the development of 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 applicant plans to employ four General Electric LM6000PC SPRINT gas turbine generators (CofA2007a, AFC § 1.2, 3.4.1). The SPRINT version of this machine is nominally rated at 50 MW and 40.3% efficiency LHV at ISO[3] conditions (GTW 2008). (Staff compares alternative machines' ISO ratings as a common baseline, since project-specific ratings are not available for the alternative machines.) Alternative machines that can meet the project's objectives are the SGT-800 and FT8 TwinPac which, like the LM6000, are aeroderivative machines, adapted from Siemens Power Generation and Pratt & Whitney aircraft engines, respectively.

The Siemens SGT-800 gas turbine generator in a simple cycle configuration is nominally rated at 47 MW and 37.5% LHV at ISO conditions (GTW 2008).

[2] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level).

[3] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level).

The Pratt & Whitney FT8 TwinPac gas turbine generator in a simple cycle configuration is nominally rated at 51 MW and 38.4% LHV at ISO conditions (GTW 2008).

Machine	Generating Capacity (MW)	ISO Efficiency (LHV)
GE LM6000PC SPRINT	**50**	**40.3 %**
Siemens SGT-800	47	37.5 %
P & W FT8 TwinPac	51	38.4 %

Source: GTW 2008

The LM6000PC SPRINT is further enhanced by the incorporation of spray intercooling (thus the name, SPRay INTercooling). This takes advantage of the aeroderivative machine's two-stage compressor.[4] By spraying water into the airstream between the two compressor stages, the partially compressed air is cooled, reducing the amount of work that must be performed by the second stage compressor. This reduces the power consumed by the compressor, yielding greater net power output and higher fuel efficiency. The benefits in generating capacity and fuel efficiency increase with rising ambient air temperatures (GTW 2000).

While the LM6000 enjoys a slight advantage in fuel efficiency over the alternative machines, any differences among the three in actual operating efficiency would be relatively insignificant. Other factors such as generating capacity, cost, and ability to meet air pollution limitations are some of the factors considered in selecting the turbine model.

Inlet Air Cooling

A further choice of alternatives involves the selection of gas turbine inlet air-cooling methods.[5] 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 a mechanical chiller (CofA2007a, AFC §§ 1.2, 3.4.1, 3.4.4.1). Given the relative lack of clear superiority of one system over the other, staff agrees that the applicant's approach would yield no significant adverse energy impacts.

[4] The larger industrial type gas turbines typically are single-shaft machines, with single-stage compressor and turbine. Aeroderivatives are two-shaft (or, in some cases, three-shaft) machines, with two-stage (or three-stage) compressors and turbines.

[5] A gas turbine's power output decreases as ambient air temperatures rise. The LM6000 SPRINT produces peak power at 50°F; this peak output can be maintained in much hotter weather by cooling the inlet air.

In conclusion, the project configuration (simple cycle) and generating equipment chosen appear to represent the most efficient feasible combination to satisfy the project objectives. There are no alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

No nearby projects have been identified that could potentially combine with the Canyon Power Plant project to create cumulative impacts on natural gas resources. The SoCal Gas natural gas supply system draws from extensive supplies originating in the Rocky Mountains, in the southwest, and in Canada, and is capable of delivering the required amount of gas to both of these projects. Therefore, staff believes the SoCal Gas system is adequate to supply the CPP without adversely impacting its other customers.

NOTEWORTHY PROJECT BENEFITS

The applicant expects the CPP to help meet local electricity generation resource adequacy requirements for the city of Anaheim. By doing so in a fuel-efficient manner with GE LM6000 SPRINT gas turbines, one of the most modern and efficient such machines now available, the Canyon Power Plant would benefit electric consumers in California.

AGENCY AND PUBLIC COMMENTS

The City of Yorba Linda submitted comments on staff's Preliminary Staff Assessment (CofYL 2009a) to the effect that the Canyon Power Plant should be configured not as a peaking power plant, but as three rapid start combined cycle units instead of four simple cycle units. The reasoning behind this conclusion is that the City of Yorba Linda, downwind of the project, would thus be subjected to less pollution from the plant's exhaust.

A rapid start combined cycle power plant differs from a conventional combined cycle partly in the design of the heat recovery steam generator (HRSG). Design options include reducing material and piping runs to reduce thermal mass and thermal stresses, and the use of a once through steam generator (OTSG). The OTSG is simpler than the heat recovery steam generator in a conventional combined cycle plant and, unlike the conventional HRSG, can be operated dry, that is, with no water or steam in the tubes. The result is that the gas turbine generator can be started and run up to full power in ten minutes or less, providing as much as 75% of full power. The steam cycle can then be started and loaded in another thirty minutes to three hours or so. An OTSG rapid start combined cycle plant can be expected to exhibit fuel efficiency as high as 49% LHV in steady-state full load operation, or about midway between a simple cycle gas turbine plant and a conventional combined cycle plant.

The City of Anaheim has explained at length why its resource needs could not be satisfied by a combined cycle plant (GB 2009g), and further why it would be fiscally irresponsible to build a combined cycle plant to serve the utility's peaking needs. Indeed, if the COA were to invest the capital necessary to build a more fuel-efficient combined cycle plant, it would be obligated to dispatch the plant more in order to justify its existence. This would expose Yorba Linda to more exhaust pollution, not less. Installing a combined cycle plant of any type to serve the COA's peaking and capacity needs is not sensible. The proposed project appears to be the optimum configuration to satisfy the COA's needs.

Note that the COA's plan leaves open the possibility of building the proposed simple cycle plant now, then converting it to a rapid start combined cycle plant in the future, as load grows and more energy is required from the plant. As this is written, the Energy Commission is processing applications from GWF to convert two LM6000-based simple cycle plants to just this configuration.[6]

CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 200 MW of peaking electric power, at an overall project fuel efficiency of approximately 38% LHV at maximum full load. While it would consume substantial amounts of energy, it would do so in the most efficient manner practicable. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would 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.

REFERENCES

CEC 2004 rr – California Energy Commission. Integrated Energy Policy Report 2004 Update, "Reliability Concerns with Aging Power Plants", p. 5. Publication # 100-02-004CM. Submitted to CEC/Dockets on 12/13/2004.

CofA2007a – City of Anaheim/S. Sciortino (tn: 43903). City of Anaheim's Canyon Power Plant Application for Certification Volume I & II. Submitted to CEC/Docket Unit on 12/28/2007.

CofYL 2009a – City of Yorba Linda/S. Harris (tn 51650). Comment Letter from City of Yorba Linda, dated 5/11/09. Submitted to CEC/Docket Unit on 5/22/09.

GB 2009g – Galati & Blek/M. Mills (tn 51881). SCPPA's Final Comments on the Preliminary Staff Assessment, dated 6/9/09. Submitted to CEC/Docket Unit on 6/9/09.

[6] The GWF Hanford (01-EP-07) and GWF Henrietta (01-AFC-18) amendments are currently in review by Energy Commission staff.

GTW (Gas Turbine World). 2008. *Gas Turbine World,* Volume 26 (the *2008 GTW Performance Specs*), pp. 11-20.

GTW (Gas Turbine World). 2000. ”LM6000 SPRINT design enhanced to increase power and efficiency”, *Gas Turbine World*, July-August 2000, pp. 16-19.

Power (Power Magazine). 1994. “Operating and maintaining IPP/cogen facilities,” Power, September 1994, p. 14.

POWER PLANT RELIABILITY

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

The applicant predicts an equivalent availability factor approaching 98%, which staff believes is achievable. Based on a review of the proposal, staff concludes that the Canyon Power 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.

INTRODUCTION

In this analysis, Energy Commission staff addresses the reliability issues of the proposed Canyon Power Plant to determine if the power plant is likely to be built in accordance with applicable laws, ordinances, regulations, and standards (LORS) and 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 the “Setting” subsection 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 applicable LORS and with typical industry norms for reliability of power generation. While Southern California Public Power Authority (SCPPA) has predicted an equivalent availability factor approaching 98% for the Canyon Power Plant (CPP) (see below), staff uses typical industry norms as a benchmark, rather than SCPPA’s projection, to evaluate the project’s reliability.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Although no federal, state, or local/county LORS apply to the reliability of this project, recently adopted laws and regulations influence the project’s operational requirements (see “Setting,” below).

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 (California ISO), that purchase, dispatch, and sell electric power throughout the state. Determining how the California ISO and other control area operators would ensure system reliability has been an ongoing process; protocols have been developed and put in place that allow sufficient reliability to be maintained under the competitive market system. “Must-run” power purchase agreements and “participating generator” agreements, for example, are two mechanisms that have been employed to ensure an adequate supply of reliable power.

In September 2005, California AB 380 (Núñez, Chapter 367, Statutes of 2005) became law. This modification to the Public Utilities Code requires the California Public Utilities Commission to consult with the California ISO to establish resource adequacy requirements for all load-serving entities (basically, public and privately owned utility companies). These requirements include maintaining a minimum reserve margin (extra generating capacity to serve in times of equipment failure or unexpected demand) and maintaining sufficient local generating resources to satisfy the load-serving entity’s peak demand and operating reserve requirements.

In order to fulfill this mandate, the California ISO has begun to establish specific criteria for each load-serving entity under its jurisdiction. These criteria guide each load-serving entity in deciding how much generating capacity and ancillary services to build or purchase, after which the load-serving entity issues power purchase agreements to satisfy these needs. The City of Anaheim, as a member of the SCPPA and a load-serving entity, is obligated to satisfy these criteria, which include maintaining a 15 percent reserve margin and increasing local generation to reduce reliance on imported power (CofA 2007a, AFC §§ 2.1.1, 2.1.2, 2.1.3).

The California ISO’s mechanisms to ensure adequate power plant reliability apparently were devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there has been valid 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 California ISO to ensure system reliability would prove invalid, with potentially disappointing results. Accordingly, staff has recommended 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 a 200-MW (nominal output) simple cycle peaking and intermediate load power plant, providing power to support local demand in the City of Anaheim (CofA 2007a, AFC §§ 1.1, 2.1.1, 2.1.2, 2.1.3). The CPP is expected to achieve an equivalent availability factor approaching 98 percent (CofA 2007a, AFC §§ 3.4.1, 3.4.4.1, 3.10.3.2). The project will be dispatched to serve peak loads at times of high demand, to provide local generation, to achieve the City of Anaheim’s required reserve margin, to bid into the CAISO’s ancillary services and energy markets, and to provide back-up for renewable resources such as as-available windpower (CofA 2007a, AFC §§ 2.1.1, 2.1.2, 2.1.3, 3.8.2.1, 3.10.3, 5.2).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to the manner in which the project is to be designed, sited, and operated to ensure safe and reliable operation (Cal. Code Regs., tit. 20, § 1752[c]). Staff 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.

The equivalent 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 (CofA 2007a, AFC § 3.8.4), the CPP 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 power plant 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 (CofA 2007a, AFC §§ 3.10.7, 3.10.7.1, 3.10.7.2) 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 **Facility Design** section of this document.

PLANT MAINTAINABILITY

Equipment Redundancy

A peaking generating facility commonly offers adequate opportunity for maintenance work during its downtime; the applicant proposes to operate the CPP no more than 4,320 machine-hours per year, or 11.4 percent of the year (CofA 2007a, AFC §§ 3.8.1, 3.8.2.1, 3.10.3.2; GB 2009k). 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. The fact that the project consists of four 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, all plant ancillary systems are also designed with adequate redundancy to ensure continued operation in the face of equipment failure (CofA 2007a, AFC §§ 1.4, 3.4.5.4, 3.4.5.5, 3.4.5.6, 3.4.12.5, 3.4.12.6, 3.8.2.5, 3.10.4.1, 3.10.4.2; Table 3.10-1). 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 (CofA 2007a, AFC §§ 3.8.2.1, 3.10.1, 3.10.3.1). 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 CPP will burn natural gas supplied by Southern California Gas Company (SoCalGas). Natural gas fuel will be supplied to the project via a new 12-inch diameter pipeline 3,240 feet long, from SoCalGas' existing transmission Line L-1218 (CofA 2007a, AFC §§ 1.2, 2.1, 3.1, 3.4.6, 3.6.1.1, 3.6.1.2, 3.10.6, 3.10.6.1). The SoCalGas natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas. Staff agrees with the applicant's prediction (CofA 2007a, AFC § 3.10.6) that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The CPP will obtain recycled water from the Orange County Groundwater Replenishment System via a new 14-inch diameter pipeline 2,185 feet long. This pipeline receives water from a new booster pump station connecting to an existing 60-inch diameter Orange County Water District recycled water line (CofA 2007a, AFC §§ 1.2, 1.4, 2.1, 3.1, 3.4.7.1, 3.6.2, 3.8.4; Appendix O). This water will be stored in a 350,000 gallon raw water storage tank, and will serve as cooling tower makeup to cool the gas turbine inlet air chillers. A portion will be demineralized and stored in a 180,000 gallon demineralized water storage tank (CofA 2007a, AFC § 3.4.7.1.2, Table 3.4-1), from which it will serve as gas turbine SPRINT injection water and combustor injection water.

Potable water from the City of Anaheim system will be used for safety and sanitary water (showers, safety showers, and eyewash stations) and for fire water, as well as function as a backup source if the supply of recycled water is interrupted (CofA 2007a, AFC §§ 1.4, 3.4.7.1.2, 3.6.3, 3.8.4). Staff believes these sources, combined with the on-site storage capacity, yield 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 in Seismic Risk Zone 4 and is located in a zone of seismic activity (CofA 2007a, AFC §§ 6.3.1.4, 6.3.1.5, 6.3.1.6); see the **Geology and Paleontology** section of this document. The project will be designed and constructed to the Seismic Zone 4 standards of the latest appropriate LORS (CofA 2007a, AFC § 5.4.4).

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 the **Facility Design** section of this document. 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 500-year floodplain (CofA 2007a, AFC § 6.3.1.6.3). With proper plant design (ensured by adherence to the proposed **Facility Design** conditions of certification), staff believes there should be no significant concerns with power plant functional reliability due to flooding. For further discussion, see the **Soil and Water**

Resources and **Geology and Paleontology** sections of this Preliminary Staff Assessment.

COMPARISON WITH EXISTING FACILITIES

The North American Electric Reliability Corporation (NERC) keeps industry statistics for availability factors (as well as many other related reliability data). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System 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 2002 through 2006 (NERC 2007):

- for Gas Turbine units (50 MW and larger):

  Equivalent Availability Factor = 91.82 percent

The gas turbines that will be employed in the project have been on the market for several years; General Electric has documented typical annual availability for this machine of 97.8% (CofA 2007a, AFC §§ 3.4.4.1, 3.10.3.2). The applicant's prediction of an annual availability factor approaching 98 percent (CofA 2007a, AFC § 3.4.1) appears reasonable compared to General Electric's experience. In fact, these new machines can well be expected to outperform the fleet of various (mostly older) gas turbines that make up the NERC statistics. Further, since the plant will consist of four parallel gas turbine generating trains, maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures. 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 follow 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 intermediate duty generation to serve the needs of the City of Anaheim, to meet resource adequacy requirements, to provide additional local generating capacity, to provide back-up to as-available wind power, and to offer ancillary services to the CAISO such as spinning reserve and Automated Generation Control (CofA 2007a, AFC §§ 1.1,2.1.1, 2.1.2, 2.1.3, 3.8.2, 3.8.2.1, 3.8.2.1.1, 3.10.3). The fact that the project consists of four 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 approaching 98% appears achievable. Staff believes this should provide an adequate level of reliability.

PUBLIC AND AGENCY COMMENTS

No comments were received.

CONCLUSION

SCPPA predicts an equivalent availability factor approaching 98%, 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.

REFERENCES

CofA 2007a – City of Anaheim/S. Sciortino (tn: 43903). City of Anaheim's Canyon Power Plant Application for Certification Volume I & II. Submitted to CEC/Docket Unit on 12/28/2007.

GE 2008 - General Electric website www.gepower.com, January 2008.

GB 2009k - Galati & Blek/M. Mills (tn 52179). Final Determination of Compliance, dated 06/26/09. Submitted to CEC/Docket Unit on 06/26/09.

McGraw-Hill 1994 - McGraw-Hill Energy Information Services Group. Operational Experience in Competitive Electric Generation, an Executive Report, 1994.

NERC 2007 - North American Electric Reliability Corporation. 2002–2006 Generating Availability Report, November 8, 2007.

TRANSMISSION SYSTEM ENGINEERING

Testimony of Sudath Arachchige and Mark Hesters

SUMMARY OF CONCLUSIONS

With the proposed COC's, Canyon Power Plant (CPP) outlet lines and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards (LORS). The analysis of project transmission lines and equipment, both from the power plant up to the point of interconnection with the existing transmission network as well as upgrades beyond the interconnection that are attributable to the project have been evaluated by staff and are included in the environmental sections of this staff assessment.

- The SIS (System Impact Study) identified that the Serrano 230kV substation will need to be upgraded to 80kA rating and multiple circuit breakers will need to be replaced throughout the SCE (Southern California Edison) system due to increase in fault currents. The Breaker upgrades would occur within the fence line of the existing SCE substations and would not trigger CEQA (California Environmental Quality Act).
- The CPP aggravated N-2 thermal overloads would be mitigated by implementing California ISO congestion management. The Facility Study will determine the cost estimates and work scope for interconnection facilities and the transmission network upgrades of the SCE system.

INTRODUCTION

STAFF ANALYSIS

This transmission system engineering (TSE) analysis examines whether this project's proposed interconnection conforms to all LORS required for safe and reliable electric power transmission. Additionally, under 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 (Title 14, California Code of Regulations §15378). The Energy Commission must therefore 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.

Commission staff relies upon the responsible interconnecting authority for analysis of impacts on the transmission grid, as well as for the identification and approval of new or modified facilities required downstream from the proposed interconnection for mitigation purposes. The proposed project would cause reliability impacts to the SCE 230-kV transmission network and requires both analysis by SCE and the approval of the California Independent System Operator.

SOUTHERN CALIFORNIA EDISON'S ROLE

SCE is responsible for ensuring electric system reliability in its service territory for proposed transmission modifications. For the CPP project, SCE performed the SIS used to determine whether or not the proposed transmission modifications conform to reliability standards. Because the Anaheim 69kV grid would be connected to the

California ISO controlled transmission grid via the SCE/Anaheim jointly owned Lewis 230kV substation, the California ISO's role is to review and approve the SIS and its conclusions.

CALIFORNIA INDEPENDENT SYSTEM OPERATOR'S ROLE

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 project power will be delivered and/or ancillary services to the California ISO grid via SCE/Anaheim jointly owned Lewis 230-kV substation. Therefore, California ISO will review the studies of the SCE system to ensure adequacy of the proposed transmission interconnection. The California ISO determines the reliability impacts of the proposed transmission modifications on the SCE transmission system in accordance with all applicable reliability criteria. According to the California ISO tariffs, the California ISO will determine the "need" for transmission additions or upgrades downstream from the interconnection point to insure reliability of the transmission grid. The California ISO reviewed the SIS performed by SCE and issued a preliminary approval to SCE. On completion of the SCE Facility Study, the California ISO will review the study results, provide its conclusions and recommendations, and issue a final approval/disapproval letter for the interconnection of the proposed CPP project. The Facility Study report updates the SIS, and provides work scope and cost estimates for the interconnection facilities and necessary downstream network reliability upgrades related to the generation project. The California ISO may provide written and verbal testimony on its findings at the Energy Commission hearings.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), *Rules for Overhead Electric Line Construction*, sets forth uniform requirements for the construction of overhead lines. Compliance with this order ensures both adequate service and the safety of both the public and the people who build, maintain, and operate overhead electric lines.
- CPUC General Order 128 (GO-128), *Rules for Construction of Underground Electric Supply and Communications Systems*, sets forth uniform requirements and minimum standards for underground supply systems to ensure adequate service and the safety of both the public and the people who build, maintain, and operate underground electric lines.
- The National Electric Safety Code, 1999, provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.
- The combined NERC/WECC (North American Electric Reliability Corporation/Western Electricity Coordinating Council) planning standards provide system performance standards for assessing the reliability of the interconnected transmission system. These standards require continuity of service as their first priority and the preservation of interconnected operation as their second. Some aspects of NERC/WECC standards are either more stringent or more specific than the either agency's standards alone. These standards are designed to ensure that

transmission systems can withstand both forced and maintenance outage system contingencies while operating reliably within equipment and electric system thermal, voltage, and stability limits. These standards include 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 WECC standards, *NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table,* and on Section I.D, *NERC and WECC Standards for Voltage Support and Reactive Power.* These standards require that power flows and stability simulations verify defined performance levels. Performance levels are defined by specifying allowable variations in thermal loading, voltage and frequency, and loss of load that may occur during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (such as the loss of load from a single transmission element) to a catastrophic loss level designed to prevent system cascading and the subsequent blackout of islanded areas and millions of consumers during a major transmission disturbance (such as the loss of multiple 500-kV lines along a common right-of- way, and/or of multiple large generators). While the controlled loss of generation or system separation is permitted under certain specific circumstances, this sort of major uncontrolled loss is not permitted (WECC, 2002).

- NERC's reliability standards for North America's electric transmission system spell out the national policies, standards, principles, and guidelines that ensure the adequacy and security of the nation's transmission system. These reliability standards provide for system performance levels under both normal and contingency conditions. While these standards are similar to the combined NERC/WECC standards, certain aspects of the combined standards are either more stringent or more specific than the NERC performance standards alone. NERC's reliability standards apply to both interconnected system operations and to individual service areas (NERC, 2006).
- California ISO planning standards also provide the standards and guidelines that ensure the adequacy, security, and reliability of the state's member grid facilities. These standards also incorporate the combined NERC/WECC and NERC standards. These standards are also similar to the NERC/WECC or NERC standards for transmission system contingency performance. However, the California ISO standards also provide additional requirements that are not found in either the WECC/NERC or NERC standards. The California ISO standards apply to all participating transmission owners interconnecting to the California ISO- controlled grid. They also apply to non-member facilities that impact the California ISO grid through their interconnections with adjacent control grids (California ISO, 2002a).
- California ISO/FERC (Federal Energy Regulatory Commission) electricity tariffs contain guidelines for building all transmission additions/upgrades within the California ISO-controlled grid. (California ISO, 2003a).

PROJECT DESCRIPTION

The applicant proposes to interconnect the 194.1 megawatt (MW) CPP project to Anaheim's Canyon 69kV switchyard near the intersection of Mira Loma Avenue and Kramer Boulevard in Anaheim, California. The proposed generating plant will consist of four 50 MW generating units, GE LM-6000 simple cycle natural gas fired combustion turbines for a total net output of 194.1 MW. The project's planned operational date is summer of 2010.The generator auxiliary load would be 4.0 MW, resulting in a maximum net output of 194.1 MW at an 85 percent power factor. Each generating unit would be connected to the low side of its dedicated 13.8/69 kV generator step-up (GSU) transformer through 15kV, 3,000-ampere metal-clad vacuum circuit breakers. The step-up transformers for the combustion turbine generating units would be rated at 13.8/69 kV and 39/52/65 megavolt ampere (MVA) at the temperature of 55 centigrade. The 69-kV side of each step-up transformer would be connected by 69kV, 2000-ampere underground cable conductors to a double bus, double breaker 69 kV switchyard at the plant site. The 69kV switchyard will consist of 18 circuit breakers, with 9 bays and two main buses. (CPP project, 2007b section 3.0 pages 3.2, 3.12 and Figure 3-7, 3.10).The proposed transmission lines are the first point of interconnection and will be permitted by the CEC. The construction of the new transmission lines are direct project impacts, and a general level of environmental review is required for the Energy Commission's CEQA process.

SWITCHYARD AND INTERCONNECTION FACILITIES

The proposed overhead generator tie lines are rated to carry the full capacity of the CPP project. The project's switchyard would use a double-bus double-breaker configuration with 9 bays and 5 positions for outgoing transmission lines. The switchyard consists of 69-kV, 2000 ampere circuit breakers, 69-kV no-load disconnect switches, and other switching gear that will allow delivery of the project's output to the Anaheim 69kV grid. The Canyon power plant switchyard will be interconnected to Anaheim grid via two new underground 69-kV double-circuits.

- The first 69kV double circuit would proceed underground and to the Southside of East Miraloma Avenue approximately 100 feet to rise up and connect to the existing 69kV overhead Vermont-Yorba lines via newly built two 85 feet tall 69kV transmission structures.
- The second 69kV underground double circuit would proceed Eastward approximately 4000 feet in East Miraloma Avenue, turn south on Miller, then proceed approximately 3000 feet to connect to the Dowling-Yorba 69kV line at East La Palma Avenue.

The 69kV two underground double circuits would build with 2000kcmil copper cable conductors and route through the 69kV duct banks to interconnect the switchyard to the existing 69kV Vermont-Yorba and Dowling-Yorba lines. Conditions of Certification TSE 1 to TSE 7 insure that the proposed facilities are designed, built and operated in accordance with good utility practices and applicable LORS. (CPP project, 2007b section 3.0 pages 3.2, 3.12 and Figure 3-7, 3.10).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The proposed CPP project would deliver energy to the 230kV SCE grid; hence SCE and the control area operator are responsible for ensuring grid reliability. These two entities determine the transmission system impacts of the proposed project and any mitigation measures needed to ensure system conformance with utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. System impact and facilities studies 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 effect of the project 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. System impact and facilities studies analyze the grid both 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 analyze the impact of the project for the proposed first year of operation, and are based on a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnected utility. Generation and transmission forecasts are established by an interconnection queue. The studies focus 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 studies show that the interconnection of the project causes the grid to be out of compliance with reliability standards, then the study will identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards.

When a project connects to the California ISO-controlled grid, both the studies and mitigation alternatives must be reviewed and approved by the California ISO. If either the California ISO or interconnecting utility determines that the only feasible mitigation includes transmission modifications or additions requiring CEQA review, the Energy Commission must analyze those modifications or additions according to CEQA requirements.

SCOPE OF SYSTEM IMPACT STUDIES

In this case staff has received two SIS from the applicant. The first interconnection study, performed by the Anaheim Public Utilities Department, has considered post project impacts that might occur within their 69kV system. Additionally, the second impact study was performed by SCE at the request of Anaheim Public Utilities Department on behalf of the Southern California Public Power Agency (SCPPA) to identify the transmission system impacts of CPP on SCE’s 230/500-kV system.

<u>Scope of the Anaheim system study</u>

According to current FERC/CPP Tariff, CPP is a participating transmission owner and under operation control of the California ISO for the existing SCE 230/69kV interconnection at Lewis 230/69kV substation. CPP is also responsible for planning, reliability and operation of their 69kV network. For the proposed interconnection of the CPP plant to their 69kV network, CPP is, therefore, responsible for insuring grid reliability and performing System Impact Studies. For the CPP 69kV system planning and operation, the CPP follows WECC and their own utility planning reliability criteria and operation standards or procedures.

The study included power flow, and short circuit studies of the Anaheim’s 69kV system. The study modeled the proposed project for a net output of 194.1 MW. The base cases included all significant Anaheim capital improvement transmission projects and output of the Dowling generation plant. Power flow studies were performed under Summer peak and Spring off-peak conditions for the first and the last year of the five-year plan. City of Anaheim has performed N-1 and N-2 contingency analysis to determine the performance of the 69 kV Anaheim system under emergency conditions. Detailed power flow study assumptions and methodology have been discussed in the section 2 of the Anaheim study report.

Power Flow study results:

<u>Overload:</u>

Power flow analysis have identified three, N-1 thermal overload criteria violations and N-2, three thermal overload criteria violations under the Summer Peak load conditions.

> Mitigation: The applicant has proposed using a spare transformer bank and bringing one peaking unit on- line to mitigate the overload criteria violations.

<u>Overload:</u>

Power flow analysis has identified one, N-2 thermal overload criteria violation under the Spring off Peak condition.

> Mitigation: The N-2 thermal overload could be mitigated by implementing generation curtailment procedures.

Other than the proposed operational procedures, the analysis indicates that the Anaheim system was designed to withstand all the single contingencies and selected double contingency conditions.

Anaheim 69kV system Short Circuit Study results:

The short circuit study was performed to analyze whether any substation equipment or breakers would be overstressed due to increase in the fault currents for the addition of the CPP units. The study identified 19, 69 kV circuit breakers of the Sharp and Lewis substations have been overstressed beyond their fault interrupting duties as shown in Table 5-6 of the study report (Anaheim short circuit study, table 5-1 to 5-6).

Mitigation: The applicant has proposed to upgrade the nineteen 69kV circuit breakers that are identified under-rated due to significant short circuit contribution from the CPP project.

<u>Scope of the SCE system study</u>

The study included power flow, sensitivity, and short circuit studies, and transient and post-transient analyses (CPP, 2008a, system impact study). The study modeled the proposed project for a net output of 194.1 MW. The base cases included all California ISO-approved major SCE transmission projects, the transmission system for the Los Angeles Department of Water and Power, and major path flow limits of Southern California Import Transmission, East-Of-River, and West-of-River. In addition, the bulk power study evaluated conditions with dispatch of generation outside of the SCE service territory and electrical system in a manner that maximized loadings in the SCE Main System/Basin area. The study included all pertinent queue generation projects in the vicinity of the CPP project. These conditions reflect the most critical expected loading condition for the transmission system in SCE's area. The detailed study assumptions are described in the study. The power flow studies were conducted with and without CPP connected to SCE's grid at the Lewis Substation, using 2013 heavy summer with a one-in-ten load forecast and 2013 light spring base cases. The power flow study assessed the project's impact on thermal loading of the transmission lines and equipment. Transient and post-transient studies were conducted for CPP project using the 2013 heavy summer base case to determine whether the project would create instability in the system following certain selected outages. Short circuit studies were conducted to determine if CPP would overstress existing substation facilities.

SCE Power Flow Study Results

Pre-project overloads are caused by either existing system conditions or by projects with higher positions in the California ISO's generator interconnection queue. The mitigation identified for the pre-project overloads was not included in the pre-project study cases; therefore addition of the CPP project does not trigger any transmission line upgrades in the SCE system.

Base Case Condition (N-0):

> The system impact study identified that there are no post-project overload criteria violations in the SCE system area under the 2013 heavy summer and 2013 light spring conditions.

Single Outage Contingency (N-1):

> The system Impact study identified that there are no single contingency (N-1) overloads that were triggered or aggravated by the addition of the CPP project in the SCE system.

Double Outage Contingency (N-2):

> The system Impact study identified five pre-existing overloads which were aggravated by the addition of the CPP project under the N-2 contingency. The 2013 heavy summer condition has aggravated three pre-existing overloads out of the five revealed. The other two, N-2 contingency occurred in the 2013 light spring condition.

The aggravated N-2 thermal overloads could be mitigated by implementing California ISO congestion management. The applicant should request a Facility Study to be performed by the SCE to determine the cost estimates and work scope for interconnection facilities and the transmission network upgrades of the SCE system.

SCE Transient Study Results

The Transient study was conducted for the critical single and double contingencies affecting the area listed in the table 1-8 of the SCE SIS. The three-phase faults with normal clearing are studied for single contingencies; single -line-to-ground faults with delayed clearing are studied for double contingencies. All outage cases were evaluated with the assumption that existing Special Protection Schemes (SPS) or Remedial Action Schemes (RAS) would operate as designed where required. Transient stability study indicates there would be no system performance issues caused by the CPP project.

SCE Post-Transient Study Results

NERC/WECC planning standards require that the system maintain post-transient voltage stability when either critical path transfers or area loads increase by 5 percent for category "B" contingencies, and 2.5 percent for category "C" contingencies. Post-transient studies conducted for similar or larger generators in the area concluded that voltage remains stable under both N-1 and N-2 contingencies. All outage cases were evaluated with the assumption that existing SPS or RAS would operate as designed where required. The studies determined that the system remained stable under both single and double contingency outage conditions and the addition of the CPP project.

SCE Short Circuit Study Results

Short circuit studies were performed to determine the degree to which the addition of CPP project increases fault duties at SCE's substations, adjacent utility substations, and the other 230-kV, and 500-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 with and without the project, and information on the breaker duties at each location are summarized in the Short Circuit Study Results tables (3 Phase to Ground and Single Line to Ground) of the System Impact Study Report (CPP, 2006b, SIS, tables 4-3 to 4-4). The short circuit duty studies identified multiple substations where duty was increased by more than 0.1 kA and duty was excess of 60% of the minimum circuit breaker ratings.

- Three Phase Short Circuit Duty has been increased by 0.1 kA or more in SCE 4, 500 kV substations and 18, 230kV substations.
- Single Line-to-Ground Short Circuit Duty has been increased by 0.1 kA or more in 2 500kV substations and 12 230kV substations.

The SIS has identified that the Serrano 230kV substation will need to be upgraded to 80kA rating and replaced multiple circuit breakers throughout the SCE system. Additionally, the specific upgrades require in mitigating the fault duty violations would be addressed in the Facility Study phase.

COMPLIANCE WITH LORS

The 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 69-kV underground double circuits.
Staff concludes that, assuming the proposed conditions of certification are met, the project would likely meet the requirements and standards of all applicable LORS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments related to the TSE discipline have been received.

CONCLUSIONS AND RECOMMENDATIONS

With the proposed conditions of certification, CPP outlet lines and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards (LORS). The analysis of project transmission lines and equipment, both from the power plant up to the point of interconnection with the existing transmission network as well as upgrades beyond the interconnection that are attributable to the project have been evaluated by staff and are included in the environmental sections of this staff assessment.

- The SIS identified that the Serrano 230kV substation will need to be upgraded to 80kA rating and multiple circuit breakers will need to be replaced throughout the SCE system due to increase in fault currents. The Breaker upgrades would occur within the fence line of the existing SCE substations and would not trigger CEQA (California Environmental Quality Act).
- The CPP aggravated N-2 thermal overloads would be mitigated by implementing California ISO congestion management. The Facility Study will determine the cost estimates and work scope for interconnection facilities and the transmission network upgrades of the SCE system.

RECOMMENDATIONS

If the Energy Commission approves this project, staff recommends that the following conditions of certification be met to ensure both system reliability and conformance with LORS.

CONDITIONS OF CERTIFICATION FOR TRANSMISSION SYSTEM ENGINEERING

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 prior to the start of construction (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

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) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or D) a mechanical engineer. (Business and Professions Code Sections 6704 et seq. require state registration to practice as a civil engineer or structural engineer in California.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California-registered electrical engineer. The civil, geotechnical or civil, and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days prior to the start of rough grading (or a lesser number of days mutually agreed to by the project owner and the CBO), 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 (California Building Code, 1998, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action required obtaining the CBO's approval.

TSE-4 For the power plant switchyard, outlet line, and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

1. Receipt or delay of major electrical equipment;

2. Testing or energization of major electrical equipment; and

3. The number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days prior to the start of each increment of construction (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit to the CBO for review and approval the final design plans, specifications, and calculations for equipment and systems of the power plant switchyard, outlet line, and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

TSE-5 The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS, including the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations as determined by the CBO. 2000kcmil copper cable conductors and route through the 69kV duct banks to interconnect the switchyard to the existing 69kV Vermont-Yorba and Dowling-Yorba lines.

1. The CPP project will be interconnected to the Anaheim grid via 69kV, 2000kcmil copper cable conductors, underground, two double circuit tie lines. The proposed CPP switchyard would use a double bus double breaker configuration with 9-bays and 5 positions for outgoing 69kV circuits.

2. The power plant outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 and General Order 98 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36, and 37 of the “High Voltage Electric Safety Orders”, California ISO standards, National Electric Code (NEC), and related industry standards.

3. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

4. 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.

5. The project conductors shall be sized to accommodate the full output from the project.

6. Termination facilities shall comply with applicable Anaheim Utility interconnection standards.

7. The project owner shall provide to the CPM:
   a. The final Detailed Facility Study (DFS) including a description of facility upgrades, operational mitigation measures, and/or Special Protection System (SPS) sequencing and timing if applicable,

   b. Executed project owner and California ISO Facility Interconnection Agreement.

Verification: At least 60 days prior to the start of construction of transmission facilities (or a lessor number of days mutually agree to by the project owner and CBO), the project owner shall submit to the CBO for approval:

1. Design drawings, specifications, and calculations conforming with CPUC General Order 95 and General Order 98 or NESC; Title 8, California Code of Regulations, Articles 35, 36, and 37 of the "High Voltage Electric Safety Orders"; NEC; applicable interconnection standards, and related industry standards 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,"[1] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC; Title 8, California Code of Regulations, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; NEC; applicable interconnection standards, and related industry standards.

3. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5** 1) through 5) above.

4. The final Detailed Facility Study, including a description of facility upgrades, operational mitigation measures, and/or SPS sequencing and timing if applicable, shall be provided concurrently to the CPM.

TSE-6 The project owner shall provide the following Notice to the California Independent System Operator (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, provide the California ISO a letter stating the proposed date of synchronization; and

[1] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

2. At least one business day prior to synchronizing the facility with the grid for testing, 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. A report of the 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 CPUC GO-95 or NESC; Title 8, CCR, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; applicable interconnection standards; NEC; and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

1. "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC; Title 8, California Code of Regulations, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders"; applicable interconnection standards; NEC; and related industry standards, and these conditions shall be provided concurrently.

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 responsible charge or acceptable alternative verification. "As built" drawings of the electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan."

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 (California Independent System Operator). 1998a. Cal-ISO Tariff Scheduling Protocol. Posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

California ISO (California Independent System Operator). 1998b. Cal-ISO Dispatch Protocol. Posted April 1998.

California ISO (California Independent System Operator). 2002a. Cal-ISO Grid Planning Standards. February 2002.

CPP (Anaheim Municipal Power Station). 2008a. Southern California Public Power Authority (System Impact Study and Re-study) submitted to the California Energy Commission.

CPP (Anaheim Municipal Power Station). 2007b. Southern California Public Authority, CPP Generating Station Application for Certification. Submitted to the California Energy Commission.

NERC/WECC (North American Reliability Council/Western Electricity Coordinating Council). 2002. NERC/WECC Planning Standards. August 2002.

DEFINITION OF TERMS

AAC — All aluminum conductor

ACSR — Aluminum conductor steel-reinforced

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.

Emergency overload – See “Single Contingency.” This is also called an L-1.

Kcmil or KCM – Thousand circular mil. A unit of the conductor’s cross sectional area When divided by 1,273, the area in square inches is obtained.

Kilovolt (kV) — A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.

Loop — An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection, and returns it back to the interrupted circuit, thus forming a loop or cul de sac.

Megavar — One megavolt ampere reactive.

Megavars Mega-volt-Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.

Megavolt ampere (MVA) – A unit of apparent power. It equals the product of the line voltage in kilovolts, current in amperes, and the square root of 3, divided by 1,000.

Megawatt (MW) – A unit of power equivalent to 1,341 horsepower.

Normal operation/normal overload – The condition arrived at when all customers receive the power they are entitled to, without interruption and at steady voltage, and with no element of the transmission system loaded beyond its continuous rating.

N-1 condition – See "single contingency."

Outlet Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Power flow analysis – A 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 – 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) – An automatic control provision, which, for instance, will trip a selected generating unit upon a circuit overload.

SF6 (sulfur hexafluoride) – An insulating medium.

Single contingency – Also known as "emergency" or "N-1 condition," the occurrence when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid dielectric cable – Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

Switchyard An integral part of a power plant and used as an outlet for one or more electric generators.

Thermal rating – See "ampacity."

TSE Transmission system engineering.

Tap A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.

Undercrossing – A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

ALTERNATIVES

Testimony of Eric K. Solorio

INTRODUCTION

In this section staff evaluated potentially feasible alternatives to the construction and operation of the proposed Canyon Power Plant project (CPP). Staff conducted the alternatives analysis in accordance with state environmental laws by providing an analysis of reasonable alternatives capable of reducing or avoiding any adverse impacts of the proposed project (Cal. Code Regs., tit. 14, §15126.6; Cal. Code Regs., tit. 20, §1765).

DETERMINING THE SCOPE OF THE ALTERNATIVES ANALYSIS

The Guidelines for Implementation of the California Environmental Quality Act, Title 14, California Code of Regulations, section 15126.6(a), provides direction for scoping the alternatives analysis by requiring an evaluation of alternatives based upon 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 basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." In addition, the analysis must address the "No Project" alternative (Cal. Code Regs., tit. 14, §15126.6[e]).

The range of alternatives is governed by the "rule of reason" which requires consideration only of those alternatives necessary to permit a reasoned choice. Further, the potentially feasible alternatives shall be selected and discussed to foster informed decision making and public participation. The CEQA guidelines state that an environmental document does not have to consider an alternative where the effect cannot be reasonably ascertained and whose implementation is remote and speculative (Cal. Code Regs., tit. 14, §15126.6[f][3]). To prepare the alternatives analysis, staff used the methodology summarized below:

- Identify the basic project objectives.
- Identify the proposed project's significant adverse environmental impacts.
- Consider the "No Project" alternative.
- Identify alternative project sites.
- Evaluate and determine whether any alternative sites are feasible *site alternatives.*
- Identify alternative energy generation technologies.
- Evaluate and determine whether any alternative energy generation technologies are feasible *project alternatives.*
- Conclude whether or not a different technology or an alternative site will yield less of an environmental impact and therefore be more feasible than the proposed project.

BASIC OBJECTIVES OF THE PROJECT

After studying the Southern California Public Power Authority (SCPPA) Application for Certification (AFC), the Energy Commission staff has determined the Canyon Power Plant project (CPP) objectives to be as follows:

- Construct and operate a 200 MW, natural gas-fired, simple-cycle generating facility;
- Provide quick start, peak load generation;
- Assist the City of Anaheim (COA) to increase peak demand capacity reserves as required under AB 380 and by the California Independent System Operator (California ISO);
- Develop a site consistent with the goals and policies of the community planning documents;
- To site the project in close proximity to natural gas and electrical interconnection infrastructure in order to achieve economic viability;
- Safely produce electricity without creating significant environmental impacts;
- Reduce COA's current reliance on out of state electricity; and
- Provide a reliable backup system for intermittent wind and solar energy.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE PROJECT

Unless significant new impacts are identified, staff has determined that potentially significant adverse environmental impacts can be mitigated to a less than significant level by implementation of mitigation measures identified in the FSA. The project's significant impacts that would be mitigated include impacts to air quality and potentially noise. The potentially significant impacts to air quality are a result of the power generation method (combusting natural gas) and siting the project within the South Coast air basin. The potential impacts to the ambient noise level would arise directly from the power generation equipment.

THE "NO PROJECT" ALTERNATIVE

CEQA Guidelines and Energy Commission regulations require consideration of the "No Project" alternative. The CEQA Guidelines state that "the purpose of describing and analyzing a No Project Alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. 14 §15126.6[i]). Toward that end, the "No Project" analysis considers "existing conditions" and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…" (§15126.6[e][2]).

The "No Project" alternative would preclude any construction or operation and, thus, grading of the site or installation of new foundations, piping, utility connections and other activities would not occur. In short, the site-specific and direct impacts associated with the power plant would not occur at this site if the project does not go forward. Selection of the "No Project" alternative would render all concerns about project impact moot.

If the project were not built, the City of Anaheim (COA), as a utility provider, would not benefit from the efficient source of a local 200 MW electrical generation facility which this project would provide. A primary benefit of the Canyon Power Plant project (CPP) is that it would assist the COA to meet the peak demand capacity reserves, required under AB 380 and by the California ISO. The project would also compensate for the intermittency of solar and wind power generation facilities by increasing the reserve capacity of the overall supply of electricity.

In light of the reliability mandates which require the COA to obtain an additional 204 MW of peak load capacity, in the absence of the proposed Canyon Power Plant project, other power plants with unknown technologies would likely be constructed in the region to supply the COA's market demand for additional reserve capacity. As discussed further in this Alternatives analysis, other new power plants would have equivalent or greater environmental impacts, as compared to the proposed CPP. As such, staff has concluded the "No Project" alternative would not be a reasonable alternative to the proposed project.

IDENTIFY, SCREEN AND EVALUATE ALTERNATIVE PROJECT SITES

The CEQA guidelines state "Where a previous document has sufficiently analyzed a range of reasonable alternative locations and environmental impacts for projects with the same basic purpose, the lead agency should review the previous document" (Cal. Code Regs., tit. 14 §15126.6). As such, staff has reviewed the Application for Certification (CofA 2007a, AFC § 5.5) including data from the COA's two prior siting studies, produced by the URS Corporation in September 2003 and October 2006, respectively. The URS 2003 siting study identified 8 alternative sites, however during the ongoing project planning and entitlement process, three of the eight sites became unavailable or developed with other uses. Subsequently, URS produced a second study in October 2006 which updated the analysis of the five remaining alternative sites.

Staff conducted an independent review of each site identified in the AFC and the 2006 URS study and staff has determined the AFC and the URS siting study "…describe[d] a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." (Cal. Code Regs., tit. 14 §15126.6[a]). The alternative sites discussed below are each referred to as site number(s) 1, 2, 3, 6, and 7, in order to preserve consistency with the COA's siting studies conducted by the URS Corporation.

SITE 1

Site 1 has reasonable access to the necessary infrastructure and appears absent of any biological resources, as is the proposed project. Locating the project at this site would not avoid or reduce any significant impacts because there are not any significant impacts that are unique to the proposed site. Specifically, impacts to air quality would be equivalent no matter where the project is located. Impacts to ambient noise levels would remain equivalent. As a result, Site 1 is not a preferred alternative to the proposed project site.

SITE 2

Site 2 is an existing industrial use facility (metal recycling, lumber yard and rail car area) that has reasonable access to the necessary infrastructure and is absent of on-site biological and cultural resources. Locating the project at this site would not avoid or reduce any significant impacts because there are not any significant impacts that are unique to the site. Specifically, impacts to air quality would be equivalent no matter where the project is located. Impacts to ambient noise levels would also be equivalent at the proposed site compared with Site 1. As a result this site is not a preferred alternative to the proposed project site.

SITE 3

Site 3 has reasonable access to infrastructure systems and potentially enough buildable land on its southern boundary. Site 3 is zoned conservation/water uses and is surrounded by water and park uses on three sides, including a ground water recharge basin and the Santa Anna River. The established zoning fails to meet the screening criteria. The surrounding uses would also be impacted from locating the proposed project at Site 3. For example impacts to visual resources would be greater at Site 3 because of the scenic viewpoints available at the surrounding recreation areas. Additionally the proposed project, if located at Site 3, would potentially cause significant impacts to the ambient noise level at Site 3 because the conservation area and park setting of Site 3 is conducive to ambient noise levels that are lower than that of the industrial setting of the proposed site. The site is also within a State designated scenic highway corridor (State Route 91). Considering the above factors, Site 3 is not a preferred alternative to the proposed project site.

SITE 6

Site 6 is the Dowling substation and includes the COA Utilities Department's existing peaking combustion turbine (a General Electric LM5000 combustion turbine) generation facility. Site 6 is located in Anaheim Specific Plan No 94-1, Northeast Industrial Area. The site has compatible zoning for the proposed project and no biological resources are present on site. All utilities are at the site, although one necessary pipeline connection is one-half mile away. Siting the proposed project at this site would require replacing the existing LM 5000 with the four new General Electric LM6000PC Sprint gas turbines (LM6000s). It would also require the acquisition of Anaheim Fire Station No. 5 and the parcel used by Walton's Pool Supplies (Walton's). Both, the fire station and the pool supply business could potentially be relocated to the proposed project site. Staff is unaware of the economic costs to relocate the fire station and Walton's or in the alternative an outright purchase of Walton's. Additionally staff is unaware of whether not relocating the fire station would negatively affect the response time.

Replacing the LM5000 with the proposed project's more efficient LM6000s would reduce the emission of criteria air pollutants on a per MW/h basis. If Site 6 was used as an alternative, the COA would have to eliminate 45MW of existing capacity and therefore not achieve its project objective to develop 200MW of "additional" reserve capacity. Although, under CEQA (Cal. Code Regs., tit. 14, §15126.6[a]) an alternative is reasonable if it can achieve "most" of the basic project objectives, due to the uncertainty of the economic costs of relocating the fire station, potential negative affects to emergency response times, and the uncertainty of Walton's willingness to relocate or sell its business, staff concludes that Site 6 is not a reasonable alternative to the proposed project site.

SITE 7

Site 7 has sufficient acreage, compatible land use/zoning designation (industrial) and is in proximity to infrastructure systems. Some of the infrastructure connections are up to two and one-half miles away. Although the site is located farther from the required water infrastructure, it is anticipated that a new connection can be constructed in the existing street right-of-way. Immediately north of this site is a ministry facility which also provides temporary housing for up to 50 people. These facilities are considered sensitive receptors. As a result of the proximity to sensitive receptors, this site is not a preferred alternative to the proposed project site.

ALTERNATIVE ELECTRICITY GENERATION TECHNOLOGIES

The second component of the Alternatives Analysis is to consider project alternatives to the proposed electrical generation technology. The primary project objective is to provide fast start, peak demand, reserve, electrical supply capacity to the COA. This section will identify and discuss the feasibility of alternative technologies to the CPP proposal.

SELECTION CRITERIA AND EVALUATION METHODOLOGY

Staff has determined the AFC for the CPP project (CofA2007a, AFC § 5.5) applied the proper screening criteria to evaluate alternative technologies, in order to "…describe a range of reasonable alternatives to the project…which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." (Cal. Code Regs., tit. 14 §15126.6[a]). The method for selecting an electrical generation technology was to use a stepped approach with each technology having to meet the screening criteria of Step 1 in order to be screened under Step 2 and then meet the requirements of Step 2 in order to be screened under Step 3.

The screening criteria used for each step is as follows:

- **Step 1 – Commercially Available and Reliable.** The technology must be proven to be commercially available and reliable for use in an on-demand "peaking generation facility".
- **Step 2 – Implementable.** The technology must be a practicable application for the project while reducing the environmental impacts beyond that of the proposed project.
- **Step 3 – Cost Effective.** The technology must be obtainable at a reasonable pass-through cost to ratepayers.

TECHNOLOGIES REVIEWED

Alternative technologies considered for the project included the following fuel sources: oil, natural gas, coal, nuclear, water, biomass, municipal, solid waste, and solar. The discussion also includes the proposed “simple-cycle combustion” compared to the alternative “combined-cycle”, “Kalina combined-cycle” and “advanced combustion turbine” technologies. Each technology is discussed below, in regards to its potential application in the proposed project.

Natural Gas Fired, Simple-Cycle Combustion Turbine (Proposed Project)

The CPP proposes to use the commercially proven technology of a simple-cycle, natural gas combustion turbine generator. The applicant would employ four General Electric LM6000PC SPRINT gas turbine generators (CofA2007a, AFC § 1.2, 3.4.1). The LM6000PC SPRINT gas turbine to be employed in the CPP represents one of the most modern and efficient such machines now available. The SPRINT version of this machine is nominally rated at 50 MW and 40.3 percent efficiency lower heating value at ISO[1] conditions (GTW 2008).

The land resource requirements for a simple-cycle, natural gas combustion turbine facility are minimal when compared to facilities of equal generation capacity using alternative technologies such as wind, thermal, photovoltaic, hydro-electric, biomass, and or geothermal. Additionally, because simple-cycle turbines have start up and shut down times that are much less than start up and shut down times for combined cycle, there are lower impacts to air quality.

The simple-cycle technology also has relatively low capital costs when compared to the cost of combined cycle, solar, hydro-electric, biomass, and geothermal. From an engineering and design standpoint, the use of four separate parallel, natural gas turbine generators is an ideal technology application for peaking plant generation needs because each turbine generator can be brought online or shut down quickly, as needed. Although simple-cycle technology is subject to the increasing cost of natural gas, these input costs are offset by the higher energy prices paid for peak time power. Following, the simple-cycle technology is very cost effective and meets the screening criteria in Steps 1, 2 and 3.

Combined-Cycle Gas Turbine (CCGT)

Combined-cycle, natural gas turbine systems convert natural gas into electricity using the combustion process then convert the waste heat (resulting from the combustion process) into steam that drives a separate electric generator. At its simplest form, a combined cycle, or CCGT, consists of the following:

- A combustion turbine that drives an electrical generator
- A boiler that uses the combustion turbine exhaust as a heat source for generating steam; and

[1] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level).

- A steam turbine that drives an electrical generator.

Because the combined-cycle technology utilizes the waste heat, its efficiency can be as high as 50 percent, which is significantly higher than the proposed single-cycle process. The drawbacks to the combined-cycle technology are the higher capital cost, slightly longer startup times to reach maximum output capacity and increased use of water*.*

Once Through Steam Generator (OTSG) technology

The Once Through Steam Generator (OTSG) technology is a combined-cycle configurations used to minimize project start times compared to most combined cycles. According to Innovative Steam Technologies (IST), a licensed supplier of Siemens' combined-cycle, Once Through Steam Generator (OTSG) technology, power plants equipped with their OTSG boilers are able to achieve full combustion turbine power in 10 minutes. The startup time for combined cycle technology to reach full capacity varies between 35 minutes and approximately 2 hours, depending on the technology (CofYL 2009c). If the OTSG were used, staff assumes that a 3 on 1 (3 50-MW CTGs and one 37.5-MW steam turbine generator) configuration would most closely match the proposed project. Staff concludes that the combustion turbine generator portion (150MW) of the OTSG system would meet the needs of the rapid startup requirement but the steam generator portion (37.5MW) would require a longer startup period and may not be available for some COA peaking scenarios.

Compared with simple-cycle technology, OTSG technology would cost approximately $80 million more to implement. The higher upfront capital costs could be substantially offset over the life of the project by the fuel use efficiency of the OTSG technology because fuel typically accounts for over two-thirds of the total operating costs of a fossil-fired power plant (Power 1994). The proposed financier and operator of the CPP is the COA. According to the COA's fact sheet (CofA 2009i) the proposed (simple-cycle configuration) CPP will provide a net benefit to COA of $17 million, annually. Staff concludes that at a minimum, the increased marginal debt service associated with OTSG technology can be serviced in a manner that still provides a net benefit to COA of at least $10 million annually.

Because the OTSG technology can meet the quick start-up time required to serve peak demand, and staff also finds the additional capital expenditure could be partially offset by lower fuel consumption resulting in higher marginal profit, staff next considers whether the OTSG application is a reasonable alternative that could reduce the project's potential impacts to air quality from the proposed project's air emissions of criteria pollutants. Staff considered two operating scenarios to compare air emissions of criteria pollutants between the proposed simple-cycle application and the OTSG application.

Operating Scenario #1 (Maximum Permit Capacity)

Because "an [environmental impact report] should analyze the **entire development that is allowed by the project's approval**", (*Christward Ministry v. Superior Court*, Cal.App.3d at p. 194), the first scenario staff analyzed is based upon the Application for Certification's proposed maximum, permitted, annual MW/h generation (200 MW x 1,080 hours) as compared with the alternative OTSG technology generating the same energy output. See **Appendix A**, for a detailed discussion of operating assumptions and annual emission comparisons. In this comparison, staff found that the alternative OTSG technology would in fact lower the air emissions of some criteria pollutants but also increase emissions of others, as compared with the proposed simple-cycle operating at the permitted energy output[2].

As reflected in **Alternatives Table 1** below, when comparing the two technologies under the maximum proposed annual MW/h generation, on an annual basis, the OTSG configuration would reduce emissions of nitrogen oxides (NOx), carbon monoxide (CO) and volatile organic compounds (VOC). Emissions of sulfur oxides (SOx) would be equivalent and emissions of particulate matter (PM10 and PM2.5) would increase.

Alternatives Table 1
Annual Emissions Comparison for Maximum Operating Profile (tons/year)

	NOx	CO	VOC	SO_2	PM10/PM2.5
Canyon Proposal Simple Cycle	14.98	11.98	3.11	0.81	7.27
OTSG with Canyon Generation Rate	14.77	11.12	3.00	0.81	7.47
Total Reduction in tons/year	.21	.86	.11	-	-
Total Increase tons/year	-	-	-	-	.2
Total Reduction in tons/project life	6.3	25.8	3.3	-	-
Total Increase in tons/project life	-	-	-	-	6

Source: FSA Air Quality Table 14, and staff calculations.

Based upon the technical analysis and conclusions reached in Appendix A, this staff concludes that under the first operating profile, the increase in emissions of criteria pollutants PM10/PM2.5 offsets the benefits from reductions of emissions of NOx, CO and VOC. Staff therefore concludes that under the first operating profile the OTSG is not a reasonable alternative to the CPP.

Operating Scenario #2 (Reduced Capacity)

In the second operating scenario, staff compared the emissions of the proposed simple-cycle project with the emissions from the alternative OTSG technology, under the assumptions that the COA is the proposed operator and the COA has stated their intent is to operate the CPP for a significantly less amount of hours than the AFC's proposed maximum MW/h production (GB 2009j). It is important to note that the Authority to Construct permit which would be issued from the SCAQMD is based on the worst case monthly operations, which is then multiplied by 12 to calculate the annual emissions and offset requirements.

COA has stated it is their intention to operate CPP for an annual 81,000 MW/h (200 MW x 405 hours) versus the maximum 216,000 MW/h (200 MW x 1,080 hours), as proposed in the Application for Certification[3]. This equates to an annual capacity factor of five percent (5%). As illustrated in **Alternatives Appendix "A", Alt-1 Table 7,** the average annual capacity factor (actual operating hours as a percent of total operating capacity)

[2] Note that the 187.5 MW OTSG would operate more hours to match the same energy output of the 200 MW proposed project (187.5 MW x 1,152 hours = 200 MW x 1080 hours = 216,000 MWhr), and with an assumption of 50 percent simple cycle operation (150 MW) and 50 percent combined cycle operation (187.5 MW) the total number of hours operating would increase to 1,280 hours per turbine.

[3] These values do not include the small amount of generation would occurs during startup cycles.

of other simple-cycle facilities is five percent (5%). Staff therefore considers the comparison of **expected** emissions of criteria pollutants, under the Reduced Capacity scenario to be a reasonable assumption and relevant information for this analysis.

As reflected in Table 2 below, under the second operating scenario, staff concludes that with the OTSG application, carbon monoxide (CO) and volatile organic compounds (VOC) emissions would be lowered however, emissions of nitrogen oxides (NOx), sulfur oxides (SOx) and particulate matter (PM10 and PM2.5) would increase.

Alternatives Table 2
Reduced Capacity Factor Annual Emissions Comparison (tons/year)

	NOx	CO	VOC	SO_2	PM10/PM2.5
Canyon Proposal Simple Cycle	8.62	6.44	1.58	0.41	3.64
OTSG with Canyon Generation Rate	8.78	6.08	1.55	0.42	3.91
Total Reduction in tons/year	-	.36	.03	-	-
Total Increase tons/year	.16	-	-	.01	.27
Total Reduction in tons/project life	-	10.8	.9	-	-
Total Increase in tons/project life	4.8	-	-	.3	8.1

Source: FSA Air Quality Table 14, and staff calculations.

In the second operating scenario, the net result is an increase in emissions of 1.2 tons of criteria pollutants, over the life of the project. Staff concludes that this net increase in emissions of criteria pollutants rules out the OTSG technology – under the second operating scenario. Staff therefore concludes that under this operating profile the OTSG is not a reasonable alternative to the CPP.

Kalina combined-cycle

Although similar to the combined-cycle technology, the Kalina combined-cycle technology utilizes a different media consisting of water and ammonia in the boiler process. The water/ammonia mixture increases the overall efficiency of the combined-cycle process by up to 15 percent. However, this technology is not considered to be proven as commercially available due it still being in the testing phase. The most recent test completed was on a 3 megawatt (MW) unit in southern California. The 3 MW project is far below the scale of the proposed 200 MW CPP project. The Kalina combined-cycle technology was therefore eliminated as an alternative, by the screening criteria in Step 1.

Advanced Combustion Turbine Cycle

Advanced combustion turbine cycle technologies are being explored and tested to increase efficiencies of steam turbines by injecting steam, inter-cooling and staged firing. The steam injected combustion turbine (SICT) is the only know version of this technology that is commercially available. Due to its developmental nature, this technology was eliminated as an alternative, by the screening criteria in Step 1.

Fuel Cells

Various types of fuel cell technologies such as those that use hydrogen and oxygen are not commercially available for the 200 MW application proposed in the CPP project.

Additionally, fuel cell technologies are not cost competitive with the simple-cycle technology, and for the above reasons, fail to meet the screening criteria of Step 2 and Step 3.

Hydroelectric

Hydroelectric technology is commercially available. However, constructing and operating a new dam and hydroelectric plant would cause significantly more environmental impact on the Santa Anna River's ecosystem, as compared with the proposed project. Moreover, staff believes it is unreasonable to assume that the construction of a hydroelectric plant on the Santa Anna River is feasible. The capital cost differential is also prohibitive and therefore hydroelectric technology fails to meet the screening criteria in Step 2 and Step 3.

Geothermal

Constructing and operating a new geothermal plant would have a more significant impact on ground water resources. Relative to the proposed project, geothermal facilities have significantly more impacts on soil destabilization and seismic activity. Moreover, there are not any known available geothermal resources in the City of Anaheim. In comparison to the proposed project, geothermal technology fails to meet the screening criteria in Step 2 and Step 3.

Solar Thermal

Many of the solar thermal technologies collect solar radiation, heat water to create steam and use the steam to power a steam turbine generator. However all of the applications require a much larger amount of land for the solar collectors and thus would have a more significant impact on the environment, in that respect. The primary concern with this technology is its limited availability due to its dependence on daylight hours necessary to allow the collection of solar radiation. In addition to the significant land requirements, thermal technologies have significantly higher capital costs than the proposed simple-cycle technology. The characteristics of the thermal technologies fail to meet the screening criteria in Step 2 and Step 3.

Photovoltaic

Photovoltaic (PV) technologies have many environmental benefits compared to other technologies such as a simple-cycle, natural gas combustion turbine generator. Similar to other solar technologies, utility scale photovoltaic applications require a much larger amount of land to develop and thus have relatively more significant impact on land resources than the proposed project. However, distributed PV applications such as rooftop installations would not have the impacts to land resources that a utility scale PV project would have. Whether the PV alternative is a utility scale power plant or distributed rooftop installations, the primary concern with photovoltaic technologies is the limited ability to perform as a "peaking plant" due to its dependence on maximum solar incidence which is limited by the number of daylight hours that vary with each season. The primary requirement for a peak load generation plant is to be able to supply immediate output at the maximum rated capacity. Neither utility scale PV plants nor distributed rooftop generation PV applications can reliably achieve that requirement.

On a per megawatt basis, photovoltaic technologies have significantly higher capital costs when compared to the costs of the proposed simple-cycle natural gas combustion turbine generator technology. Considering the land requirements of utility scale PV plants, limitations on peak power output, and high capital costs, photovoltaic technology fails to meet the screening criteria in Step 2 and Step 3.

Wind Generation

Wind driven electricity generators have some of the lowest environmental impacts on air and water resources, in particular. Wind technology is commercially viable but is difficult to finance due to its inherent risk arising from its unreliability. The unreliability is due to the intermittent nature of when the blows and the limited locations that are conducive to the volumes of wind needed for economically viable power generation. Wind technology fails to meet the screening criteria in Step 2 and Step 3.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comments on the PSA Alternatives analysis were received from two local agencies. Responses to those comments are provided below.

City of Yorba Linda – Steven K. Harris, Director of Community Development
The City of Yorba Linda provided comments regarding the project design and that air quality impacts could be reduced if the design were changed to a conventional combined-cycle or Benson once-through-steam-generator (OTSG) combined-cycle design **(**CofYL 2009a, CofYL 2009b). The City of Yorba Linda also provided a consultant's analysis (IC 2009a) that provides additional comparative analysis regarding combined cycle versus simple cycle designs and the availability of fast-start combined cycle technologies and its appropriateness for CPP. These comments essentially argue that a fast-start combined cycle power plant design, regardless of the applicant's intended purpose for the project, is preferable in the context of air quality emissions and impacts than a simple cycle design and that this project should be designed as a combined cycle project.

City of Placentia – Troy Butzlaff, City Administrator
The City of Placentia commented that Energy Commission staff's discussions of mitigations and alternatives presented in the Preliminary Staff Assessment is not complete, staff failed to properly analyze the OTSG combined-cycle technology and this is of special concern to the communities of Placentia and Yorba Linda because they are downwind from the proposed Canyon Power Plant project. The City of Placentia believes that the City of Yorba Linda's assessment of the OTSG alternative is correct in that it would reduce air emissions of criteria pollutants. The City of Placentia supports the use of a combined-cycle application such as the OTSG.

Staff's Response to both the City of Placentia and the City of Yorba Linda, respectively: Staff has expanded its Alternatives analysis of the OTSG combined-cycle application. This analysis can be found on pages 6, 7, and 8 of the Alternatives analysis and in the entire Appendix A.

CONCLUSIONS

The applicant's primary project objective is to assist the City of Anaheim, as a utility provider, to meet its peak demand generation capacity reserves, as required under AB 380 and by the California Independent System Operator. The nature of supplying power in peak demand periods requires reliability and immediate responsiveness for electrical generation facilities.

Staff concludes that none of the alternative sites are feasible project alternatives because the potentially significant impact to air quality that would be caused from the project is a result of the power generation equipment and locating the project in the South Coast air basin. Therefore, the proposed CPP would have equally, significant impacts to air quality despite which alternative site in the South Coast air basin the project could be located. Potential impacts to ambient noise levels would also arise from the project despite which alternative site the CPP could be constructed. It follows that none of the alternative sites could feasibly avoid or reduce any of the proposed project's significant impacts to air quality and/or noise.

Staff concludes that the OTSG, combined-cycle application is not a reasonable alternative to the proposed simple-cycle combustion turbine. Staff has reached this conclusion because although the OTSG application would reduce some of the project's air emissions of criteria pollutants, it would also increase emissions of other criteria pollutants which results in no net benefit.

After evaluating the various alternative electrical generation technologies and applying the screening criteria, staff has determined many of the alternative technologies evaluated in this section to be viable technologies for other applications but none were determined to be feasible alternatives for the proposed CPP.

REFERENCES

CofA 2007a - City of Anaheim/S. Sciortino (tn 43903). Application for Certification Volume I & II, dated 12/27/07. Submitted to CEC/Docket Unit on 12/28/07.

CofA 2007b - City of Anaheim/S. Sciortino (tn 43905). Air Quality and Public Health Modeling Files, dated 12/27/07. Submitted to CEC/Docket Unit on 12/28/07.

CofA 2008b - City of Anaheim/S. Sciortino (tn 48477). Notification of Change in Scope, dated 9/18/08. Submitted to CEC/Docket Unit on 10/8/08.

CofA 2009b – City of Anaheim/S. Sciortino (tn 49917). Change in the Fuel Use and Sox/PM10 Emission Factors Used During Commissioning, dated 1/28/09. Submitted to CEC/Docket Unit on 1/28/09.

CofA 2009d – City of Anaheim/S. Sciortino (tn 49929). Change in Scope, dated 1/28/09. Submitted to CEC/Docket Unit on 1/28/09.

CofA 2009i – City of Anaheim Public Utilities (tn 52975). Canyon Power Plant Fact Sheet, dated 4/15/09. Submitted to CEC/Docket Unit on 8/25/09.

GB 2009d – Galati & Blek/S. Galati (tn 51425). Critical Issues Assessment Anaheim Peaking Power Siting Study (September 2003), dated 5/4/09. Submitted to CEC/Docket Unit on 5/4/09.

GB 2009e – Galati & Blek/S. Galati (tn 51426). Critical Issues Assessment Anaheim Peaking Power Siting Study (October 2006), dated 5/4/09. Submitted to CEC/Docket Unit on 5/4/09.

GB 2009j - Galati & Blek/M. Mills (tn 52104). SCPPA's Canyon Power Project Operational Hours Spreadsheet, dated 06/22/09. Submitted to CEC/Docket Unit on 06/22/09.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX ALT-1: ALTERNATIVE DESIGN AIR QUALITY COMPARISON

Testimony of William Walters, P.E.

INTRODUCTION

The City of Yorba Linda has provided comments that a combined cycle design would be more efficient and emit fewer emissions than the applicant's proposed simple-cycle design and identified that a Once Through Steam Generator (OTSG) design can be operated in both simple cycle and combined cycle modes. This appendix includes staff's comparison of the air quality emissions and impacts and other operating considerations from these two designs, and includes the assumptions and caveats associated with such a comparison.

TECHNOLOGY COMPARISON DESCRIPTION

The proposed project will utilize four General Electric LM6000 gas turbines (200 MW), and also includes a small wet cooling tower for the chiller heat rejection load and a small emergency fire pump engine.

For the alternative, the OTSG project design is assumed. The comparable Henrietta project uses two turbines; it is assumed that the City of Anaheim would use three LM6000 CTGs with OTSGs and a STG to approach the current project's 200 MW, so the Henrietta numbers are adjusted and the cooling is changed from dry cooling to wet cooling to continue to use the proposed reclaimed water source. This design includes three General Electric LM6000 gas turbines with a once through steam generator (187.5 MW total[4]), and also includes a cooling tower for heat rejection and a small boiler. The emergency equipment emissions are assumed to be based on the Canyon proposal.

COMPARISON METHODS AND ASSUMPTIONS

EMISSIONS ASSUMPTIONS

The emission basis will use the Canyon project's estimated simple cycle emission rates, including simple cycle startup rates, as presented in this FSA, and the Henrietta Amendment estimated OTSG combined cycle emission rates (GWF Energy 2008a), including combined cycle startup rates with corrections for the base PM10 and SOx emission rates to conform to those requested for Canyon. It is assumed that the auxiliary equipment associated with Henrietta would also be necessary for an OTSG facility at Canyon with the exception of project cooling which is assumed to be wet cooling rather than dry cooling. The auxiliary boiler necessary for the OTSG is assumed to be 50 percent larger due to the extra turbine assumed for this comparison.

[4] Please note that this alternative is 12.5 MW short of the applicant's capacity proposal.

The specific emission factors used in this comparison, shown in **ALT-1 Table 1**, differ between simple and combined cycle because of different BACT requirements for combined cycle and simple cycle turbines for NOx and CO emissions. VOC, SO2 and PM10/PM2.5 emission rates typically correlate directly to fuel use – so there is not a difference between an LM6000 in simple or combined cycle configuration.

ALT-1 Table 1
Normal Operating Emission Rates (pounds/hour) per Turbine

	NOx	CO [a]	VOC [a]	SO_2	PM10/PM2.5
Simple-cycle	3.98	4.24	1.2	0.34	3
Combined-cycle	3.4	3.1	1.2	0.34	3

Source: FSA Air Quality Table 10 and GWF Energy 2008a

The emission factors shown in **ALT-1 Table 2** are for startup and shutdowns. For an OTSG design, as proposed by the Henrietta project, there are two startup cycles, the simple cycle start needed to first get the turbine operating in simple cycle mode, and a secondary start cycle for combined cycle that can occur directly after the simple cycle start cycle or some time later after operating for a while in simple cycle mode before changing the operating mode to combined cycle operation. Shutdowns sequences in a similar manner.

ALT-1 Table 2
Start-up/Shutdown Emission Rates (pounds/event) per Turbine for OTSG

	NOx	CO	VOC	SO_2	PM10/PM2.5
Simple-cycle					
Startup (lbs/event)[a]	10.09	4.06	0.79	0.14	1.29
Shutdown (lbs/event)[b]	0.69	0.62	0.27	0.02	0.18
Combined-cycle					
Startup (lbs/event)[c]	6.1	3.0	0.5	0.3	3
Shutdown (lbs/event)[d]	2.1	1.0	0.2	0.1	1.09

Source: FSA Air Quality Table 9 and GWF Energy 2008a
Notes:
[a] Simple-cycle startup, for emissions purposes, is based on a 35-minute start cycle.
[b] Simple-cycle shutdown is based on a 10-minute stop cycle.
[c] Combined-cycle startup is based on a 60-minute start cycle.
[d] Combined-cycle shutdown is based on a 20-minute stop cycle.

The OTSG configuration, based on the Henrietta design, is also assumed to require an auxiliary boiler and would require a steam-cycle cooling tower that will provide additional emission sources for the OTSG configuration. The OTSG auxiliary equipment emissions are shown below in **ALT-1 Table 3**.

ALT-1 Table 3
OTSG Auxiliary Equipment Emissions

Maximum Hourly Emissions, lbs/hr (excluding start-ups and shutdowns)					
	NOx	CO	VOC	SO_2	PM10/PM2.5
Auxiliary Boiler	0.465	2.4	0.315	0.0435	0.48
Cooling Tower	--	--	--	--	0.264

Source: GWF Energy 2008a with boiler increased 50% based on extra turbine, and staff estimate for cooling tower.

It is assumed that the cooling tower operates the same number of hours as the combined cycle OTSG operation. It is assumed that the boiler operates a maximum of one hour for every two hours of turbine operation, which is the same ratio as requested for the Henrietta amendment.

SCENARIOS FOR PERMITTED EMISSIONS COMPARISON

The comparison will be based on the Canyon project's proposed MWh generation (200 MW x 1,080 hours), and assumes that output is achieved by operating the OTSG design with a 50/50 split in simple cycle and combined cycle modes, with a marginal increase in operating hours (to achieve the same annual MWh given the smaller project size) and an equivalent marginal increase in startup/shutdown cycles. There is also a separate OTSG scenario based on the Henrietta Amendment permitted operation, which includes 1,350 hours in simple cycle and 6,650 hours in combined cycle with 325 startup/shutdown events. This second comparison relates to how an OTSG designed facility might be permitted in reality when compared to a simple cycle permitted facility.

ALTERNATIVES EMISSIONS COMPARISON

The permitted emission levels for the Canyon project and the two OTSG design emission scenarios are provided in **ALT-1 Table 4**.

ALT-1 Table 4
Alternatives Annual Emissions Comparison (tons/year)

	NOx	CO	VOC	SO_2	PM10/PM2.5
Canyon Proposal Simple Cycle	14.98	11.98	3.11	0.81	7.27
OTSG with Canyon Generation Rate	14.77	11.12	3.00	0.81	7.47
OTSG using Henrietta Proposal	47.20	46.30	15.32	4.16	38.40

Source: FSA Air Quality Table 14, and staff calculations.

As this table shows, with the operating assumptions used, the OTSG proposal would have roughly the same annual emissions as the simple cycle proposal for an equivalent number of MWh generated[5]. However, if permitted with the same maximum operating capacity as the Henrietta OTSG project the annual emissions would be much higher than the Canyon proposal.

GROUND LEVEL IMPACT COMPARISON

The ground level impacts are a factor of many parameters including the stack and exhaust parameters and emissions from short-term operating scenarios. Simple cycle power plants, such as the proposed CPP, have exhausts that much hotter (500°F or more) and generally have exhaust velocities at least 50 percent higher than OTSG combined cycle plants and so are much more buoyant and disperse better in the atmosphere than combined cycle power plant exhausts. These two factors greatly aid in

[5] Please note that staff is not concerned with the differences in CO emissions as the CO emissions were determined not to be significant before mitigation due to the fact that CO is an attainment pollutant and the fact that there is no potential cause exceedances of the CO standards.

the dispersion of emissions so that for equivalent stack emissions a combined cycle power plant will have higher ground level impacts than a comparably designed simple cycle power plant.

A comparison of the GWF Hanford proposed OTSG retrofit project worst-case ground level air quality impacts when running in simple cycle versus combined cycle is provided below[6]:

	NOx OLM 1-hour	PM10 24-hour
Simple Cycle Gas Turbine Impacts	7.8 μg/m^3	0.33 μg/m^3
Combined Cycle Gas Turbine Impacts	15.2 μg/m^3	1.15 μg/m^3

Source: GWF Energy 2008a

As this comparison between the Simple Cycle and Combined Cycle impacts for the GWF Hanford proposed OTSG retrofit project shows it is a mistake to make a generalization that that a combined cycle power plant will have lower ambient air quality impacts than an equivalently sized simple cycle power plant just because it has lower emissions per MWh. As this comparison shows, even considering a reduction in the number of turbines from four to three for an OTSG design, the reduction in emissions is more than compensated for by the reduced dispersion of the slower and cooler combined cycle exhausts. In addition, the additional cooling tower requirements and associated PM10 emissions for a combined cycle design would also increase the worst case 24-hour PM10 impacts, probably by a factor that is much greater than the increase in PM10 impacts from the gas turbines operating in combined cycle mode.

In the long term, air quality emission and impacts would be higher if the OTSG were operated with a higher capacity factor that is normal for a combined cycle design. However, offsets and mitigation would be required for any project configuration, which would reduce any potential significant impacts to less than significant.

CAPACITY FACTOR VERSUS FACILITY DESIGN

The difference between the actual operating capacity factors between combined cycle facilities and simple cycle facilities are dramatic. Even assuming the Henrietta permitted operating levels are conservative, or high, there is little doubt that the Henrietta facility will increase annual generation once the conversion to an OTSG combined cycle facility is complete. Staff would expect a similar dramatic increase in actual annual operations if the OTSG configuration were used at Canyon.

[6] This comparison is for identical turbine NOx and PM10 emissions when operating at 63 degrees Fahrenheit. The NOx impacts are for worst case startup emissions and the PM10 emission are for steady state emissions. Using the Independent Consultants assumption of reducing the number of gas turbines from 4 to 3 with the addition of OTSG, the anticipated reduction in PM10 emissions and worst-case startup NOx emissions is 25 percent, while the reduction in normal full-load NOx emissions using the Hanford emission factors would be approximately 40 percent. In all cases the reduction in dispersion is a more dominant factor than the emission reductions, so ground level impacts would increase for NOx and PM10 in all cases for this revised project OTSG configuration in combined cycle operation.

COMBINED CYCLE FACILITY CAPACITY FACTORS

A list of recent LM6000 combined cycle facility capacity factors are provided in **ALT-1 Table 5**.

ALT-1 Table 5
LM6000 Combined Cycle Facility Capacity Factors

Year	Von Raesfeld	Roseville
2005	38.08%	--
2006	36.56%	--
2007	52.22%	--
2008	43.37%	65.30%

Source: Energy Commission QFER Data

The capacity factors are based on the annual average non-duct fired capacity for each facility. These two facilities are municipal utility (Muni) owned and operated.

Other larger frame turbine combined cycle facility capacity factors are provided in **ALT-1 Table 6**.

ALT-1 Table 6
Frame F Turbine Combined Cycle Facility Capacity Factors

Year	Magnolia	Moss Landing	High Desert	Sutter	Los Medanos	La Paloma	Delta	Sunrise
2001				32.1%	23.3%			
2002		28.4%		72.8%	76.4%		41.1%	
2003		57.9%	31.9%	62.9%	69.4%	34.6%	71.5%	32.3%
2004		55.5%	51.9%	67.3%	76.4%	57.2%	76.0%	62.1%
2005	10.8%	52.6%	50.3%	47.9%	76.8%	46.4%	72.8%	65.7%
2006	31.2%	57.7%	54.0%	41.5%	62.7%	57.0%	65.7%	70.2%
2007	49.4%	70.3%	61.1%	52.5%	74.4%	62.6%	71.6%	71.5%
2008	54.5%	62.2%	63.4%	57.1%	66.4%	62.6%	65.4%	70.2%

Year	Blythe	Metcalf	Mountainview	Pastoria	Elk Hills	Palomar	Consumnes
2001							
2002							
2003							
2004	26.8%				82.6%		
2005	19.6%	36.3%	1.6%	38.3%	74.4%		
2006	23.2%	44.9%	52.7%	70.6%	71.7%	51.7%	57.8%
2007	26.1%	55.4%	68.2%	73.5%	77.5%	69.9%	85.0%
2008	30.1%	61.4%	72.3%	74.6%	73.7%	75.1%	87.6%

Source: Energy Commission QFER Data

The capacity factors are based on the annual average duct fired capacity for each facility, so they are somewhat low based on the normal non-duct firing operation. Magnolia and Consumnes are municipal utility (Muni) owned/operated and Palomar and Mountainview are Investor Owned Utility (IOU) owned and operated. The other power plants are all merchant facilities. Blythe is currently transmission capacity constrained and so has lower capacity factors than it will after new transmission lines are built.

SIMPLE CYCLE FACILITY CAPACITY FACTORS

A list of LM5000/LM6000 simple cycle facility capacity factors, where all turbines are rated between 45 and 51 MW and have similar efficiencies, are provided in **ALT-1 Table 7.**

ALT-1 Table 7
LM5000/LM6000 Simple Cycle Facility Capacity Factors

Year	Anaheim	Barre	Center	Creed	Etiwanda	Feather	Gilroy	Goose Haven	King City
2001	21.88%								
2002	29.90%						4.90%		3.90%
2003	25.41%			3.26%		3.66%	5.41%	3.10%	4.04%
2004	13.07%			2.39%		3.92%	5.65%	2.57%	4.99%
2005	12.29%			2.20%		3.03%	4.13%	2.46%	3.75%
2006	12.85%			2.66%		3.73%	4.21%	2.75%	3.80%
2007	11.45%	2.14%	1.90%	3.06%	1.61%	6.06%	7.21%	3.44%	5.43%
2008	12.04%	1.10%	1.10%	3.78%	0.86%	6.48%	7.77%	3.67%	5.77%
Year	Lambie	Riverview	Wolfskill	Yuba City	Glenarm	Grayson	Hanford	Henrietta	Indigo
2001							3.23%		
2002							4.89%	3.38%	0.33%
2003	3.24%	3.66%	3.85%	4.34%			2.24%	2.29%	5.86%
2004	3.69%	4.14%	5.01%	4.22%	5.43%	8.05%	1.20%	1.28%	6.28%
2005	3.62%	4.89%	3.74%	8.22%	2.78%	4.17%	3.95%	1.52%	4.71%
2006	2.80%	4.29%	3.96%	5.21%	4.97%	2.85%	2.62%	2.24%	4.40%
2007	3.47%	6.37%	4.87%	5.94%	4.50%	1.26%	4.43%	2.45%	6.86%
2008	3.51%	7.15%	6.14%	8.32%	4.07%	6.11%	5.69%	5.60%	9.90%
Year	Malaga	Larkspur	Los Esteros	MID Ripon	Mira Loma	Niland	Riverside		
2001									
2002		1.18%	9.42%						
2003		4.01%	16.08%						
2004		4.74%	15.92%						
2005		3.85%	4.58%						
2006	7.58%	2.89%	3.87%	2.00%			7.53%		
2007	15.52%	6.00%	4.79%	3.09%	1.72%		4.80%		
2008	17.59%	8.02%	7.91%	3.85%	1.04%	9.21%	9.43%		

Source: Energy Commission QFER Data

Anaheim, Glenarm, Grayson, Malaga, MID Ripon, Niland, and Riverside are municipal utility (Muni) owned and operated and Barre, Center, Etiwanda, and Mira Loma are Investor Owned Utility (IOU) owned and operated. The other power plants are all merchant facilities. While the Muni facilities have historically had higher capacity factors than the other facilities these capacity factors are still well less than combined cycle facility capacity factors.

Therefore, while staff did present a comparison between the CPP and the alternative OTSG combined cycle design, in terms of expected actual operation these two designs are not really comparable. An OTSG facility can reasonably be expected to operate considerably more and emit more air pollutant emissions than a simple cycle facility.

PROPOSED OPERATIONS PERMITTED EMISSIONS COMPARISON

The purpose for combined-cycle projects and simple-cycle projects are very different – one supplies energy and one supplies capacity. As proposed by the applicant in the new turbines power supply forecast from 2013 through 2027 (GB 2008j), the overall range in annual capacity factor ranges from 1.5 percent to 4.9 percent. The project applicant has asked that the project be analyzed with more startup cycles, compared to what was originally proposed in the AFC, indicating the likelihood that the project will be used almost exclusively for capacity or peaking service.

Using the applicant's highest forecast operating year (2022), and assumptions equivalent to those used to develop the emissions comparison in **ALT-1 Table 4**, another emissions comparison of the Canyon 200 MW facility design versus the 187.5 MW OTSG facility design was completed and is presented below in **ALT-1 Table 8**. The startup cycles are assumed to be reduced but, as is true for actual facility operations, not proportionately with the reduction in number of hours in normal operation.

ALT-1 Table 8
Reduced Capacity Factor Annual Emissions Comparison (tons/year)

	NOx	CO	VOC	SO_2	PM10/PM2.5
Canyon Proposal Simple Cycle	8.62	6.44	1.58	0.41	3.64
OTSG with Canyon Generation Rate	8.78	6.08	1.55	0.42	3.91

Source: FSA Air Quality Table 14, and staff calculations.

As the amount of normal operation decreases the startup cycles emissions fraction of the total becomes greater, and because the simple cycle design has lower startup emission the emission estimate trend more in favor of the simple cycle design as the operation, or capacity factor, decreases. Additionally, the more complex the design the more likely that the facility will have an upset, such as turbine trips (gas or steam turbines), which would increase the number of startup cycles and decrease reliability and availability of the project.

CONCLUSIONS

Staff concludes that there is no meaningful air quality emissions or impact related advantage to the OTSG combined cycle design for the permitted level of operation proposed for the Canyon Power Plant. While the emissions comparison for the same amount of generation would be slightly lower for NOx and VOC, they would be slightly higher for PM10 (see **ALT-1 Table 4**). Additionally, the ground level impacts would be higher for the OTSG facility due to the difference in gas turbine/OTSG exhaust characteristics and the additional particulate emissions from the larger required cooling tower. Therefore, staff's comparison of the applicant's proposed project versus an OTSG combined cycle design at the permitted annual generation rate does not show that air quality impacts are reduced for the OTSG design.

Staff's review of the applicant's anticipated generation rates for the project indicate that the project is expected to operate less than half of the permitted annual basis. Staff's comparison of the emissions from the applicant's maximum forecasted annual project operations (for 2011 through 2027) show that as the actual capacity factor drops the applicant's simple cycle design case becomes more and more favorable (see **ALT-1 Table 8**).

Additionally, staff believes that if an OTSG facility were built by the applicant, that facility would be permitted to allow considerably more operation, either now or in the future, than what the applicant has permitted for their proposed limited use simple cycle peaking facility. Staff is not aware of any combined cycle facility, and certainly none of the size of this facility, being permitted to such a low capacity factor (less than 13 percent), so staff believes that a comparison of emissions that is based on the proposed peaking project's permitted capacity is complicated and subject to possible misinterpretation since it does not consider the known differences regarding simple cycle versus combined cycle facility operations and the resulting differences in total emissions.

REFERENCES

GB 2009j - Galati & Blek/M. Mills (tn 52104). SCPPA's Canyon Power Project Operational Hours Spreadsheet, dated 06/22/09. Submitted to CEC/Docket Unit on 06/22/09.

GWF Energy (GWF Energy LLC/CH2MHILL). 2008a. GWF Henrietta Energy Park Peaker, Petition for License Amendment, Conversion to GWF Henrietta Combined-Cycle Power Plant. Submitted to the California Energy Commission, October 14, 2008.

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Ron Yasny

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 below a level of significance. 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 fencing, 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. Walking, driving or parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization.

CONSTRUCTION

Onsite work to install permanent equipment or structures for any facility.

Ground Disturbance

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site beyond site mobilization needs, and for access roads and linear facilities.

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.

Notwithstanding the definitions of ground disturbance, grading, boring and trenching above, 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, when the power plant has reached reliable steady-state production of electricity at the rated capacity. 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 Compliance Project Manager (CPM) shall oversee the compliance monitoring and is 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 (petition to amend), and ownership or operational control (petition for change of ownership) (See instructions for filing petitions)

4. Documenting and tracking compliance filings

5. Ensuring that compliance files are maintained and accessible

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies, Energy Commission, and staff 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. All submittals must include searchable electronic versions (pdf or word files).

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 is to assemble both the Energy Commission's and 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. This is to confirm that all applicable conditions of certification 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 the following documents and information as a public record, in either the Compliance file or Dockets file, for the life of the project (or other period as required):

- All documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
- All monthly and annual compliance reports filed by the project owner;
- All complaints of noncompliance filed with the Energy Commission; and
- All petitions for project or condition 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 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 delegated 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 on-site 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, documents submitted as verification for conditions, and other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files maintained pursuant to this condition.

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.

Verification of compliance with the conditions of certification can be accomplished by the following:

1. Monthly and/or annual compliance reports, filed by the project owner or authorized agent, reporting on work done and providing pertinent documentation, as required by the specific conditions of certification;

2. 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 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 project by AFC number, the appropriate condition(s) of certification by condition number(s), and 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 and CEC submittal number.

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 hardcopy submittals shall be addressed as follows:

> **<u>Compliance Project Manager</u>**
> **(07-AFC-05C)**
> **California Energy Commission**
> **1516 Ninth Street (MS-2000)**
> **Sacramento, CA 95814**

Those submittals shall be accompanied by a searchable electronic copy, on a CD or by e-mail, as agreed upon by the CPM.

If the project owner desires Energy Commission staff action by a specific date, that request shall be made in the submittal cover letter and shall include a detailed explanation of the effects on the project if that date is not met.

Pre-Construction Matrix and Tasks Prior to Start of Construction (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing <u>only</u> 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 submitted 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 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 commencing 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. Compliance submittals should be completed in advance where the necessary lead time for a required compliance event extends beyond the date anticipated for start of construction. The project owner must 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).
8. if the condition was amended, the date of the amendment.

Satisfied conditions shall be placed at the end of the matrix.

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 the AFC number and 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 an electronic searchable version 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, as well as the conditions they satisfy 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;

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.

All sections, exhibits, or addendums shall be separated by tabbed dividers or as acceptable by the CPM.

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 include the AFC number, 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, with the condition it satisfies, 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 compliance fee, which is adjusted annually. Current Compliance fee information is available on the Energy Commission's website http://www.energy.ca.gov/siting/filing_fees.html. You may also contact the CPM for the current fee information. The initial payment is due on the date the Energy Commission adopts the final decision. You will be notified of the amount due. 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 than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the 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, Staff Approved Project Modifications 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 **staff approved project modifications** as specified below. Both shall be filed as a “Petition to Amend.” Staff will determine if the change is significant or insignificant. 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(a), 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. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(a). Upon request, the CPM will provide you with a sample petition to use as a template.

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 requires public notice and approval by the full Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(b). Upon request, the CPM will provide you with a sample petition to use as a template.

STAFF APPROVED PROJECT MODIFICATION

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 a staff approved project modification pursuant to section 1769(a) (2). This process usually requires minimal time to complete, and it requires a 14-day public review of the Notice of Petition to Amend that includes staff’s intention to approve the proposed project modification unless substantive objections are filed. These requests must also be submitted in the form of a “petition to amend” as described above.

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.

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 Process

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 an informal dispute resolution process. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This process 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 process 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 procedure.

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. 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 also provide an initial verbal report, within 48 hours.

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;

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 understandings 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

DECLARATION OF
Eric K. Solorio

I, Eric Solorio, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Project Manager (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 the **Executive Summary** and helped prepare staff testimony on the **Alternatives** section of the Final Staff Assessment for the Canyon Power Plant (07-AFC-9) 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(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_______________ Signed:_________________________

At: Sacramento, California

ERIC SOLORIO

SUMMARY

I'm currently a project manager for the California Energy Commission. I have nine years of experience managing business operations for real estate development companies and three years of experience with economic development through international trade and foreign direct investment. I have a working knowledge of the California Environmental Quality Act. My strengths are in business development, strategic planning, team building, economic analysis, and raising private equity. I'm experienced with managing diverse groups of people to accomplish common objectives.

PROFESSIONAL EXPERIENCE

Presentation Skills

- Organize and participate in public workshops to facilitate public participation in the environmental review of large-scale real estate development projects, up to 4,000 acres in size.
- Organize and participate in international trade and investment, "business to business" workshops.
- Organize and participate in international trade and investment, business development seminars.
- Make presentations to foreign delegations and dignitaries to solicit "foreign direct investment" into California business ventures.
- Assist with implementing protocol for receiving foreign trade delegations visiting California.

Technical Skills

- Review and analyze Application(s) for Certification submitted to the California Energy Commission for proposed, utility-scale thermal power plant development.
- Manage the development of comprehensive environmental impact reports, in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the Federal Clean Water Act.
- Develop and maintain financial models for various business types: real estate development, resource development (forestry) and international trade (technology transfers).
- Work with the following software applications: Access, Excel, PowerPoint, Project and Word.

Legislation and Policy Analysis

- Review, analyze and draft official Agency opinions on proposed legislation that could affect international trade and investment in California.

Writing

- I've written weekly reports to the Governor's office (two years), business plans, letters, memos and environmental impact reports.

EMPLOYMENT HISTORY

October 2008 – Present	**Project Manager**	California Energy Commission; Siting, Transmission and Environmental Protection Division
May 1999 – April 2008	**Owner / Manager**	Various Real Estate Development Partnerships in California
Sept. 2001 – Nov. 2002	**Owner / Manager**	Technology Transfer Services
Nov. 1999 – August 2001	**Special Assistant to Deputy Secretary**	California Trade and Commerce Agency, International Trade and Investment Division

EDUCATION

California State University at Sacramento
Major: International Business
Minor: Economics

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** and **Visual Resources (Visible Plume Modeling Analysis)**, and assisted in the preparation of the **Alternatives** staff testimony, for the **Canyon 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 24, 2009 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, emissions inventories, source permitting, energy and pollution control research RCRA/CERCLA site assessment and closure, site inspection, and source monitoring,.

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; Starwood Power Plant; and Riverside Energy Resource Center Units 3 and 4 Project (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; South Bay Replacement Project; Walnut Creek Energy Park; Sun Valley Energy Project; Highgrove Power Plant; Colusa Generating Station; Russell City Energy Center; Avenal Energy Project; Carlsbad Energy Center; Community Power Project; Panoche Energy Center; San Gabriel Generating Station; Sentinel Energy Project; and Victorville 2 Hybrid Power Project.
  - Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; Russell City Energy Center Amendment (including expert witness testimony); Eastshore Energy Power Plant (including expert witness testimony); Carlsbad Energy Center (in progress), Riverside Energy Resource Center Units 3 and 4 Project; Victorville 2 Hybrid Power Project; 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; Salton Sea Unit 6 Project; and Starwood Power-Midway Peaking Power Plant.
- 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 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 staff paper "Emission Offsets Availability Issues" and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the Energy Commission.
- Preparation of information request and data analysis to update the Energy Commission's Cost of Generation Model capital and operating cost factors for combined and simple cycle gas turbine projects. Additionally, performed a review of the presentation for the revised model as part of the CEC's 2007 Integrated Energy Policy Report workshops, and attended the workshop and answering Commissioner questions on the data collection and data analysis.

- 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 **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.
- Other Projects:
  - 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.

- 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 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.
- Preparation of the emission estimates used in the Air Quality Sections for the DWR Tehachapi Second Afterbay Project Initial Study and EIR.

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
MATTHEW S. LAYTON

I, Matthew S. Layton, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a Supervising Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the greenhouse gas analysis in the Air Quality section for the Canyon Power Plant Final Staff Assessment 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(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:________________ Signed:__________________________

At: Sacramento, California

MATTHEW S. LAYTON

Experience Summary

Twenty five years of experience in the electric power generation field, including regulatory compliance and modification; research and development; licensing of nuclear, coal-fired, peaking and combined cycle power plants; and engineering and policy analysis of regulatory issues.

Education

B.S., Applied Mechanics, University of California, San Diego.

Registered Professional Engineer - Mechanical, California.

Experience

1987-present – Senior Mechanical Engineer, Systems Assessment and Facilities Siting Division, California Energy Commission. Review and evaluate power plant proposals, identify issues and resolutions; coordinate with other agencies; and prepare testimony, in the areas of:

- Air quality resources and potential impacts, and mitigation measures;
- Public Heath; and
- Transmission Line Safety and Nuisance.

Prepared Commission demonstration project process; contributed to the Energy Technology Status, Energy Development, and Electricity Reports; Project Manager for demonstration projects; evaluated demonstration test plans, procedures, data and reports; disseminated test results; and managed research and development contracts.

1983-1986 -- Control Systems Engineer, Bechtel Power Corporation. Managed a multi-disciplined effort to environmentally qualify client's safety related nuclear plant equipment. Performed analyses, calculations and reviews against vendor test reports, NRC guidelines and plant normal and postulated accident conditions. Initiated purchase orders for testing and formulated test objectives and test plans. Developed and implemented plant equipment maintenance and surveillance program based on test results, vendor recommendations and industry operating experiences. Trained client in environmental qualification engineering analysis and equipment maintenance program. Prepared client for NRC audits and presentation.

1981-1983 -- Engineer, GA Technologies, Inc. Supervised design and procurement of full-scale test assembly used to evaluate design changes to operating reactor graphite core assembly. Conducted experiment to determine the relationship of graphite oxidation rate to water concentration, temperature, and helium pressure. Environmentally qualified essential and safety related nuclear power plant equipment to comply with NRC guidelines.

DECLARATION OF
Richard York

I**, Richard York**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Environmental Protection Office** of the **Energy Facilities Siting Division** as a **Planner III**.

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 Canyon Power Plant 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: August 28, 2009 Signed:__________________________

At: Sacramento, California

RICHARD P. YORK

WORK EXPERIENCE SUMMARY

Experienced in biological resource and environmental assessments including endangered species field surveys, mitigation and monitoring, and state and federal agency coordination. Educational background emphasized biological resources, plant identification and taxonomy, general ecology, and herbarium specimen curatorship. Currently supervise biological resources and cultural resources technical analyses completed for the California Environmental Quality Act process required for new power plant licensing for California.

WORK EXPERIENCE

1989 to present - PLANNER I, II, and III, California Energy Commission. Currently, I supervise the Biological Resources and Cultural Resources Unit of the Energy Facilities Siting Division, California Energy Commission. I provide independent environmental assessments for proposed energy facilities and review compliance with Conditions of Certification as required by the Warren-Alquist Act and the California Environmental Quality Act. I am Technical Lead for Biological Resource technical analyses included in the Energy Commission's Environmental Performance Report and Integrated Energy Policy Report. I manage Peak Workload Work Authorizations/technical experts used to complete biological resource and cultural resource analyses for power plant licensing projects, the Environmental Performance Report, and the Integrated Energy Policy Report.

1986 to 1989 – ASSISTANT BOTANIST, The Nature Conservancy. Collected, mapped, and computerized rare plant location and ecological information for the California Natural Diversity Data Base as a contract employee to the California Department of Fish and Game. Required statewide coordination with amateur and professional botanists, field work, and management of work contracts.

1980 to 1986 - BOTANIST, California Native Plant Society. Compiled and co-edited the 3rd edition of the California Native Plant Society's statewide *Inventory of Rare and Endangered Vascular Plants of California.* Work involved field surveys, attendance at public meetings and statewide board meetings, coordination and supervision of volunteers, data base management and quality control, endangered species regulatory review and comment, coordination with state and federal agencies, and writing special plant status reports.

1975 - 1980 **BOTANIST** (Bureau of Land Mgmt., Wyoming)
HERBARIUM ASSISTANT (Humboldt State University)
RESEARCH ASSISTANT (California Native Plant Society)
PARK AIDE (California Department of Parks and Recreation)
PRIVATE BOTANICAL CONSULTANT (Six Rivers National Forest)

EDUCATION

- **B. S. BOTANY** (1979) - Humboldt State University, Arcata, California
- **B. A. PSYCHOLOGY** (1979) - Humboldt State University, Arcata, California

AWARDS

- **1992 RARE PLANT CONSERVATION AWARD** – California Native Plant Society

PROFESSIONAL AFFILIATIONS

- California Native Plant Society
- California Botanical Society
- The Nature Conservancy
- Interagency Botanists
- The Wildlife Society

DECLARATION OF
Beverly E. Bastian

I, **Beverly E. Bastian**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission, and Environmental Protection Division** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Cultural Resources,** for the Canyon 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 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: July 15, 2009 Signed:__________________________

At: ________________________

Beverly E. Bastian
1516 Ninth Street MS 40
Sacramento, CA 95814-5504
(916) 654-4840 email: bbastian@energy.state.ca.us

Education	**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, Siting, Transmission, and Environmental Protection 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 50-MW+ 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; identifying California Register of Historical Resources-eligible cultural resources; developing mitigation measures to reduce to insignificant any impacts to Register-eligible cultural resources; providing expert testimony on my analyses and recommendations 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; coordinating environmental review of power plant projects with cultural resources specialists in sister state agencies and in federal agencies; supervising and reviewing the work of Commission cultural resources consultants; reviewing the CEQA documents of sister state agencies; 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 II, Cultural Resources Division, Cultural Resources Support Unit
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; participation in interdisciplinary teams and project assignments; preparation of technical reports and correspondence; inventorying and evaluating historic properties; coordinating the statewide registration of historical properties; assessing the eligibility of historic properties to the National Register of Historic Places and the California Register of Historical Resources; reviewing environmental documents and providing technical analyses of major Departmental projects to determine impacts to cultural resources under State and federal laws; identifying resource issues and constraints; establishing allowable use and development guidelines; developing approaches to protect, enhance, and perpetuate cultural resources under relevant State and federal laws, regulations, and standards; proposing and developing programs, policies, and budgets to meet Department's historic preservation missions.

Department of Social Sciences, American River College *2000 to 2002*
Instructor (part-time), American History
Creation and presentation of classroom lectures, selection of assigned texts and readings, creation and administration of quizzes and examinations, assignment and supervision of student research papers, student consultation in office hours, grading of all quizzes, tests, and papers, and assigning final student grades. These research, organizing, and teaching skills demonstrate ability to organize information, to speak effectively to the public, and to train and direct other personnel.

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 an 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 (personal services contract) *1979 to 1981, 1983-1984*
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 *1966 to 1981*

Professional Societies

Register of Professional Archaeologists, #10683
Society for Historical Archaeology
California Council for the Promotion of History
Vernacular Architecture Forum
Society for California Archeology

DECLARATION OF
Michael D. McGuirt

I, **Michael D. McGuirt**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission, and Environmental Protection Division** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Cultural Resources,** for the Canyon 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: __September 2, 2009____________ Signed:__________________________

At: _Sacramento, California_______

MICHAEL D. MCGUIRT, MA, RPA

OBJECTIVE

To participate in the consultations that guide the management of heritage resources in native, public, and private trusts, to foster public support for heritage resource conservation through archaeological research and public outreach, and to contribute to the formulation of historic preservation policy.

EDUCATION

MASTER OF ARTS in Anthropology ◦ The University of Texas at Austin May 1996

Area concentration in the North American Southwest. Technical concentrations in geoarchaeology, palynology, and ceramic analysis.

BACHELOR OF ARTS in Anthropology and Archaeological Studies ◦ The University of Texas at Austin December 1990

Area concentrations in Mesoamerica and the Andes. Technical concentration in lithic analysis.

PROFESSIONAL EMPLOYMENT

ENERGY PLANNER II ◦ California Energy Commission, Sacramento, California November 2007 to November 2008

Develop environmental impact analyses of the potential effects that the construction and operation of proposed thermal power plants may have on significant cultural resources. Apply applicable Federal, State, and local statutes and regulations, as they relate to the consideration of cultural resources. Design and execute cultural resource impact analyses that are appropriate to the specific regulatory context for each proposed project. Gather and evaluate information on projects and on cultural resources in project areas. Develop and maintain agency and public relationships to acquire the most useful data and to elicit input in the development of California Energy Commission conditions of certification. Succinctly convey, orally in different public forums and in different written technical formats, the results of cultural resource impact analyses and proposed conditions of certifications meant to mitigate adverse impacts to significant cultural resources. Periodic reviews of licensees' actions to ensure compliance with extant conditions of certification. Oversight of consultants' who are preparing cultural resource impact analyses preservation program.

SENIOR STATE ARCHAEOLOGIST ◦ Office of Historic Preservation, California Department of Parks and Recreation (California State Parks), Sacramento, California December 2004 to December 2005

Out-of-class assignment supervising the Project Review Unit for the California State Historic Preservation Officer (SHPO) in the California Office of Historic Preservation (OHP). As the Acting Chief of Project Review, I managed and trained a staff of eight professionals and one clerical assistant to conduct, on behalf of the SHPO, the review of all Federal agency actions in the State of California under 36 CFR Part 800. 36 CFR Part 800 is the Advisory Council on Historic Preservation's implementing regulation for Section 106 of the National Historic Preservation Act of 1966, and the primary Federal historic preservation program.

ASSOCIATE STATE ARCHAEOLOGIST ◦ Office of Historic Preservation, California Department of Parks and Recreation (California State Parks), Sacramento, California May 2001 to November 2007

Project Review Unit archaeologist for the California State Historic Preservation Officer (SHPO). Consulted under 36 CFR Part 800 on the adequacy of federal agency efforts to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. 470f). Served as SHPO contact person for informal federal agency consultation and formal initiation of Section 106 consultation (36 CFR § 800.3). Reviewed documentation of and provide comment on federal agency determinations and

findings (36 CFR §§ 800.4 and 800.5). Negotiated, drafted, and reviewed memoranda of agreement and treatment plans to resolve adverse effects to historic properties (36 CFR § 800.6). Negotiated, drafted, and reviewed program alternatives and management plans (36 CFR § 800.14). Administered federal agency efforts to comply with previously executed agreement documents. Developed and delivered public and professional presentations and workshops on the Section 106 regulatory process in California and the role of the SHPO in Section 106 consultation. Helped create initiatives through the National Park Service's Certified Local Government (CLG) program to encourage the development of local community archaeological site preservation plans. Evaluated and recommended proposals for CLG grants and helped administer resultant grants. Reviewed and provided comment on National Register of Historic Places (National Register) property nominations, and prepared and presented staff reports on the nominations to the State Historical Resources Commission. Member of committee to revise the Comprehensive Statewide Historic Preservation Plan for California, and author of the archaeology section of the plan. The Office of Historic
Preservation's (OHP) liaison to the Society for California Archaeology (June 2002 to September 2009).

ARCHAEOLOGICAL CONSULTANT ◦ Kaniakapūpū Project, O`ahu, Hawai`i ◦ Department of Anthropology, University of Hawai`i at Mānoa, Honolulu, Hawai`i June 2000

Recorded exposed architectural elements and directed test excavations to reconstruct building sequences of Native Hawaiian stone architecture. Advised on the interpretation of archaeological stratigraphy and on the field application of archaeological mapping methods and techniques.

ENVIRONMENTAL SPECIALIST III ◦ Jones & Stokes, Sacramento, California February 1999 to May 2001

Designed, conducted, and managed short- and long-term archaeological projects in California, Nevada, and New Mexico to comply with Sections 106 and 110 of the NHPA. Prepared proposals. Assisted with client contract negotiations. Conducted archaeological record searches and archival research. Directed Phase I pedestrian inventory surveys and test excavations for Phase II evaluations. Analyzed material culture assemblages. Prepared technical reports and regulatory compliance documents including National Register property and district evaluations, and monitoring and discovery plans. Represented clients in consultations with federal and state agencies, and coordinated and managed clients' compliance with federal cultural resource regulations and the cultural resource regulations of California, Nevada, and New Mexico.

ARCHAEOLOGICAL TECHNICIAN ◦ B.O.A.S., Inc., Seattle, Washington August 1998 to October 1998

Assisted with data recovery excavations on a short-term cultural resource management contract.

ASSISTANT ANTHROPOLOGIST ◦ Bernice Pauahi Bishop Museum, Honolulu, Hawai`i August 1996 to June 1998

Assisted with archaeological project design, preparation of proposals, and client contract negotiations, directed Phase I pedestrian inventory surveys, test excavations for Phase I subsurface inventory surveys, test excavations for property evaluations, and data recovery excavations, and assisted with preparation of technical reports on short-term cultural resource management contracts. Analyzed field records, prepared site reports and synthetic report chapters, and analyzed and prepared reports on lithic assemblages for Phases I–III of a long-term federal highway project (Interstate Route H–3). Conducted research in Hawaiian archaeology, and delivered public and professional presentations of that research. Advised on the integration of geoarchaeological methods and techniques into cultural resource management field efforts, and on geoarchaeological interpretations of extant field records, and designed and conducted geoarchaeological components of fieldwork for short–term cultural resource management contracts.

FIELD DIRECTOR ◦ Chersonesos Project, Ukraine, Eastern Europe ◦ Institute of Classical Archaeology, University of Texas at Austin, Austin, Texas May 1996 to July 1996

Assisted in archaeological project design. Directed a geoarchaeological reconnaissance, a pedestrian inventory survey, archaeological mapping, test excavations, and data recovery excavations in the National Preserve of Tauric Chersonesos. Conducted on-site project presentations for the United States Ambassador to Ukraine, and Ukrainian and Russian archaeological scholars. Assisted in the preparation and implementation of archaeological site preservation plans. Taught archaeological field methods and techniques to graduate students. Prepared portion of requisite field report for Crimean Archaeological Council, Simferopol.

ASSISTANT FIELD DIRECTOR ◦ Chersonesos Project, Ukraine, Eastern Europe ◦ Institute of Classical Archaeology, University of Texas at Austin, Austin, Texas May 1995 to July 1995

Assisted in the direction of data recovery excavations in the National Preserve of Tauric Chersonesos. Taught archaeological field methods and techniques to graduate students. Advised on the interpretation of archaeological stratigraphy.

ARCHEOLOGIST I ◦ Archeology Survey Team ◦ Texas Parks and Wildlife Department, Austin, Texas December 1994 to May 1995

Assisted in the direction of pedestrian inventory surveys, the preparation of cultural resource management plans, and the preparation of state site forms and reports of investigations. Advised on the integration of
global positioning system (GPS) technology and the field methods of archaeological survey.

RESEARCH ASSISTANT ◦ Colha Project, Belize, Central America ◦ Department of Anthropology, University of Texas at Austin, Austin, Texas July 1994 to August 1994

Conducted an extensive ground survey to correct the published base map for the Maya site of Colha. Assisted in mapping of surface architectural ruins. Directed a test excavation crew. Assisted in the preparation of the field report.

ARCHAEOLOGIST ◦ Lower Colorado River Authority, Austin, Texas February 1994 to December 1994

Designed and implemented trial mitigation plans for archaeological sites threatened by fluvial and lacustrine erosion. Assisted in pedestrian inventory surveys and test excavations, the preparation of state site forms, the development of the agency's database of its archaeological site inventory, and public education initiatives that included site tours for primary and secondary students, and workshops for primary and secondary teachers.

COLLEGIATE EXPERIENCE

TEACHING ASSISTANT ◦ Archaeological Analysis ◦ Department of Anthropology, University of Texas at Austin, Austin, Texas August 1993 to December 1993

Presented undergraduate lectures on archaeological method and theory. Wrote and graded examinations. Advised students.

TEACHING ASSISTANT ◦ Archaeological Field School, New Mexico ◦ Department of Anthropology, University of Texas at Austin, Austin, Texas May 1993 to July 1993

Taught archaeological field methods and techniques to undergraduate and graduate students.

PROJECT ARCHAEOLOGIST ◦ WS Ranch Project, New Mexico ◦ Department of Anthropology, University of Texas at Austin, Austin, Texas May 1992 to July 1992, May 1993 to July 1993

Designed and prepared proposals for two field seasons. Addressed New Mexico State Historic Preservation Office and United States Forest Service comments on the proposals. Directed test excavations and data recovery excavations for two field seasons. Conducted geoarchaeological, palynological, and material culture analyses. Prepared a report of the research.

VOLUNTEER LITHIC ANALYST ∘ WS Ranch Project, New Mexico ∘ Department of Anthropology, University of Texas at Austin September 1991 to December 1991

Analyzed lithic tool collections from San Francisco and Three Circle phase Mogollon sites on the Gila National Forest.

VOLUNTEER ARCHAEOLOGICAL TECHNICIAN ∘ WS Ranch Project, New Mexico ∘ Department of Anthropology, University of Texas at Austin June 1991

Assisted in test excavations for the Phase II evaluations of San Francisco and Three Circle phase Mogollon sites on the Gila National Forest in advance of the development of an interpretative trail.

VOLUNTEER LITHIC ANALYST ∘ WS Ranch Project, New Mexico ∘ Department of Anthropology, University of Texas at Austin September 1990 to December 1990

Analyzed a lithic tool collection from a Three Circle to Tularosa phase Mogollon site on the Gila National Forest and submitted a report of the analysis.

ARCHAEOLOGICAL TECHNICIAN ∘ Archaeological Research, Inc., Austin, Texas July 1990

Assisted in a Phase I pedestrian inventory survey on the Sitgreaves National Forest, Arizona in advance of a timber sale.

ARCHAEOLOGICAL TECHNICIAN ∘ New World Consultants, Inc., Albuquerque, New Mexico June 1990

Assisted in a Phase I pedestrian inventory survey on the Gila National Forest, New Mexico in advance of a timber sale.

UNDERGRADUATE PARTICIPANT ∘ Archaeological Field School, New Mexico ∘ Department of Anthropology, University of Texas at Austin May 1990 to July 1990

Laid out mapping control networks and assisted in test excavations on a Reserve phase Mogollon site and a Three Circle to Tularosa phase Mogollon site, and assisted in a pedestrian inventory survey of the upper San Francisco River Valley on the Gila National Forest.

TECHNICAL KNOWLEDGE AND SKILLS

CULTURAL RESOURCE AND ENVIRONMENTAL LAW

Expert knowledge of Section 106 of the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. 470f), as amended, and the regulation that implements Section 106 (36 CFR Part 800). Thorough knowledge of Section 110 of the NHPA and the U.S. Army Corps of Engineers' Appendix C to 33 CFR Part 325. Working knowledge of the Native American Graves Protection and Repatriation Act of 1990, the National Environmental Policy Act of 1969, the Archaeological Resource Protection Act of 1979, the California Environmental Quality Act of 1970, and cultural resource statutes, regulations, and guidelines for the states of California, Hawai`i, Nevada, New Mexico, and Texas.

GEOARCHAEOLOGY

Specialty in geoarchaeology with emphases on processual and historical geomorphology, paleoecology, stratigraphy, pedology, and sedimentology. Strong ability to reconstruct the depositional history and paleoenvironment of archaeological resources at multiple areal scales. Design and implement geoarchaeological data collection strategies. Analyze and interpret resultant data. Analyze and interpret geoarchaeological data from extant field records. Expertise used to provide superior contexts for material culture assemblages and architecture at sites in Hawai`i, Ukraine, and New Mexico.

Mapping and Spatial Analysis

Five years of professional land surveying experience prior to 1988. Thorough knowledge of principles and techniques of land surveying, of a wide variety of optical instruments, of GPS receivers, and of the integration and manipulation of positional and attribute data from multiple sources in drafting and GIS applications. Expertise used to develop archaeological mapping and GIS programs for projects in California, Ukraine, Belize, Hawai`i, New Mexico, and Texas.

Archaeological Survey and Excavation

Archeological survey and excavation experience on sites that represent a wide range of cultures, time periods, and environments. Survey experience in California on nineteenth and twentieth century Karuk sites and late nineteenth to early twentieth century Euroamerican mining sites, in Nevada on Pre-Archaic, Archaic, and Protohistoric Native American sites and mid-nineteenth to early twentieth century railroad, mining, emigrant trail, and homestead sites with European, Euroamerican, and Asian components, in northeastern and southern Texas on Paleoindian, Archaic, Caddoan, and early nineteenth to early twentieth century Euroamerican sites, in western New Mexico and eastern Arizona on Archaic and Mogollon sites, on the Na Pali Coast of Kaua`i, Hawai`i on precontact Native Hawaiian sites and in the southern Crimea, Ukraine on Neolithic, Bronze Age, Greek, Roman, Byzantine, and nineteenth century Russian sites.

Excavation experience in California on late nineteenth to early twentieth century Euroamerican mining sites, early twentieth century Euroamerican homesteads, and a Feather River site with Maidu and Euroamerican components, in western New Mexico on Early Pithouse period, Three Circle, Reserve, and Tularosa phase Mogollon sites, in eastern Belize on the Middle Preclassic to Postclassic Maya site of Colha, on O`ahu, Hawai`i on early postcontact to early twentieth century sites with Native Hawaiian, Chinese, Japanese, European, and Euroamerican components in downtown Honolulu, on the East Loch of Pearl Harbor, and in Nu`uanu Valley, in Washington on an Olcott phase Native American site, and in the southern Crimea, Ukraine on Hellenistic Greek and Roman sites.

Experience in the excavation of adobe and stone architecture, house pits or pithouses, former sites of wooden and grass structures, ancient roadways, hearths, refuse pits, storage pits, and extramural surfaces.

Material Analyses

Experience with a wide range of prehistoric and historic material culture. Analyzed and reported on lithic assemblages from Hawai`i and New Mexico, ceramic assemblages from Ukraine and New Mexico, sediments from Hawai`i, Ukraine, and New Mexico, and fossil pollen from New Mexico. Ability to identify and date archaeological site assemblages with late eighteenth to early twentieth century architectural materials, bottle glass, tin cans, and American, British, Chinese, and Japanese ceramics.

Computer Literacy

Experience with diverse word processing, spreadsheet, database, drafting, graphics, data processing, and GIS applications on PC (Windows XP) and MacIntosh platforms in networked environments. Word processing applications used include Microsoft Word and WordPerfect. Spreadsheet applications used include Microsoft Excel. Database applications used include Microsoft Access, Quattro Pro, FoxPro, and MinArk. Drafting applications used include AutoCAD and Surfer. Graphics applications used include CorelDraw. Data processing applications used include PathFinder, SurveyLink, and GeoLink. GIS applications used include ArcView.

Recent Professional Development

Cultural Resource and Environmental Law

ACHP - FHWA Advanced Seminar: Reaching Successful Outcomes in Section 106 Review ∘ Vancouver, Washington ∘ Advisory Council on Historic Preservation, Don Klima and Carol Legard; Federal Highway Administration, Mary Ann Naber October 2007

NEPA Compliance and Cultural Resources ∘ Portland, Oregon ∘ National Preservation Institute, Joe Trnka October 2007

Section 106: How to Negotiate and Write Agreements ∘ Sacramento, California ∘ National Preservation Institute, Claudia Nissley November 2004

Consultation with Indian Tribes on Cultural Resource Issues ∘ Sacramento, California ∘ National Preservation Institute, Thomas F. King and Reba Fuller September 2003

Section 106: How to Negotiate and Write Agreements ∘ The Presidio, San Francisco, California ∘ National Preservation Institute, Thomas F. King May 2002

Introduction to CEQA ∘ Sacramento, California ∘ University of California, Davis, Continuing and Professional Education, Ken Bogdan and Terry Rivasplata July 2000

TECHNICAL ARCHAEOLOGY

Introduction to Historic Site Survey, Preliminary Evaluation, and Artifact ID ∘ West Sacramento, California ∘ California Department of Transportation and California Department of Parks and Recreation, Glenn Farris, Larry Felton, Julia Huddleson, Anmarie Medin, Pete Schulz, Judy Tordoff, and Kimberly Wooten September 2006

Principles of Geoarchaeology for Transportation Projects (Course No. 100246). Sacramento, California ∘ California Department of Transportation, Graham Dalldorf, Glenn Gmoser, Jack Meyer, Stephen Norwick, Adrian Praetzellis, and William Silva October 2006

INFORMATION TECHNOLOGY AND CULTURAL RESOURCE MANAGEMENT

GIS: Practical Applications for Cultural Resource Projects ∘ Sacramento, California ∘ National Preservation Institute, Deidre McCarthy September 2006

STATE GOVERNMENT

Introduction to California State Parks ∘ Asilomar, Monterey County, California ∘ California Department of Parks and Recreation and Monterey Peninsula College December 2001

PUBLICATIONS, REPORTS, PAPERS, AND WORKSHOPS

Darcangelo, Jennifer, John Sharp, Michael D. McGuirt, Andrea Galvin, and Clarence Caesar

2004 *Section 106 for Experienced Practitioners: Consulting with the California SHPO (GEV4111).* Course taught on 8 September in Oakland to California Department of Transportation cultural resources personnel and private sector cultural resource consultants (8 hours).

Darcangelo, Jennifer, John Sharp, Michael D. McGuirt, and Andrea Galvin

2005 *How to Consult with the California SHPO.* Workshop presented on 23 April at the 39th Annual Meeting of the Society for California Archaeology, Sacramento, California (6 hours).

Jones & Stokes

1999a *Cultural Resource Inventory Report for Williams Communications, Inc. Fiber Optic Cable System Installation Project, Wendover, Nevada to the California State Line*. Volume 1: Draft Report. July. (JSA 98-358.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

1999b *Cultural Resources Report for the Williams Communications, Inc. Interstate 80 Fiber Optic Cable System Installation Project*. Volume I. September. (JSA 98-358.) Submitted to Williams Communications, Inc., Tulsa, Oklahoma. On file with the State Historic Preservation Office, Carson City, Nevada.

1999c *Archaeological Site Avoidance and Monitoring Plans for Williams Communications' Fiber Optic Cable Installation In the Union Pacific Railroad Right-of-Way, Doña Ana County to Hidalgo County, New Mexico*. October. (JSA98-379.) Sacramento, California. Prepared for Williams Communications, Inc., Tulsa, Oklahoma.

2001 *Final Phase II Cultural Resource Evaluation for the Kramer Mining District, Edwards AFB, Kern and San Bernardino Counties, California*. Volume I. November. Sacramento, California. On file with the Base Historic Preservation Officer, Edwards AFB, California.

Lebo, Susan A. and Michael D. McGuirt

1997 *Geoarchaeology at 800 Nuuanu: Archaeological Inventory Survey of Site 50-80-14-5496 (TMK1-7-02:02), Honolulu, Hawai`i.* Department of Anthropology, Bishop Museum, Honolulu. (100 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998a *Assessments of Stone Architecture: a Case Study from North Hālawa Valley, O`ahu.* Paper presented at the 11th Annual Hawaiian Archaeology Conference of the Society for Hawaiian Archaeology, Kailua-Kona, Hawai`i.

1998b Pili *Grass, Wood Frame, Brick, and Concrete: Archaeology at 800 Nuuanu*. Department of Anthropology, Bishop Museum, Honolulu. (142 pp.) Submitted to Bank of Hawaii, Honolulu. On file with the State Historic Preservation Division, Honolulu.

Lennstrom, Heidi A., P. Christiaan Klieger, Michael D. McGuirt, and Susan A. Lebo

1997 *Archaeological Reconnaissance of Pouhala Marsh, `Ewa District, O`ahu.* Department of Anthropology, Bishop Museum, Honolulu. (14 pp.) Submitted to Ducks Unlimited, Inc., Rancho Cordova, California. On file with the State Historic Preservation Division, Honolulu.

McGuirt, Michael D.

1996 *The Geoarchaeology and Palynology of an Early Formative Pithouse Village in West-Central New Mexico*. Unpublished M.A. thesis, Department of Anthropology, University of Texas at Austin.

1998 50-80-10-2010, 50-80-10-2016, 50-80-10-2088, and 50-80-10-2134. In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vols. 2a and 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–3, 1–44, 1–5, and 1–46. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

2002 Committee Reports, OHP Liaison. *SCA Newsletter* 36(3):4–5.

2004 Committee Reports, OHP Liaison. *SCA Newsletter* 38(2): 7, 38(3):6–8.

2006 Preservation Archaeology. In *California Statewide Historic Preservation Plan: 2006–2010*, edited by Marie Nelson, pp. 8–15. California Department of Parks and Recreation's Office of Historic Preservation, Sacramento. Submitted to the National Park Service, Washington, D.C. On file at the California Office of Historic Preservation, Sacramento.

2008 Dealing with Multi-element Cultural Resources under Section 106. In *Historic Properties Are More Than Meets the Eye: Dealing with Historical Archaeological Resources under the Regulatory*

Context of Section 106 and CEQA. Session presented on 25 April at the *33rd Annual California Preservation Conference* of the California Preservation Foundation in Napa, California, moderated by Michelle Messinger and Michael D. McGuirt (1 1/2 hours).

McGuirt, Michael D. and Leigh Ann Garcia

1991 Lithic Stew at Apache Creek: the 1990 Chipped Stone Artifact Collection from LA 2949. In *An Analysis of Lithic Artifacts Recovered During the 1990 Test Excavations at the Apache Creek Site (LA 2949), Gila National Forest, West Central New Mexico*, edited by James A. Neely and Jay R. Peck, pp. 13–61. Department of Anthropology, University of Texas at Austin. Submitted to United States Forest Service. On file at the Gila National Forest Office, Silver City, New Mexico.

McGuirt, Michael D. and Leslie H. Hartzell

1997 50-80-10-2139 and 50-80-10-2459. In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawa Valley, O`ahu*, vols. 2c and 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–17 and 1–5. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

1998 Chapter 1: Introduction. In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vol. 1, edited by Department of Anthropology, Bishop Museum, pp. 1–14. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

McGuirt, Michael D. and Margaret Howard

1995 Prehistoric Background. In *Archeological Survey of Tyler State Park, Smith County, Texas*, edited by Margaret Howard, pp. 16–31. Texas Parks and Wildlife Department, Austin. On file with the Texas Historical Commission, Austin, Texas Antiquities Committee Permit No. 1484.

McGuirt, Michael D. and Shannon P. MacPherron

1998 50-80-10-2137 . In *Activities and Settlement in an Upper Valley: Data Recovery and Monitoring Archaeology in North Hālawa Valley, O`ahu*, vol. 2b, edited by Department of Anthropology, Bishop Museum, pp. 1–86. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

McGuirt, Michael D. and Deborah I. Olszewski

1997 50-80-10-2256. In *Imu, Adzes, and Upland Agriculture: Inventory Survey Archaeology in North Hālawa Valley, O`ahu*, vol. 2d, edited by Department of Anthropology, Bishop Museum, pp. 1–9. Department of Anthropology, Bishop Museum, Honolulu. Submitted to State of Hawaii, Department of Transportation, Honolulu. On file with the State Historic Preservation Division, Honolulu.

Mikesell, Stephen, Michael McGuirt, and Trish Fernandez

2007 Introduction to the White Papers in State Historical Resources Commission Archaeology Committee White Papers. *SCA Newsletter* 41(1):18–21.

Sharp, John, Michael D. McGuirt, Jennifer Darcangelo, and Andrea Galvin

2004 *How to Consult with the California SHPO*. Workshop presented on 18 March at the 38th Annual Meeting of the Society for California Archaeology, Riverside, California (4 hours).

Professional and Honorary Associations

Register of Professional Archaeologists
Society for American Archaeology
Society for California Archaeology
Honor Society of Phi Kappa Phi

References and Writing Samples

Available upon request.

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 **Public Health, Hazardous Materials Management,** and **Worker Safety/Fire Protection** sections for the **Canyon Power Plant Application** 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: ____________________ 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 in the preparation of human and ecological risk assessments, air quality assessments, hazardous materials handling and risk management/prevention, infrastructure vulnerability assessments, occupational safety and health, hazardous waste site characterization, interaction with regulatory agencies in obtaining permits, and conducting lead surveys and studies. He has particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, the intrusion of subsurface contaminants into indoor air, and the preparation and review of public health/public safety sections of EIRs/EISs. 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 and has assisted the CEC in the assessment of safety and security issues for proposed LNG terminals. In addition to providing security expertise to the State of California, Dr. Greenberg was the Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 26

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, review and evaluation of EIRs/EISs, preparation of public health and safety sections of EIRs/EISs, 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 Hazardous Materials Management and Security, Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Waste Site Characterization, and Toxic Substances Control Policy for over 26 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, refineries, 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 is presently assisting the California Energy Commission in assessing the risks to workers and the public of proposed power plants and LNG terminals in the state. His experience in hazard identification, exposure assessment, risk assessment, occupational safety and health, emergency response, and Critical Infrastructure Protection has made him a valuable part of the CEC team addressing this issue. He has reviewed and commented on the DEIS/DEIR for the proposed SES LNG Port of Long Beach terminal, focusing on security issues for the CEC and on safety matters for the City of Long Beach. He has presented technical information and analysis to the State of California Interagency LNG Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

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 been a member of the Squaw Valley Technical Review Committee since 1986 establishing chemical application management plans at golf courses to protect surface and groundwater quality. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

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 contaminated soils. 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.

Liquefied Natural Gas (LNG)

Dr. Greenberg assisted the CEC in the preparation of the "background" report on the risks and hazards of siting LNG terminals in California ("LNG in California: History, Risks, and Siting" July 2003) and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. He has also conducted an evaluation and prepared comments on the risks, hazards, and safety analysis of the DEIS/DEIR for the City of Long Beach on a proposed LNG terminal at the Port of Long Beach (POLB) and conducted an analysis on vulnerability and critical infrastructure security for the CEC on this same proposed LNG terminal. He currently advises the CEC on the POLB LNG proposal on risks, hazards, human thresholds of thermal exposure, vulnerability, security, and represented the CEC at a U.S. Coast Guard briefing on the Waterway Suitability Assessment that included the sharing of SSI (Sensitive Security Information). He has presented technical information and analysis to the State of California LNG Interagency Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

Infrastructure Security

Since 2002, 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 assessment of Critical Infrastructure Protection, threat assessments, criticality assessments, and 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 foreign and domestic 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 is used by 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 also leads 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, 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.

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)

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
- SFERP Project, San Francisco, Ca. 2004 – 2006. hazardous materials, worker safety/fire protection, waste management, public health

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, confined spaces, 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. He is currently the team leader conducting safety and security audits at power plants throughout California for the California Energy Commission. Safety issues audited include compliance with regulations addressing several safety matters, including but not limited to, confined spaces, lockout/tagout, hazardous materials, and fire prevention/suppression equipment.

Examples

Review and Evaluation of Public and Worker Safety Issues at the proposed SES LNG Facility, Port of Long Beach. prepared for the City of Long Beach. (November 2005)

Confidential safety and security audit reports for 18 power plants in California. prepared for the California Energy Commission. (January 2005 through March 2006)

Report on the Accidental release and Worker Exposure to Anhydrous Ammonia at the BEP I Power Plant, Blythe, Ca. prepared for the California Energy Commission. (October 2004)

Investigation of a Worker Death in a Confined Space, La Paloma Power plant. prepared for the California Energy Commission. (July 2004)

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)

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)

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)

DECLARATION OF
Rick Tyler

I, **Rick A. Tyler**, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting Office of the Energy Facilities Siting Division as a Senior Mechanical Engineer**.**

2. A copy of my professional qualifications and experience were included in the FSA, and is incorporated by reference herein.

3. I supervised the preparation of Staff Testimony on Hazardous Materials Management, Worker Safety / Fire Protection and Public Health for the Canyon Energy 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: August 28, 2009 ____________ Signed:__________________________

At: Sacramento, California

RESUME
RICK A. TYLER
Senior Mechanical Engineer
CALIFORNIA ENERGY COMMISSION

EXPERIENCE Oct. 2001- Oct 2004 (Part Time)	**Corporate President, Chairman, and CEO** Professional Engineers in California Government (PECG) 2002, **Section Director** 2003-2004, 2008-2009 PECG Board of Directors

As President / CEO of the Professional Engineers in California Government, I served as the Chairman of the Board and Chief Executive Officer of this 13,000 member organization representing engineers employed by the State of California. In this capacity I was 1) the primary interface between the Corporate Board and the consultant organization that conducted most of the day to day business of the organization 2) the Chairman responsible for conducting quarterly board meetings and 3) responsible for ensuring that the member stake holders received good value for their investment. During my tenure on the corporate board we obtained the best contract negotiated in more than 20 years. This was achieved during a period of extreme economic constraints for, our employer, the State of California. I believe that this achievement was the direct result of my focus on the organization's primary mission and my success in keeping the organization on task.

As Section Director I represented the interests of the stakeholders in one of the 17 local sections represented on the PECG Board. This experience gave me a keen understanding of corporate board dynamics and how interactions between individual directors having conflicting priorities affects board function.

My experiences on the PECG Board of Directors provided me with a clear understanding of corporate board structure, function, and leadership as well as extensive knowledge of labor relations functions. It also provided me with a first hand understanding of the need for a clear vision and strong corporate governance which I provided during my tenure.

June 2000- Present (Full Time)	California Energy Commission – **Senior Mechanical Engineer (energy facility permitting)** Systems Assessment and Facilities Siting Division

Responsible for planning, organizing and directing the work of the Facility Safety Unit within the Systems Assessment and Facilities Siting Division's, Engineering Office. This unit evaluates the adequacy of proposed and ongoing safety management practices associated with hazardous material handling, worker safety and fire protection at very large conventional and alternative/renewable energy power facilities certified by the California Energy Commission. Responsible for quality and timeliness of all work conducted by employees and contractors performing work for this unit, including engineering analysis, products such as expert witness testimonies, compliance verifications, and conducting accident evaluations and investigations.

Jan. 1998-
June 2000
(Full Time)

California Energy Commission **- Associate Mechanical Engineer (energy facility siting)** Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permits) 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
(Full Time)

California Energy Commission **- Health and Safety Program Specialist (energy facility siting)** ; 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. Present expert witness testimony at regulatory hearings.

Nov. 1977-
April 1985
(Full Time)

California Air Resources Board – **Mechanical Engineer (regulatory compliance)** last four years at 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 a representative, of the State I coordinated efforts with federal, local, and industrial representatives.

EDUCATION

B.S., Mechanical Engineering, California State University, Sacramento.

KNOWLEDGE OF

Knowledge of; corporate governance, Roberts Rules of Order, corporate organization, structure and bylaws, business plan development, management supervision, organizational failure, contract management, process safety management, CEQA, statistics, instrumentation, technical writing, toxicology, risk assessment, loss prevention, environmental chemistry, hazardous materials management, technical management of chemical process safety, noise measurement, regulations and framework of toxic substances control and workplace safety, and presentation expert witness testimony.

PUBLICATIONS, PROFESSIONAL PRESINTATIONS, AND ACCOMPLISHMENTS

Authored staff reports published by the California Air Resource 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, overseeing contract work totaling more than $500,000.

DECLARATION OF
DAVID FLORES

I, **David Flores** declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a **Planner 2**.

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 Canyon Power Plant Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 8, 2009 Signed:____________________

At: Sacramento, California

DECLARATION OF
DAVID FLORES

I, **David Flores** declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a **Planner 2**.

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 Canyon Power Plant Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 8, 2009 Signed:____________________

At: Sacramento, California

DAVID FLORES

WORK EXPERIENCE

Sept. 1998 to Present — **Planner 2.** California Energy Commission, Energy Facilities Siting and Protection Division.

- Provide technical analysis of proposed energy planning, conservation, and development programs on land use, visual and traffic and transportation resources. Specific tasks include: the analysis of potential impacts; identification of suitable mitigation measures; preparation of testimony; participate in public workshops; present sworn testimony during evidentiary hearings, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations.

March 29,1988 to September 12, 1998 — **Senior Planner.** County of Yolo Planning and Public Works Department

Senior Planner - Current and Advanced Planning (Resources Management and Planning)

Responsibilities included the following:

- Administered the establishment of Planning schedules and timeframe completion schedules; Administration and staff support to Planning Commission and Board of Supervisors; Staff support and liaison to citizen's committees. Preparation of Environmental documents (Negative Declarations, preparation of Environmental Impact Reports and Categorical Exemptions) in accordance with State and Federal Regulations.

June 1, 1976 to March 25, 1988 — **Manager of Resources** Citizens Utilities Company of California

Responsibilities included the following:

- Coordinated, planned and developed semi-annual and annual construction and operating and maintenance budgets for all Northern California operations.
- Assisted in the development of rate and fee schedules before the California Public Utilities Commission for all Northern California Operations.
- Direct five employees and twenty-five employees in the outlying operations.
- Extensive experience in specification writing, project planning and scheduling, construction management, and site supervision

EDUCATION

California State University @ Sacramento
University of California @Davis
Major: Environmental Studies
Minor: Business Administration

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 testimony on **NOISE AND VIBRATION**, for the **Canyon 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: ______________________ 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
Testimony of Scott Debauche

I**, Scott Debauche,** 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 **Socioeconomics Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Socioeconomics** for the **Canyon Power Plant** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 30, 2009 Signed:______________________________

At: Agoura Hills, California

SCOTT DEBAUCHE

Environmental Planner

ACADEMIC BACKGROUND

B.S., Urban & Regional Planning, University of Minnesota, 1994

PROFESSIONAL EXPERIENCE

Mr. Debauche is an environmental planner with 14 years of experience preparing a variety of federal and State of California environmental, planning, and analytical documents for large-scale infrastructure and development projects. Mr. Debauche brings the experience of specializing in the integration and completion of NEPA and CEQA documentation joint documentation. Mr. Debauche specializes in evaluating Transportation/Traffic, Noise, Socioeconomics and Environmental Justice, Air Quality, Alternatives analysis, and public and community involvement programs.

Aspen Environmental Group — 2001 to present

- **TANC Transmission Project (TTP) EIR/EIS, several Northern California Counties.** Mr. Debauche is currently serving as the Technical Specialist in charge of preparation of the EIR/EIS Transportation/Traffic and Socioeconomics CEQA/NEPA analysis. The Transmission Agency of Northern California (TANC) and Western Area Power Administration (Western), an agency of the U.S. Department of Energy (DOE), are the CEQA lead agency and NEPA lead agency, respectively. The TTP generally would consist of new and upgraded 500 kilovolt (kV) and 230 kV transmission lines, substations, and related facilities generally extending from northeastern California near Ravendale in Lassen County to the California Central Valley through Sacramento and Contra Costa Counties and westward into the San Francisco Bay Area.
- **Alta Wind Project EIR, Kern County, CA.** Mr. Debauche is the Technical Specialist for Transportation/Traffic, Noise, and Air Quality for this EIR. The applicant, Alta Windpower Development, LLC, proposes to develop the Alta-Oak Creek Mojave Project (proposed project or project) for the commercial production of up to 800 Megawatts (MW) of electricity from wind turbines. The proposed project would result in construction of up to 350 wind turbine generators, their ancillary facilities and supporting infrastructure located on three distinct land areas comprising a total of approximately 10,750 acres located approximately 3 miles west of State Route (SR) 14 (Antelope Valley Freeway) and 3 miles south of SR-58 in the Willow Springs area of eastern Kern County.
- **Littlerock Reservoir Sediment Removal Project EIS/EIR, Palmdale, CA.** Mr. Debauche is the Technical Specialist for Transportation/Traffic, Noise, and Socioeconomics for this joint EIS/EIR evaluating the impacts of sediment removal alternatives for the Littlerock Reservoir and Dam on USFS Angeles National Forest (NEPA Lead Agency) lands in Los Angeles County. The project involves impacts to the arroyo toad, extensive coordination with USFWS for a Section 7 consultation, incorporation of new Forest Service Plan updates and requirements into the analysis, preparation of the Forest Service required BE/BA, and analysis of compliance with federal conformity requirements. Aspen is currently working on the Administrative Draft EIR/EIS and assisting the PWD with portions of their Proposition 50 grant application to the DWR.

- **Baldwin Hills Oil Field Community Standards District EIR Review and Ordinance Preparation, Culver City, CA.** Mr. Debauche served as the Technical Specialist for the City of Culver City reviewing the Los Angeles County Baldwin Hills Oils Field Community Standards District EIR Noise analysis evaluating the impacts of expanding the existing Baldwin Hills oil field. Once completed, Mr. Debauche then prepared the Noise section of the newly enacted City of Culver City Community Standards District overlay zone restricting noise generation by the Baldwin Hills Oil Field on the residents of Culver City.
- **Long Beach LNG Import Project, Long Beach, CA.** Under contract to the City of Long Beach, Aspen was tasked to review the Draft EIS/EIR for the proposed construction and operation of this onshore Liquified Natural Gas facility to be located at the Port of Long Beach. Mr. Debauche reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Transportation/Traffic and Noise.
- **Sunset Substation and Transmission and Distribution Project CEQA Documentation, Banning, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for this EIR. The City of Banning proposes to construct the Sunset Substation and supporting 33-kilovolt (kV) transmission line that would interconnect with the City's existing distribution system. The purpose of this new substation and transmission is to relieve the existing overloads that are occurring within the City's electric system and to accommodate projected growth in the City.

California Public Utilities Commission (CPUC). Under Aspen's environmental services contract with the CPUC, Mr. Debauche has prepared environmental analysis sections of environmental reports analyzing large-scale infrastructure projects. His project experience with the CPUC includes the following:

- **Tehachapi Renewable Transmission Project (TRTP) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Debauche is currently serving as the Technical Specialist for Noise and Alternatives evaluation for SCE's proposal to construct, use, and maintain a series of new and upgraded high-voltage electric transmission lines and substations to deliver electricity generated from new wind energy projects in eastern Kern County. Approximately 46 miles of the project would be located in a 200- to 400-foot right-of-way on National Forest System land (managed by the Angeles National Forest) and approximately three miles would require expanded right-of-way within the Angeles National Forest. The proposed transmission system upgrades of TRTP are separated into eight distinct segments: Segments 4 through 11. Segments 1 (Antelope-Pardee) and Segments 2 and 3 (Antelope Transmission Project) were evaluated in separate CEQA and NEPA documents as described below.
- **Devers–Palo Verde 500 kV Transmission Line Project EIS/EIR, southern California/western Arizona.** For this EIR/EIS prepared by U.S. Bureau of Land Management and CPUC, Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for SCE's proposed 250-mile transmission line project from the Palo Verde Nuclear power plant in Arizona to the northern Palm Springs area in California. Major issues of concern include EMF and visual impacts on property values, impacts on the area's vast recreational resources and tribal lands, and the development and evaluation of several route alternatives, including the Devers-Valley No. 2 Route Alternative, which eventually was approved by the CPUC.
- **Antelope-Pardee 500 kV Transmission Line Project EIS/EIR, Los Angeles County, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for SCE's proposed 25-mile transmission line project from the Antelope Substation in the City of Lancaster, through the ANF, and terminating at SCE's Pardee Substation in Santa Clarita. Major issues of concern included impacts to biological, recreational, and cultural resources within Forest lands, EMF and visual impacts on property values, impacts on residences in the urbanized southern regions of the route, and the development and evaluation of several route alternatives.
- **MARS EIR/EIS, Monterey, CA.** Mr. Debauche served as the technical specialist in charge of preparing the Environmental Justice analysis for this EIR/EIS, which would evaluate the effects associated with the

installation and operation of the proposed Monterey Accelerated Research System (MARS) Cabled Observatory Project (Project) proposed by Monterey Bay Aquarium Research Institute (MBARI)[NEPA Lead Agency]. The goal of the Project was to install and operate, in State and Federal waters, an advanced cabled observatory in Monterey Bay that would provide a continuous monitoring presence in the Monterey Bay National Marine Sanctuary (MBNMS) as well as serve as the test bed for a state-of-the-art regional ocean observatory, currently one component of the National Science Foundation (NSF) Ocean Observatories Initiative (OOI). The Project would provide real-time communication and continuous power to suites of scientific instruments enabling monitoring of biologically sensitive benthic sites and allowing scientific experiments to be performed. The environmental justice analysis evaluated the potential for any disproportionate project impacts to both land-based populations and fisheries workers. The CEQA Lead Agency was CSLC.

- **El Casco System Project EIR, Riverside, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for this EIR prepared for the CPUC to evaluate SCE's application for a Permit to Construct (PTC) the El Casco System Project. The Proposed Project would be located in a rapidly growing area of northern Riverside County, which includes the Cities of Beaumont, Banning, and Calimesa. A 115 kV subtransmission line begins at Banning Substation and extends westward toward the proposed El Casco Substation site within the existing Banning to Maraschino 115 kV subtransmission line and Maraschino–El Casco 115 kV subtransmission line ROWs. Major issues of concern include impacts to existing and residential land uses, which have led to the development of a partial underground alternative and a route alternative different than the project route proposed by SCE (the Applicant). The 1,200-page Draft EIR was released for a 45-day public review and comment on December 12, 2007, and evaluates project alternatives at the same level of detail as the Proposed Project analysis.
- **Antelope Transmission Project, Segments 2 & 3 EIR, Los Angeles and Kern Counties, CA.** For this EIR being prepared by the CPUC, Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation. The proposed Project includes both Segment 2 and Segment 3 of the Antelope Transmission Project, and involves construction of new transmission line infrastructure from the Tehachapi Wind Resource Area in southern Kern County, California, to SCE's existing Vincent Substation in Los Angeles County, California. The Tehachapi Wind Resource Area is one of the State's greatest potential sources for the generation of wind energy. A variety of wind energy projects are currently in development for this region. Major issues of concern include EMF and visual impacts on property values, impacts on residences and agricultural resources, and the development and evaluation of several substation and route alternatives.
- **Diablo Canyon Power Plant (DCPP) Steam Generator Replacement Project EIR, San Luis Obispo County, CA.** Mr. Debauche served as the Technical Specialist for Socioeconomics and Alternatives evaluation of this EIR. The EIR addressed impacts associated with the replacement of the eight original steam generators (OSGs) at DCPP Units 1 and 2 due to degradation from stress and corrosion cracking, and other maintenance difficulties. The Proposed Project would be located at the DCPP facility, which occupies 760 acres within PG&E's 12,000-acre owner-controlled land on the California coast in central San Luis Obispo County.
- **SDG&E Miguel Mission Substation Draft EIR.** The major part of the Proposed Project would include the installation of a new, bundled 230 kV circuit between Miguel and Mission Substations, which would be located entirely within SDG&E's existing 35-mile ROW. Mr. Debauche prepared social science analysis for the Initial Study, as well as the Draft EIR Project Description and several key environmental sections.
- **PG&E's Proposed Divestiture of Hydroelectric Assets Project EIR.** Mr. Debauche prepared several key sections of the Draft EIR, including Socioeconomics and Hazardous Materials analysis.
- **Viejo System Project IS/MND, Orange County, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for the project's CEQA documentation, including and Initial Study, prepared on behalf of the CPUC to evaluate Southern California Edison's (SCE) Application for a Permit to Construct the Viejo System Project, which was in SCE's forecasted demand of electricity and goal of providing reliable electric service in southern Orange County. The Viejo System Project would serve Lake Forest, Mission Viejo, and the surrounding areas. Components of the project included, construction of the new 220/66/12 kilovolt (kV) Viejo Substation, installation of a new 66 kV subtransmission line within an existing SCE right-of-way, replacement of 19

double-circuit tubular steel poles with 13 H-frames structures, and minor modification to other transmission lines. Major issues of concern include visual impacts of transmission towers, EMF effects, and project impacts on property values.

- **Looking Glass Networks Fiber Optic Cable Project IS/MND, northern and southern California.** As part of Aspen's ongoing contract with the CPUC for review of Telecommunications projects, this document encompasses and evaluation of project impacts and network upgrades in the San Francisco Bay Area and the Los Angeles Basin Area. Prepared the socioeconomic analysis for this comprehensive CEQA document reviewing the potential impacts of hundreds of miles of newly proposed fiber optic lines throughout northern and southern California, including Los Angeles and Orange Counties.

California Energy Commission (CEC), Technical Assistance in Application for Certification Review. In response to California's power shortage, Aspen is assisting the California Energy Commission in evaluating the environmental and engineering aspects of new power plant applications throughout the State. As part of this effort, Mr. Debauche works as a technical specialist for Transportation/Traffic, Socioeconomics and Environmental Justice, and Alternatives analyses for the following power plant projects:

- **Carlsbad Energy Center Project, Carlsbad, CA.** Technical Specialist for both the Transportation/Traffic and Alternatives Staff Assessment for Carlsbad Energy Center, LLC's Application for Certification (AFC) to build the Carlsbad Energy Center Project (CECP), which will consist of a 558 MW gross combined-cycle generating facility configured using two units with one natural-gas-fired combustion turbine and one steam turbine per or unit. Issues of concern include major incompatibilities with local LORS, and cumulative impacts from widening of I-5.

- **GWF Tracy Combined Cycle Power Plant, San Joaquin County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for GWF's proposal to modify the existing TPP, a nominal 169-megawatt (MW) simple-cycle power plant, by converting the facility into a combined-cycle power plant with a nominal 145 MW, net, of additional generating capacity.

- **GWF Henrietta Peaker Project, Kings County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for GWF's proposal to modify the existing Henrietta Power Plant. New once-through steam generators (OTSGs) will be installed to allow the plant to be operated in its current simple-cycle configuration with no steam generation but with the selective catalytic reduction (SCR) and oxidation catalyst in operation, or to operate as a combined-cycle power plant generating an additional 25 MW of power with new proposed emission limits.

- **CPV Vaca Station Power Plant, Solano County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for CPV Vacaville, LLC (CPVV) filed an Application for Certification (08-AFC-11) seeking authority to construct and operate the CPV Vaca Station (CPVV) project, a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 660 megawatts (MW). The CPVV is proposed for a 24-acre site located at the intersection of Lewis and Fry roads in a rural area within the city limits of Vacaville, Solano County.

- **Kings River Conservation District Community Peaker Power Plant, Fresno County, CA.** Technical Specialist for the Transportation/Traffic Staff Assessment for the Kings Rivers Conservation District, who filed a Small Power Plant Exemption for the King River Conservation District Peaking Power Plant. The proposed 97-megawatt natural gas-fired plant will be located south of the City of Fresno and near the community of Malaga in Fresno County.

- **Lodi Energy Center, Lodi, CA.** Technical Specialist for the Socioeconomics Staff Assessment for a combined-cycle nominal 225-megawatt (MW) power generating facility.

- **Ivanpah Solar Electric Generating System Project, San Bernardino County, CA.** Technical Specialist for the Socioeconomics Staff Assessment/BLM EIS for a 400-megawatt solar thermal electric power generating system. The project's technology would include heliostat mirror fields focusing solar energy on power tower receivers producing steam for running turbine generators. Related facilities would include administrative buildings, transmission lines, a substation, gas lines, water lines, steam lines, and well water pumps. The proposed project would be developed entirely in the Mojave Desert region of San Bernardino County, California.

- **Canyon Power Plant, Anaheim, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a nominal 200 megawatt (MW) simple-cycle plant, using four natural gas-fired combustion turbines and associated infrastructure proposed by Southern California Public Power Authority (SCPPA). This project is a peaking power plant project located within the City of Anaheim, California.
- **Valero Cogeneration Project, Benicia, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a proposed cogeneration facility at the Valero Refinery in Benicia. Issues addressed included impacts on public services and other project-related population impacts such as school impact fees.
- **Rio Linda/Elverta Power Project, Sacramento, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a 560-megawatt natural gas power plant in the northern Sacramento County. Issues of importance included environmental justice and impacts on property values.
- **Magnolia Power Project, Burbank, CA.** Technical Specialist for the Socioeconomics Staff Assessments for this nominal 250-megawatt natural gas combined-cycle fired electrical generating facility to be located at the site of the existing City of Burbank power plant. Environmental justice issues and potential impacts on local economy and employment were evaluated.
- **Avenal Energy Project, Kings County, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a 600-megawatt combined cycle electrical generating facility, and associated linear facilities.
- **Inland Empire Energy Center, Riverside County, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a 670-megawatt natural gas-fired, combined-cycle electric generating facility and associated linear facilities including, a new 18-inch, 4.7-mile pipeline for the disposal of non-reclaimable wastewater, and a new 20-inch natural gas pipeline. The project would be located on approximately 46-acres near Romoland, within Riverside County.
- **Coastal Plant Study.** Technical Specialist for the Socioeconomics Staff Assessments for a possible modernization, re-tooling, or expansion of California's 25 coastal power plants including the Encina Power Plant and the San Onofre Nuclear Power Plant.

Los Angeles Department of Water and Power (LADWP). Responsible for conducting the analyses of the technical and social science issue areas for a variety of EISs and EAs as part of two environmental services contracts. Delivery orders have included:

- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for the CEQA document for this project. The RSC is a major transmission pipeline in the LADWP water distribution system. The existing RSC pipeline's purpose is to transport large amounts of water from the Los Angeles Reservoir Complex and local ground water wells to reservoirs and distribution facilities located in the central areas within of the City of Los Angeles. The LADWP proposed a new larger RSC pipeline to replace and realign the Upper and Lower Reaches of the existing RSC pipeline, which would involve the construction of approximately 69,600 linear feet (about 13.2 miles) of 42-, 48-, 60-, 66-, 72-, 84-, and 96-inch diameter welded steel underground pipeline.
- **Mulholland Pumping Station and Lower Hollywood Reservoir Outlet Chlorination Station Project IS/MND, Los Angeles, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to replace the existing historic pumping/chlorination station building as well as the existing lavatory and unoccupied Water Quality Laboratory buildings with a new single structure pumping/chlorination station within the LADWP's Hollywood Reservoir Complex located in the Hollywood Hills section of the City Los Angeles. These improvements were required due to the age and deterioration of the facility and the potential risk of seismic damage to existing structures. An Initial Study was prepared in support of a City of Los Angeles General Exemption.
- **Taylor Yard Water Recycling Project (TYWRP) IS/MND, Los Angeles and Glendale, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to construct the TYWRP in order to provide recycled water produced by the Los Angeles–Glendale Water Reclamation Plant (LAGWRP) to the Taylor Yard. An important part of the City of Los Angeles' expanding emphasis on water conservation is the concept that water is a resource that can be used more

than once. Because all uses of water do not require the same quality of supply, the City has been developing programs to use recycled water for suitable landscaping and industrial uses. The project is located in the southernmost part of the City of Glendale and northeastern part of the City of Los Angeles. The IS/MND was adopted in the Summer of 2007.

- **DC Electrode Project IS/MND, Los Angeles, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to construct a new electrode distribution line from West Los Angeles to the Pacific Ocean stopping point in Malibu, CA up the Pacific Coast Highway.
- **District Cooling Plant Project, Los Angeles IS/MND, CA.** Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for preparation of CEQA documentation for this project. LADWP proposed to construct a District Cooling Plant and Distribution System (proposed project) in order to provide a centralized system for producing chilled water for use by area users, which are generally large commercial, governmental, industrial and institutional buildings who generate their own chilled water utilizing individual chiller plants for space cooling and air-conditioning.

U.S. Army Corps of Engineers, Los Angeles District. Responsible for conducting the analyses of the social science issue areas for a variety of EISs and EAs as part of two environmental services contracts. Delivery orders have included:

- **Northeast Phoenix Drainage Area Alternatives Analysis Report, Phoenix and Scottsdale, AZ.** Worked with preparation of an alternatives analysis report that evaluated the potential environmental impacts associated with channel and detention basin alternatives to control flooding problems resulting from fast rate of development in the northeast Phoenix area.
- **Murrieta Creek Flood Control and Environmental Restoration Project**. Mr. Debauche served as a technical writer of an Environmental Assessment and Mitigation Monitoring plan for Phase 1 of a flood control and restoration project in Riverside County.

California Department of Water Resources. Responsible for conducting the environmental analyses for CEQA compliance as part of two environmental services contracts. Delivery orders have included:

- **Piru Creek Stabilization and Restoration Project.** The California Department of Water Resources (CDWR) proposes to repair erosion damage at a series of three locations downstream of Pyramid Dam and seismically retrofit the Pyramid Dam access bridge that crosses Piru Creek. Mr Debauche served as technical writer of the Initial Study for this project.

Los Angeles Unified School District (LAUSD), Los Angeles County, CA. Deputy Program manager and Technical writer for several CEQA documents (EIRs and IS/MNDs) being prepared as part of Aspen’s ongoing services contract with the LAUSD to help approve school projects that would meet existing overcrowded conditions in the greater Los Angeles area. Projects have included:

- **New School Construction Program EIR.** Serves as a technical writer for social science issues, including socioeconomics, and population and housing for this Program EIR being prepared for the LAUSD. The LAUSD 2020 Program would provide student seats throughout the LAUSD via a combination of the addition of portable classrooms to existing campuses, modernization and reconfiguration of existing campuses, and the construction of new schools. Mr. Debauche prepared the Noise, Socioeconomic, and Alternative Evaluation of this EIR.
- **East Valley Middle School No. 2 EIR.** Served as a key technical writer for this middle school project proposed to be located at the previous Van Nuys Drive-In site. The EIR focused on impacts associated with air quality, hazards and hazardous materials, noise, land use and planning, and traffic and transportation. Major issues of concern included traffic and noise generated by school operation activities. The EIR included LAUSD design standards and measures employed to minimize environmental impacts.
- **Mt. Washington Elementary School Multi-Purpose Room Addition Project IS/MND.** Served as Deputy Program Manager for this project proposed the development of a multi-purpose room facility, including a library, auditorium, and theater, to the existing Mt. Washington Elementary School campus located in Los Angeles. The surrounding residential community had concerns regarding the proposed

project's impacts on aesthetics, traffic, air quality, and noise. Of particular concern, was impacts generated due to the after-hours use of the multi-purpose room facility by civic and community groups.

- **Canoga Park New Elementary School IS/MND.** Served as technical writer for this elementary school project proposed to be developed on a parcel of land owned by the non-profit organization, New Economics For Women (NEW). This "turn-key" project consisted of a Charter Elementary School to be developed by NEW and sold to the LAUSD for operation. It was later decided that NEW would lease the school back and run it as a charter school. Issues of concern included, pedestrian safety, traffic, air quality, noise, and land use.
- **Hughes Magnet Span School IS/MND.** Served as a technical writer for socioeconomics, hydrology, public services and utilities, and recreational impacts for the proposed re-opening of the existing Hughes Middle School as a Magnet Span School serving up to 1,620 District 6th though 12th grade students. The re-opening of the Hughes Middle School would require the relocation of the existing uses of the campus. The existing Enadia Way Elementary School and Platt Ranch Elementary School would be re-opened for the relocation of these uses.
- **Wonderland Elementary School Portable Classroom Additions IS/MND.** Served as the technical writer of an IS/MND for a proposed addition to the Wonderland Avenue Elementary School, located in the City of Los Angeles. Ms. Walker is responsible for overall coordination and scheduling of the project's environmental review, communications with the LAUSD, senior technical review of all documents produced, presentation during the project's public scoping meetings and hearings, and assurance of public noticing. Served as technical writer of the IS/MND.
- **Pio Pico Elementary School Playground Expansion IS/MND**. Completed a Notice of Preparation, Initial Study, and Administrative Draft EIR for the expansion of a playground at the existing Pio Pico School in the LAUSD. The playground was proposed on five residential properties. One of the residences is a potentially significant historical resource because of its association with an African-American woman journalist, Fay M. Jackson. This project was cancelled by the LAUSD after completion of the administrative draft report. Served as technical writer of the IS/MND.
- **Fairfax Senior High School Portable Classroom Addition IS/MND**. Served as technical writer of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.
- **Polytechnic Senior High School Portable Classroom Addition IS/MND**. Served as technical writer of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.
- **Washington Senior High School Portable Classroom Addition IS/MND**. Served as technical writer of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.

EIP Associates 1998 to 2001

MTA Mid Cities/Westside Transit Corridor Study EIS/EIR. Was a key writer of the EIS/EIR for this 3-phase (including prepared the Major Investment Study (MIS), the Environmental Impact Statement (EIS), and an evaluation of the urban design implications of transit interventions on selected routes) study intended to address current and long range traffic congestion in the central and westside areas of the Los Angeles Basin. Three east/west corridors and a range of transit alternatives ranging including Rapid Bus, light rail, and heavy rail are being evaluated. In addition to preparing several issue area chapters of this comprehensive joint EIS/EIR, Mr. Debauche assisted with the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the land use and socioeconomics sections of the EIS/EIR.

Wes Thompson Ranch Development Project EIR. Served as project writer for this hillside residential development in the City of Santa Clarita. Issues of concern included seismic and air quality impacts associated with the excavation of 2 million cubic yards of soil, the project's non-compliance with the City's hillside ordinance for innovative design, and traffic generated by project-related population growth in the area. Four different site configuration alternatives were developed as part of the EIR analysis. Other issues of concern included sensitive biological resources, the potential for hydrological impacts due to disturbance of the hillside, and cultural resources. As the technical writer for socioeconomics, noise, hazardous materials, air quality, and public services, Mr. Debauche conducted analysis and prepared these environmental sections as well as the project description, alternatives screening and development, traffic assistance, and cumulative scenario for:

City of Santa Monica Environmental Assessments. Was key writer of several environmental assessment documents for housing, commercial, institutional, and mixed-use developments in compliance with CEQA. As the technical writer for socioeconomics, noise, hazardous materials, air quality, and public services, Mr. Debauche conducted analysis and prepared these environmental sections as well as the project description, alternatives screening and development, traffic assistance, and cumulative scenario for:

- **Seaview Court Condominiums IS/MND.** This comprehensive Initial Study/Mitigated Negative Declaration included six technical reports including traffic, cultural resources, parking survey, shade and shadow analysis, and a geotechnical assessment to evaluate the level of severity of this development in the waterfront area of Santa Monica. Major issues of concern were; parking and project-generated traffic on adjacent narrow residential streets; visual obstruction and shading impacts of the proposed structure; liquefaction and seismic impacts to adjacent properties as result of the projsect's excavation for a subterranean parking garage; and the potential impacts of the project to impact the integrity of a historic district and the historic Seaview Walkway to the beachfront.
- **Four-Story Hotel IS/MND.** A comprehensive Initial Study/Mitigated Negative Declaration was prepared for this four-story hotel adjacent to St. John's Hospital in Santa Monica. Major issues of concern included project-generated traffic on surrounding multi-family residential uses and emergency access to the hospital.
- **Santa Monica College Parking Structure B Replacement EIR.** This focused EIR addressed issues related to traffic and neighborhood land use impacts associated with the addition of a 3-story parking structure in the center of the SMC campus. Major issues of concern included the potential for project-generated traffic to cause congestion at the school's main entrance on Pico Boulevard, and the potential for overflow traffic to impact the Sunset Community of single-family homes adjacent to the school.
- **North Main St. Mixed-Use Development Project EIR**. This EIR included evaluation of impacts resulting from the development of a mixed-use development in Santa Monica's "Commercial Corridor" on Main Street, with ground-floor residences and boutique commercial uses. Major issues of concern included traffic and parking impacts to Main Street and surrounding residential land uses, shade and shadow impacts, and neighborhood impacts.

Specific Plans and Redevelopment Projects. As the technical writer for socioeconomics, noise, hazardous materials, air quality, and public services, Mr. Debauche conducted analysis and prepared these environmental sections as well as the project description, alternatives screening and development, traffic assistance, and cumulative scenario for:

- **Cabrillo Plaza Specific Plan EIR in Santa Barbara.** This project consisted a mixed-use commercial development on Santa Barbara's waterfront on Cabrillo Boulevard. On-site uses included an aquarium, specialty retail, restaurants, and office space.
- **Culver City Redevelopment Plan and Merger EIR.** This programmatic EIR evaluated the impacts of the City's redevelopment of its redevelopment zones. A major land use survey and calculation of acreage of redevelopment lands was conducted as part of the EIR.
- **Dana Point Headlands Specific Plan EIR.** This EIR evaluated the development of coastal bluff in the City with hotel, single- and multi-family residential, and commercial uses. Major issues of concern included ground disturbance as a result of excavation, impacts to terrestrial and wildlife biology, recreation impacts to beachgoers, and project-generate population inducement.
- **Triangle Gateway Redevelopment Project EIR in Beverly Hills, CA.** This EIR evaluated the development of a supermarket, retail shops, and office space in the triangle gateway portion of

downtown Beverly Hills. Issues of concern evaluated by Mr. Debauche included traffic, land use, and impacts to on-site historic structures.

- **UCLA Campus Housing Expansion.** This EIR evaluated the development and expansion of campus housing within the UCLA campus. Issues of concern evaluated by Mr. Debauche included hazardous materials and population/housing.

CH2M Hill - Minneapolis, MN 1995 to 1998

- **Minneapolis/St. Paul International Airport Expansion EIS:** Mr. Debauche was a key writer of the EIS for this $4 million technical and environmental study, including the preparation of an Environmental Impact Statement (EIS), and an evaluation of the urban design implications of a proposed $800 million expansion of the existing MSP International airport, including transit and terminal modifications and the inclusion of a new perpendicular runaway. The studies included alternatives to the project and the long-term effects on the cities of Minneapolis and St. Paul. In addition to preparing several issue area chapters of this comprehensive EIS, Mr. Debauche assisted with the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the socioeconomics sections of the EIS. In addition, Mr. Debauche assisted with preparation of a technical report on airport noise effects on nearby housing and mitigation programs for the impacts of the proposed runway.
- **Minneapolis/St. Paul Wastewater Treatment Facility Expansion EIS:** Was a key writer of the EIS for expansion of the existing wastewater treatment facility serving the twin cities area. The studies included alternatives to the project and the long-term effects on the cities of Minneapolis and St. Paul. Mr. Debauche prepared several issue area chapters of this comprehensive EIS, including the Environmental Justice Analysis (per Executive Order 12898), and the socioeconomics sections of the EIS.

PROFESSIONAL ASSOCIATIONS

- American Planning Association (APA), Chapter Member

DECLARATION OF
Paul Marshall

I, **Paul Marshall**, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Protection Office of the Siting, Transmission and Environmental Protection Division as a Senior Engineering Geologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Soil and Water Resources**, and supervised preparation of the staff testimony on **Waste Management**, for the Canyon 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:______________ Signed:__________________________

At: Sacramento, California

Paul D. Marshall

EDUCATION

SAN DIEGO STATE UNIVERSITY, CALIFORNIA
Bachelor of Science Degree in Engineering Geology
Completed post-baccalaureate courses in Engineering Geology

FRESNO STATE UNIVERSITY, CALIFORNIA
Completed post-baccalaureate courses in Civil Engineering

LICENSES

California Registered Geologist, No. 5718
California Certified Engineering Geologist, No. 1817
California Certified Hydrogeologist, No. 468

EMPLOYMENT HISTORY

CALIFORNIA ENERGY COMMISSION
Siting, Transmission, and Environmental Protection Division – Supervisor, Soil, Water Resources, and Waste Management Unit/ January 2008 -Present
Supervise a multidisciplinary team of engineers and geologists responsible for analysis of potential environmental impacts from power plant construction and operation to soil and water resources and from waste management activities. Provide guidance and technical assistance to staff for complex analysis of power plant impacts on water supply, water quality, wastewater disposal, discharges to surface water and groundwater, development and utilization of groundwater, flood impacts and storm water management, and assessment of potential impacts on human health and the environment. Ensures staff work products are consistent with laws, regulations, and policies of the US EPA, US ACOE, SWRCB, RWQCB's, CDFG, DTSC, and other local ordinances. Contract with and direct the work of consultants conducting technical reviews of power plants. Schedule and confer with a multidisciplinary staff of planners, engineers, and scientists to ensure staff analyses are coordinated with other disciplines where there is overlap. Ensure product delivery in a timely manner. Hire and develop staff, complete probationary and performance reports, counsel and mentor staff. Take adverse actions when appropriate.

CALIFORNIA DEPARTMENT OF CONSERVATION
Office of Mine Reclamation – Supervisor, Compliance Unit/October 2006 – January 2008
Supervise a team of engineering geologists responsible for ensuring compliance with mine reclamation plans and specifications. Review and approve staff work conducted to ensure plans and specifications were adequate and enforceable. Direct staff responsible for enforcement actions and preparation of data and reports for presentation to the State Mining and Geology Board. Oversight of staff review of cost estimates for mine reclamation and conduct statewide workshops outlining requirements for mine reclamation cost estimates. Implement Lead Agency review and audit program.

STATE WATER RESOURCES CONTROL BOARD
Division of Financial Assistance – Chief, Project Implementation Unit/January 2001 – September 2006
Supervise a multidisciplinary team responsible for contract and project management associated with Prop 13, Prop 40, Prop 50, Water Bond 1986 and 1996, and the Federal Clean Water Act funding programs. Develop program policies and procedures for implementation and management of grant and loan programs and projects. Direct the work of staff and coordinate with state and federal agencies in the development of technical review criteria for selection of projects recommended for grant award. Direct the work of staff and contractors developing a Project Assessment and Evaluation Program used to evaluate program effectiveness. Provide guidance and technical support to stakeholders for project development. Represent SWRCB at public meetings and conduct training on program procedures. Ensure project integrity and compliance with State and Federal laws.

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Division of Local Assistance - Senior Engineering Geologist/ July 2000 – January 2001

Manage multidisciplinary staff to identify and develop conjunctive water management programs throughout Southern California. Organize, guide, and support local stakeholder groups in development of conjunctive water management plans. Develop partnering opportunities with other local, state, and federal agencies to spread program benefits region-wide and implement CALFED goals and objectives. Write and review contract documents, task orders, grant applications, and provide input on program policy. Solicit and assist agencies with loan and grant applications for various Water Bond 2000 programs.

Division of Safety of Dams - Senior Engineering Geologist/October 1995 – June 2000

Serve as an engineering geology consultant to a staff of 47 design and field engineers performing regulatory oversight of dam construction and operation. Evaluate existing and proposed dam sites for geologic and seismic hazards; review and comment on geotechnical site assessments and construction plans and specifications; act as technical adviser to staff during construction; inspect and document geologic conditions. Communicate findings to staff, consultants, and owners through written reports, briefings, and meetings. Give presentations to DSOD Board of Consultants on development of state-of-the-art procedures. Develop information and monitor changes in the regional geologic environment.

Division of Local Assistance - Associate Engineering Geologist/November 1993 - October 1995

As a member of the Water Quality Assessment Program I independently performed surface and groundwater studies, and environmental site assessments for both DWR and federal and local government agencies. Negotiated contracts, authored task assignments, and oversaw the work of consultants. Authored reports with analysis of data from various types of exploration and sampling programs. Assembled a Department-wide Site Assessment Project Team and assisted in developing DWR policy for site assessments. Trained team members and gave staff presentations outlining program and team goals.

Division of Local Assistance - Associate Engineering Geologist/October 1992 - October 1993

Under the auspices of the Proposition 82 Water Conservation Bond Law of 1988, I directed the Department's technical, environmental, and economic review of ground water recharge and water supply loan applications. Performed independent technical review and certified feasibility and construction loan applications. Provided assistance to public water agencies regarding compliance with environmental and water rights regulations, and institutional and legal requirements for project development. Coordinated Department's technical review and comment on various CEQA documents.

KLEINFELDER, INC.

Project Geologist - 4 years

Worked in regional offices throughout Central and Southern California, Western Arizona and Southern Nevada performing geotechnical investigations and environmental site characterizations. Supervised field exploration activities throughout the Central Valley and Central Coast of California. Directed water resource, groundwater recharge, geotechnical, and environmental site characterization studies. Marketed clients, determined scope of services, and prepared cost proposals. Monitored project schedules and billing. Briefed clients and supervisors on project status. Authored reports providing geotechnical recommendations for various federal, state, municipal, and commercial projects. Inspected remediation and stabilization projects. Other responsibilities included compilation of data using spreadsheets and databases, conducting literature and aerial photograph review, and writing reports.

EARTH SYSTEMS, INC.

Staff Geologist - 3 years

Designed and supervised installation of monitoring well arrays, extraction wells, drains, dewatering, and slope monitoring equipment throughout central and southern California. Directed subsurface exploration using various drilling and geophysical techniques. Conducted liquefaction, fault rupture hazard, and coastal bluff stability studies. Conducted special inspections of excavations, deep foundations, reinforced earth, and concrete. Performed numerical analyses for slope stability, liquefaction, and earthquake ground motion studies. Authored reports containing cross-sections, maps, and graphs presenting various types of water resource and geotechnical data.

DECLARATION OF
Dr. Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection 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 Canyon Power Plant Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: July 14, 2009 Signed:____________________

At: Sacramento, California

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
James Adams

I**,** James Adams declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting, Transmission, and Environmental Protection Division as an Environmental Planner ll.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Visual Resources for the Final Staff Assessment for the Canyon Power Project (07-AFC-9), based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: ____________________ 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 **<u>Environmental Planner</u>**
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 **<u>Energy and Resource Consultant</u>**
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 **<u>Senior Analyst - Safe Energy Communication Council (SECC)</u>**
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 **<u>Principal Consultant - Redwood Alliance</u>**
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
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 Siting Transmission& Environmental Protection 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 Canyon Power Plant based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:__________________________ Signed:__________________________

At: Sacramento, California

Ellen Townsend-Hough

SUMMARY

I am a chemical engineer with over 20 years of experience. My professional career has afforded me many unique growth and development opportunities. Working knowledge of the California Environmental Quality Act. Strength in analyzing and performing complex engineering analyses. Also worked as a policy advisor to a decision-maker for three years.

PROFESSIONAL EXPERIENCE

Writing

- Write letters, memos, negative declarations, environmental impact reports that require technical evaluation of mechanical engineering and environmental aspects of pollution control systems, environmental impacts, public health issues and worker safety.

Technical Analysis and Presentation

- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems

- Review and process compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects

- Provides licensing recommendations and function as an expert witness in regulatory hearings.

- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.

- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure

- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts

Technical Skills

- Establish mitigation that reduces the potential for human exposure to levels which would not result in significant health impact or health risk in any segment of the exposed population.

- Assist with on-site audits and inspection to assure compliance with Commission decisions.

- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.

- Work with the following software applications: WORD, Excel, and PowerPoint.

Policy Advisor

- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission's power plant licensing, research and development and export programs.

- Track and provide research on 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
Steve Baker

I, Steve Baker, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission and Environmental Protection 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 Reliability** and **Facility Design**, and supervised preparation of the staff testimony on **Power Plant Efficiency, Noise and Vibration** and **Geology and Paleontology**, for the Canyon 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:______________ Signed:__________________________

At: Sacramento, California

STEVE BAKER, P.E.
Senior Mechanical Engineer

Experience Summary

Thirty-five 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 6/30/2010

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
Testimony of Dal Hunter, Ph.D., C.E.G.

I**, Dal Hunter, Ph.D., C.E.G.,** declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as an engineering geologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **GEOLOGY AND PALEONTOLOGY** for the proposed **Canyon 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: July 15, 2009 Signed:______________________________

At: Black Eagle Consulting, Inc.
Reno, Nevada

Robert D. Hunter, Ph.D., C.E.G.
Engineering Geologist
Vice President

Education

- Ph.D. – Geology – 1989 – University of Nevada, Reno
- M.S. – Geology – 1976 – University of California - Riverside
- B.S. – Earth Science – 1972 – California State University, Fullerton

Registrations

- Professional Geological Engineer – Nevada
- Registered Geologist – California
- Certified Engineering Geologist – California

Experience

1997 to Present: Black Eagle Consulting, Inc.; Vice President. Dr. Hunter is in charge of all phases of geochemical, geological, and geotechnical projects and is responsible for conducting, coordinating, and supervising geotechnical investigations for public and private sector clients. He is very familiar with design specifications and state and federal requirements.

Dr. Hunter has also provided geological, geotechnical, and paleontological review and written and oral testimony for California Energy Commission (CEC) power plant projects including:

- El Segundo Power Redevelopment Project (Coastal, including testimony and compliance monitoring)
- Magnolia Power Project (including compliance monitoring
- Ocotillo Energy Project (Wind Turbines)
- Vernon-Malburg Generating Station
- Inland Empire Energy Center (including testimony and compliance monitoring)
- Palomar Energy Project
- Henrietta Peaker Project
- East Altamont Energy Center
- Avenal Energy Center
- Teayawa Energy Center monitoring
- Walnut Energy Center (including compliance monitoring
- Riverside Energy Resource Center
- Salton Sea Unit 6 (Geothermal Turbines)
- National Modoc Power Plant
- Pastoria Energy Center
- Sun Valley Energy Project
- El Centro Unit 3 Repower Project
- AES Highgrove Project
- South Bay Replacement Project
- Vernon Power Plant

- Humboldt Bay Repowering Project
- Victorville Power Project
- Carlsbad Energy Center
- San Gabriel Generating Station
- Orange Grove
- Chula Vista Energy Upgrade
- Carrizo (Solar)
- Kings River
- Canyon Power Plant
- Otay Mesa Generating Project (compliance monitoring)
- Montainview Power Plant Project (compliance monitoring)
- Consumes Power Plant (compliance monitoring)
- Sunrise Power Project (compliance monitoring)
- Niland Power Project (compliance monitoring)
- Panoche Power Plant (compliance monitoring)

Attended Expert Witness Training Sponsored by CEC.

1978 to 1997: SEA, Incorporated; Geotechnical Manager, Engineering Geologist. Dr. Hunter was in charge of all phases of geotechnical projects for SEA, including project coordination and supervision, field exploration, geotechnical analysis, slope stability analysis, soil mechanics, engineering geochemistry, mineral and aggregate evaluations, and report preparation. Numerous investigations were undertaken on military, commercial, industrial, airport, residential, and roadway projects. He worked on many geothermal power plants, providing expertise in foundations design, slope stability, seismic assessment, geothermal hazard evaluation, expansive clay, and settlement problems. Project types included high-rise structures, airports, warehouses, shopping centers, apartments, subdivisions, storage tanks, roadways, mineral and aggregate evaluations, slope stability analyses, and fault studies.

1977 to 1978: Fugro (Ertec) Incorporated Consulting Engineers and Geologists; Staff Engineering Geologist; Long Beach, California.

Affiliations

- Association of Engineering Geologists

Publications

- Hunter, 1988, *Lime Induced Heave in Sulfate Bearing Clay Soils*, Journal of Geotechnical Engineering, ASCE, Vol. 14, No. 2, pp. 150-167.

- Hunter, 1989, *Applications of Stable Isotope Geochemistry in Engineering Geology*: Proceedings of the 25th Annual Symposium on Engineering Geology and Geotechnical Engineering.

- Hunter, 1993, *Evaluation of Potential Settlement Problems Related to Salt Dissolution in Foundation Soils*: Proceedings of the 29th Annual Symposium on Engineering Geology and Geotechnical Engineering.

DECLARATION OF
Erin Bright

I**, Erin Bright,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting Transmission and Environmental Protection Division as a **Mechanical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Power Plant Efficiency** for the **Canyon Power Plan 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: July 28, 2009 Signed: ______________________________

At: Sacramento, California

Erin Bright
Mechanical Engineer

Experience Summary

One year of experience in the electric power generation field, including analysis of noise pollution, construction/licensing of electric generating power plants, and engineering and policy analysis of thermal power plant regulatory issues. One year of experience in the alternative energy field, including analysis of alternative fuel production and use.

Education

- University of California, Davis--Bachelor of Science, Mechanical Engineering and Materials Science
- University of California, Davis Extension Program--Renewable Energy Systems

Professional Experience

2007 to Present-- Mechanical Engineer, Energy Facilities Siting Division - California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

2006 to 2007--Energy Analyst, Fuels & Transportation Division - California Energy Commission

Performed analysis of use potential and environmental effects of emerging non-petroleum fuels, including compressed natural gas, biomass, hydrogen and electricity, in heavy and light duty transportation vehicles. Contributor to Energy Commission's alternative fuels plan.

DECLARATION OF
Sudath Arachchige

I, Sudath Arachchige declare as follows:

I am presently employed by the California Energy Commission in the Transmission System Engineering Office of the Systems Assessments and Facilities Siting Division as an Associate Electrical Engineer.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the TSE testimony on 07-31-09 for the Canyon 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.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 07-31-09 Signed: Sudath Arachchige

At: Sacramento, California

Sudath Arachchige
1916 Ackleton Way
Roseville CA 95661-USA **Phone 916-786-6468**

EDUCATION:

Bachelor of Science in Electrical Engineering at California State University Fullerton

ATTAINMENTS:

Member of the Professional Engineers in California Government
Vice President Electrical Engineering Society-California State University Fullerton.

EXPERIENCE:

November-2001 to Present: - Associate Electrical Engineer, System Assessment and Facilities Siting Division, California Energy Commission.
Conduct and perform planning studies and contingency analysis including power flow, short-circuit, stability, and post-transient analysis to maintain reliable operation of the power system. Investigates and analyzes Grid Planning problems and provides appropriate information to Grid Planning Engineers. Develops automated computer programs and other advance analysis methods for comprehensive evaluation of the operational performance of the transmission system.
Understanding of regulatory and reliability guidelines, WECC and NERC planning and operation criteria, CPUC and FERC requirements. Review technical analyses for WECC/ISO/PTO transmission systems and proposed system additions; provide support and analyses associated with Reliability Must-Run (RMR) contracts and the Local Area Reliability Services (LARS) process; review new generation interconnection studies; provide congestion analyses; and provide support for regulatory filings.

June-1998 to November-2001: - Project Electrical Engineer, Design Electrical Engineering Section, Department of Transportation, California.
Electrical Engineering knowledge and skills in the design, construction and maintenance of California state work projects involving all the public work areas; contract administration, construction management, plan checking, field engineering and provide liaison with consultants, developers, and contractors. Plan review in facility constructions, highway lighting, sign lighting, rest area lighting, preparation of project reports, cooperative agreements, review plans for compliance of construction and design guide lines for national electrical code, standards and ordinance. Review process included breaker relay coordination, detail wiring diagrams, layout details, service coordination, load, conductor sizes, derated ampacity, voltage drop calculations, harmonic and flicker determination.

June-1993 to May-1998:- Substation Electrical Engineer, City of Anaheim, California.
Performed protective relay system application, design and setting determination in Transmission & Distribution Substation. Understanding of principles of selective

coordination system protection and controls for Electric Utility Equipment. Understanding of Power theory and Analysis of symmetrical components. Ability to review engineering plans, specifications, estimates and computation for Electrical Utility Projects. Practices of Electrical Engineering design, to include application of Electro-mechanical and solid state relays in Electrical Power Systems. Software skills in RNPDC (Fuse Coordination Program), Capacitor bank allocation program, and Load Flow Program. Design projects using CAD, Excel spread sheets including cost estimates, wiring diagrams, material specifications and field coordination.
Performed underground service design 12kV and 4kV duct banks; pole riser; getaway upgrade; voltage drop calculation, ampacity calculation and wiring diagrams. Design and maintence of substations in City Electrical Utility System. Upgrade Station Light and power transformers; upgrade capacitor banks; replacement of 12kV-4kV power circuits; Breakers at Metal Clad Switchgear. Design one-line diagrams; three line diagrams; grounding circuits; schematics; coordination of relay settings; conduit and material list preparation. Calculation of derated ampacity; inrush current, short circuit current and fault current.

DECLARATION OF
Mark Hesters

I**, Mark Hesters** declare as follows:

1. I am presently employed by the California Energy Commission in the **Strategic Transmission Planning Office** of the Siting, Transmission and Environmental Protection 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 helped prepare the staff testimony on **Transmission System Engineering**, for the **Canyon Power Plant** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_________________________ Signed:__________________________

At: Sacramento, California

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
Ron Yasny

I, **Ron Yasny**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission, and Environmental Protection Division** as a **Planner I**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Compliance,** for the Canyon 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 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: July 15, 2009 Signed:__________________________

At: ________________________

RON YASNY

Planner I

EXPERIENCE SUMMARY

Ron Yasny has twenty five years of experience in project management. He has worked in construction, real estate, and finance since 1980 overseeing construction projects as a general contractor and residential real estate and residential financing as a licensed broker. Ron now works in the Energy Commission's Compliance Unit of the Siting, Transmission & Environmental Protection Division.

EXPERIENCE

March 2007
To Present

Compliance Project Manager – California Energy Commission
Siting, Transmission & Environmental Protection Division

Provides oversight of energy facility construction and operation activities to ensure compliance with conditions of certification. Functions as a team leader for all compliance monitoring activities, processing of post-certification amendments, complaints, and facility closures.

May 1999 -
March 2007

Licensed California Real Estate Broker
Licensed California Mortgage Broker

- Market, negotiate and oversee successful close to sale of real estate transactions.
- Originate and process a wide variety of loans including FHA, VA, B loans, and conventional loans.

September 1986 -
May 1999

Licensed California B-1 General Contractor

- Marketing residential and commercial construction projects and supervising completion of those projects.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE *CANYON POWER PLANT PROJECT*

Docket No. 07-AFC-9

PROOF OF SERVICE
(Revised 2/25/2009)

APPLICANT

Southern California Public Power Authority (SCPPA)
c/o City of Anaheim
Public Utilities Department
Steve Sciortino, Project Manager
201 S. Anaheim Blvd, Suite 802
Anaheim, CA 92805
ssciortino@anaheim.net
swilson@anaheim.net

APPLICANT CONSULTANT

URS Corporation
Cindy Poire, Project Manager
130 Robin Hill Road, Suite 100
Santa Barbara, CA 93117
cindy_poire@urscorp.com

COUNSEL FOR APPLICANT

*Scott Galati
Galati & Blek, LLP
455 Capitol Mall, Suite 350
Sacramento, CA 95814
sgalati@gb-llp.com

INTERESTED AGENCIES

California ISO
e-recipient@caiso.com

INTERVENORS

ENERGY COMMISSION

JEFFREY D. BYRON
Commissioner and Presiding Member
jbyron@energy.state.ca.us

ARTHUR H. ROSENFELD
Commissioner and Associate Member
arosenfe@energy.state.ca.us

Paul Kramer
Hearing Officer
Pkramer@energy.state.ca.us

Eric Solorio
Project Manager
esolorio@energy.state.ca.us

Deborah Dyer
Staff Counsel
ddyer@energy.state.ca.us

Elena Miller
Public Adviser
publicadviser@energy.state.ca.us

DECLARATION OF SERVICE

I, Maria Santourdjian, declare that on October 8, 2009, I served and filed copies of the attached Canyon Power Plant Project's (07-AFC-9) Final Staff Assessment. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/canyon/index.html]**. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(C*heck all that Apply*)

For service to all other parties:

__✓__ sent electronically to all email addresses on the Proof of Service list;

__✓__ by personal delivery or by depositing in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

__✓__ **sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);**

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 07-AFC-9
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Original Signature in Dockets
Maria Santourdjian